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Contents

Section 7. Medicine, Biology & Sport

Arthur T. Johnson, Prakash Chapain, Darnell Slaughter, Sally Gallena and Jafar Vossoughi
Inspiratory and Expiratory Resistances During Exercise 6

S. Shambhu and C. M. Cheshire
Oesophageal Carcinoma: an Atypical Presentation – a Case Report 19

Daniela Tenea and Melanie Louw
Trichoepithelioma Multiplex: a Study of the Relationship between the Anatomical Location and the Histopathological Features 24

A. S. Kamat and A. F. Aliashkevich
Neurosurgical Knowledge of Interns in New Zealand: the Potential for Improvement 40

Shi-Ni Lim, Zaheedah Yahya, Dimphy Zeegers, Thiha Moe Ei Ei Phyo Kyaw, George SH Yeo, M Prakash Hande and Ene-Choo Tan
Distribution of Telomere Length in the Cord Blood of Chinese Newborns..... 47

Alla Gruzdeva, Aleksandr Korneychuk
Evaluating the effectiveness of therapeutic and prophylactic complex in the treatment of generalized periodontitis in elderly men 60

Anatoliy Fomenko, Valeriy Turmanidze, Anton Turmanidze
Factorial structure of coping strategies for skilled Greco-Roman style wrestlers..... 66

Ganna Pechko, Tatyana Zaharovska, Tatyana Novak, Victoria Rozhkova
Features improvement of coordination abilities in runners with hearing impairment on the 400 m hurdles 72

Nina Perederii, Sergiy Dubinin, Nataliia Ulanovskaya-Csyba, Angela Vatsenko, Olena Ryabushko
The impact of seasonal rhythms on morphological status of the gallbladder wall of middle-aged people..... 77

G. Scripkina, A. Pitaeva
Clinical laboratory parameters of the norm in children cariology 85

V. Kurilova, G. Kuzyura
Seeking ways to improve mental performance adolescents in secondary schools 95

E. Dorofeyeva, K. Yarymbash
Health students: features and perspectives of physical rehabilitation in higher education..... 101

Ruska Paskaleva
Isometric training and swimming in children with spinal deformities..... 112

Ruska Paskaleva, Evgenia Hristakieva, Rositza Lavcheva
Rehabilitation programme for surgery of hidradenitis suppurativa..... 120

Ruslana Sushko, Eduard Doroshenko
Professionalization issues of concern as a factor of sports games globalization (basing on basketball)..... 128

Svetlana Malanchuk, Nikolay Popov, Marina Mishina
Conjugacy of cellular and humoral immunity cooperation in experimental generalized purulent-inflammatory process caused by Pseudomonas aeruginosa..... 133

Sergey Trachuk, Vyacheslav Semenenko, Victoriia Biletskaya
Modeling the regimens of physical activity for junior schoolchildren 139

Valery Myasoedov, Maryna Mishyna, Yuliya Mozgova, Nataliia Makieieva, YuriyMishyn
RAMAG action for the prevention of chronic pyelonephritis in infants..... 143

Section 8. Mathematics,Technologies & Engineering

Sumayah F. Rahman, Stephen N. Rudnick, Sonya P. Milonova, James J. McDevitt and Edward A. Nardell
Influence of Bioaerosol Source Location and Ceiling Fan Direction on Eggcrate Upper-room Ultraviolet Germicidal Irradiation 149

M. Balah, G. Elsaeed and M. Hasan
Evaluation Studies for Shore Protection Design 155

H. Farid, F. Erchiqui, M. Elghorba and H. Ezzaidi
Neural Networks Approach for Hyperelastic Behaviour Characterization of ABS under Uniaxial Solicitatio 190

Ahmed Cherifi, Mario Dubois, Mickael Gardoni and Abdelaziz Tairi
A Catalyst Method for an Innovative Eco-Design Strategy Using TRIZ Approach 207

Karina Ramonova, Zamira Karatseva, Robert Gagloev
Research methods of controlling solids in the tails of Norilsk concentrating factory 231

Natalya Derkanosova, Svetlana Schelamova, Olga Vasilenko, Irina Ponomareva, Valentina Gins, Nikolay Derkanoson
Powdered prefabricated yacon as a prebiotic ingredient of bakery products 236

Section 9. Economics

Sriprakash Srivastava and Brajesh Kumar Tiwari
Consolidation in Banking Industry – A Cross Country Experience 243

Satyajit Ghosh and Ioannis N. Kallianiotis
Current Account and Exchange Rate Dynamics in Presence of Risk and Economic Shocks 258

Oon Fok-Yew and Hartini Ahmad
The Effect of Change Management on Operational Excellence in Electrical and Electronics Industry: Evidence from Malaysia 273

Fabio Maria Santucci
Agritourism for Rural Development in Italy, Evolution, Situation and Perspectives 302

Xavier Sales and Jordi Carenys
Case Study on Performance Management. A Comprehensive Approach 321

Venelin Terziev
The system of social services in Bulgaria and the process of deinstitutionalisation of children 338

Tatyana Kononenko, Nadegda Polstyana, Natalya Fedak, Ksenia Kalenik, Viktoria Viktoria Fedak
Analysis of the development of restaurant business in Ukraine 352

Vladimir Khabarov, Vladimir Kabaloev
Strategic tasks of government enterprises 359

Ludmila Matveeva, Anatoly Yarzhemsky, Elena Khadzaragova, Regina Radchenko
Analysis methods for the determination of resistant characteristics of the instrument 365

Lala Hamlet Ismaylova, Mirza Agarza Rzayev
Azerbaijan and the World Trade Organization: the prospect of membership 371

Natalia Shchegoleva
Factor analysis of the Russian online lending market 377

Nikolay Atanasov
Digitalisation and Personalism 385

Oleg Tsepelev, Olga Kolesnikova
To the question of assessing the tax potential of the region using representative tax system 392

Olga Terenteva
Central banks different strategies in official gold reserves management 399

Aliyev Teyyub Gani, Aliyeva Shams Teyyub
Modern conditions of human resources turnover for industrial enterprises of Azerbaijan 405

Section 10. Humanities & Social Sciences

Julianne Wai-Yin Wong, Canon Tong and Anthony Wong
The Mediating Effects of School Reputation and School Image on the Relationship between Quality of Teaching Staff and Student Satisfaction in Higher Education in Hong Kong 412

David F. Samuel and Babalola J. Ogunkola
Elementary Teachers Educational Beliefs and Their Instructional Approaches: In Search of a Meaningful Relationship 446

K. Shivakumara, Sangeetha R. Mane, M. Ravindra, Ravikanth B. Lamani and Ashok A. Pal
Aggression Behaviour of Delinquent and Non-Delinquent Adolescents 477

Marcel Lourel, Nicolas Gueguen and Alexandre Pascual
Complex Systems: Thoughts on the Causes of Nature 491

Yi-chun Pan
Conversation Textbook Assessment: A Critique of Survival English 501

Aleksey Romanov, Larisa Romanova
Communicative construct as 'tunnel window' of media discursive reality 512

Gaukhar Uruzbayeva, Aigul Aitysheva, Anar Valiyeva
The study of attitudes and values of young wedding people 518

Anna Simonyan
Main objectives of psychological problems impacting on the subject-developing environment 524

Hasmik Hayk Harutyunan, Hasmik Hamlet Matikyan
Interrelations of ashough traditions in Kars and Alexandrapol in the second half of the XIXth century 529

Venelin Terziev, Krasimir Enimanev, Svetoslava Enimaneva
Theoretic and methodological aspects of making a model for management of buildings condition..... 533

Venelin Terziev, Krasimir Enimanev, Svetoslava Enimaneva
Factors and a system of models for measuring their impact on the economic efficiency of investment in improving buildings condition..... 574

Venelin Terziev, Veselin Madanski
Guidelines for development of military education system in Bulgaria 610

Venelin Terziev, Ekaterina Arabska
Deinstitutionalisation of children as part of the development of social services in Bulgaria 626

Venelin Terziev, Nikolay Nichev
Research of the value orientation and structural peculiarities of management activitiesofcadets in the course of military professional training..... 646

Venelin Terziev, Nikolay Nichev
Research of the motivation for management activities of cadets in the course of their military professional training 659

Viktor Divak
Formation of architecture and art expansion of art museums 671

Dimitrina Hamze
Grotesque as an Antiform (on the works of Witold Gombrowicz)..... 677

Ekaterina Malysheva
Suggestive specificity of tactile communication..... 692

Elena Galeeva, Irina Galkina
The contents and features of formation of emotional concepts and their verbalization in children of senior preschool age..... 699

Natalya Deputatova, Zubayda Biktagirova
Some features of expressing verbal aggression in mass media 704

Iryna Pogorska
Updating discourse on the problem of co-optation integrative potential in the security dimension of a united Europe..... 710

Liliia Biretska
Communicative competence as an important factor of professional development of a future doctor 716

K. Massenov, S. Ashibekov, A. Bakytbek, O. Beisenaly, A. Amralin, T. Salikhov
Influence of anthropogenous load on the structural state of the soil in the conditions in the dry steppe zone..... 723

Y. Popadiukha, Y. Kopochynska
Ways to improve the quality of professional training in physical therapy and occupational therapy in terms of technical higher educational institutions..... 728

Yury Neduzhko
The Activity of the Ukrainian Diaspora, Authorities and the Public of Ukraine Concerning Lighting Truth and Perpetuate the Memory of Victims of Holodomor of 1932–1933 years 734

Section 7. Medicine, Biology & Sport

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Inspiratory and Expiratory Resistances During Exercise

1. INTRODUCTION

Paradoxical Vocal Fold Motion (PVFM), previously known as Vocal Cord Dysfunction (VCD), is a condition where the vocal folds adduct (close) during inspiration when they should abduct (open), thus decreasing airway patency. Although sporadic case reports have described symptoms suggestive of PVFM in the early literature, the disorder had not gained recognition until the past 15 years. Patients experience breathing difficulty, usually triggered by exercise, and seek medical amelioration [1-2]. They are commonly misdiagnosed as asthmatics, yet they do not respond to asthma therapy. Accurate and timely diagnoses are needed before satisfactory treatments can be developed, but there are presently no standardized methodologies for PVFM assessment [3].

At present, the standard assessment procedure uses a laryngoscope to visualize the vocal cords [4], although other pulmonary function tests have also been used [5-8]. Adduction of the vocal folds is mostly seen during inspiration, but it can continue into expiration as well [9]. However, adduction during expiration alone should not be considered to represent PVFM, because this can be caused by an adaptation to lower airway constriction [9].

Laryngoscopy has not been found to be well tolerated by exercising patients in our clinic. The optical fiber laryngoscope must be positioned deep in the oropharynx for proper visualization, and gagging is common. Although there may be other

triggers for the condition, exercise frequently brings on exercise-induced PVFM (EIPVFM) for those susceptible. EIPVFM may subside soon after exercise ceases, so laryngoscopy must be performed within a very short time after exercise ceases. Whereas other well-trained professionals may be able to administer laryngoscopic measurements during the exercise stage of testing, others, including ourselves, have found it to be nearly impossible to perform during exercise. Thus, we have searched for an alternative means to indicate when EIPVM is likely.

The Airflow Perturbation Device (APD) is an experimental instrument to measure respiratory resistance. It consists of a segmented wheel rotating in the breathing flow pathway [10]. Part of the wheel is open, and part screened, so that, as it rotates, it causes flow to periodically diminish and grow. Measured mouth pressure is also perturbed. The depth of each of these perturbations depends upon two things: resistance of the device and respiratory resistance of the patient. Measuring both mouth pressure and flow easily gives the resistance of the device, so patient respiratory resistance can be obtained noninvasively. Values obtained with the APD are comparable to those measured by impulse oscillometry (IOS), a form of forced oscillation (FO) [11].

The APD is relatively small and easy to use. It requires only about a minute of normal breathing to make its measurement. Of particular interest to PVFM diagnosis, it can separate respiratory resistance during inspiration from that during expiration. Thus, the APD could become a very important noninvasive tool to diagnose PVFM.

However, in order to ascertain the utility of the APD in EIPVFM diagnosis, APD measurements must be compared directly with laryngoscope findings. That produces a physical conflict, because the APD requires a seal with the mouth or nose to measure properly [12], yet the laryngoscope requires access to the throat. One possible means around this conundrum is to measure inspiratory and expiratory resistances immediately before exercise ceases with the APD, and immediately after exercise cessation with the laryngoscope. This procedure could be justified if the APD measured the same resistances immediately before and after exercise stopped. It is the purpose of this study to determine if resistances during inspiration and expiration change or remain the same on either side of the exercise transition. If there is no change, then laryngoscope and APD diagnoses could be directly compared. In addition, measurements of respiratory resistance before, during, and immediately after exercise could be of interest to pulmonologists interested in respiratory mechanics.

2. MATERIALS AND METHODS

Fifteen healthy non-asthmatic male and female subjects aged 18 years or older volunteered for respiratory resistance measurements at rest, during exercise, and at post-exercise rest. All subjects were students at the University of Maryland College Park and the protocol for human testing was approved by the University of Maryland Institutional Review Board. Before each test session, each subject completed a brief Medical History Questionnaire and a Physical Readiness Questionnaire for subject screening purposes. Only subjects presumed fit for exercise were allowed to participate in the test session. All subjects exercised by pedaling on a bicycle ergometer (Life Cycle 9500HR) and respiratory resistance measurements were taken in a seated position while breathing through the APD before, during, and after exercise. They breathed through the mouth only, a nose clip obstructing nasal flow.

The APD used in this study was calibrated for resistance values by comparison with a commercially-available Impulse Oscillometry (IOS) system (Care Fusion Master Screen; San Diego, CA) using a physical mechanical analog of the respiratory system [13]. Because the IOS cannot distinguish between resistances during inspiration from those during expiration, the APD was then calibrated with a three liter syringe (flow) and manometer (pressure) for resistances in both inspiration and expiration directions following the procedure in [10].

2.1 Initial Exercise Calibration

Each subject was tested on the bicycle ergometer prior to the data collection to determine the proper settings to elicit 70% of the subject's predicted maximum heart rate. Subjects were seated on the ergometer which measures the amount of work done and asked to pedal at a rate of 80-90 rpm. The heart rate was monitored using the sensors on the ergometer. The ergometer settings were adjusted until the heart rate reached a steady state value of about 70% of age-predicted maximum heart rate.

2.2 Experimental Session and Respiratory Resistance Measurements

Following the exercise calibration, subjects were allowed to rest for a long enough time for the heart rate to return to normal resting values. The subjects were then

asked to sit on the ergometer and rest while respiratory resistance measurements were continuously acquired and recorded for a minute using the APD and the APD computer program. Subjects were then asked to begin pedaling the ergometer using the predetermined settings that would elicit a heart rate of 70% of age-predicted maximum heart rate. Each subject's heart rate was monitored using the sensors on the ergometer. Subjects exercised on the ergometer for five minutes while breathing through the APD. Pedaling ceased at five minutes, and the post-exercise rest period continued for two and a half additional minutes. The total time for data collection was eight and one half minutes.

2.3 Data Analysis

Individual APD readings exhibit a moderate amount of variability, and this variability can obscure recognition of real resistance changes. At least some of this variability appears to come from dynamic resistance changes of physiological origin in the respiratory system [13]. The APD, when used as a stand-alone device, averages individual readings for about one minute to produce a reasonably stable resistance reading. When used with a computer, however, individual APD resistance readings are accessible, and these were used for this study. To dampen variation of these readings, each reading was averaged over readings obtained for ten seconds, and labeled with the time corresponding to the average time of the ten second sample. Samples overlapped by nine seconds so that an averaged reading was available for each second from time beginning at 5 seconds to time ending at 510 seconds. The number of samples for each of these time intervals varied, because resistance was calculated once for each airflow perturbation, but wheel rotation speed can vary somewhat, especially during the intense breathing of exercise. APD pressure and flow data were collected at 200/sec, but times for perturbations usually slowed during inspiration, when the wheel was pulled closer to the APD body, and became faster during expiration.

Data for the entire cohort of participants were analyzed using the Student's t-test [14]. This test was performed for six conditions: difference of APD inspiratory resistance (R_i) immediately before and resistance immediately after exercise ceased (two readings total, denoted as local differences), and the same for expiratory resistances (R_e); differences of R_i averaged for 30 seconds immediately before and

30 seconds immediately after exercise ceased (60 readings total), and the same for R_e; and differences of R_i averaged for 60 seconds immediately before and 60 seconds immediately after exercise ceased (120 readings total), and the same for R_e. These values of Student's t were compared to two-tailed (sign ignored) tabled values at the p=0.05 level with 14 degrees of freedom [14]. Data for the entire cohort of participants were also analyzed using a t-test with paired means using resistance differences before and after exercise ceased.

In order to investigate whether each individual subject's R_i and R_e immediately before exercise ceased could be considered to be the same as R_i and R_e immediately after, the same ratios as described above for the entire cohort were calculated for each subject. Ratios of sample averages divided by appropriate standard deviations were calculated for three inspiratory and three expiratory conditions: R_i and R_e immediately on each side of exercise cessation (local), R_i and R_e averaged for 30 seconds before and after, and R_i and R_e averaged 60 seconds before and after. Lacking a standard deviation for one local reading, the standard deviation for the entire eight and one-half minute test was used as the denominator for the local ratios, but standard deviations for the 30 second and 60 second ratios used standard deviations calculated for each of these time intervals. It was not appropriate to use a t-test on the local ratios because of the use of the entire sample standard deviation, but the 30 second and 60 second ratios were tested at the p=0.05 level with 58 and 118 degrees of freedom, respectively.

All calculations were performed using the Microsoft (Redman, WA) Excel program.

3. RESULTS AND DISCUSSION

In Table 1 are shown demographic characteristics for the 15 subjects. In general, they were all young, healthy adult college students.

Table 1. Subject demographics. Values given are means ± standard deviation and ranges

Sex	11 male, 4 female
Age (years)	22.3 ± 3.4 (19 to 30)
Height (cm, [in])	173 ± 6.9 cm [68.1 ± 2.7 in] 165 to 185 [65 to 73]
Body mass (kg, [lb])	68.2 ± 8.9 kg [150.1 ± 19.6 lb] 47.7 to 79.1 [105 to 174]

In Fig. 1 is shown a graph of R_i (black) and R_e (gray) averaged for all 15 subjects. Exercise began at 60 seconds and ceased at 360 seconds (each time given by the solid vertical line on the graph). Resistances stabilized while the subjects rested pre-exercise, and increased by about 15% when exercise started. There appears to be some anticipatory increase immediately before exercise began. The trend during exercise was slightly positive for inspiration and somewhat negative for expiration. From the graph, it appears that there is no easily discernible resistance difference in either R_i or R_e at the cessation of exercise, although there was a marked decrease in both at about 30 seconds after exercise ceased. This is about the time that the high breathing flow rates accompanying exercise diminish.

In Fig. 2 are shown data for subject 10. As can be easily noted, the variation of resistance values is more pronounced for this typical subject than it is for the averaged values appearing in Fig. 1. Most of the trends appearing in Fig. 1 are also present here: 1) there is a stable period before exercise began, 2) there was a general increase in resistances once exercising, 3) there were no discernible differences immediately upon exercise cessation, and 4) there was a general decrease about 30 seconds after exercise stopped. There was no appearance of an anticipatory increase before exercise and the general trend for both R_i and R_e during exercise was slightly downward.

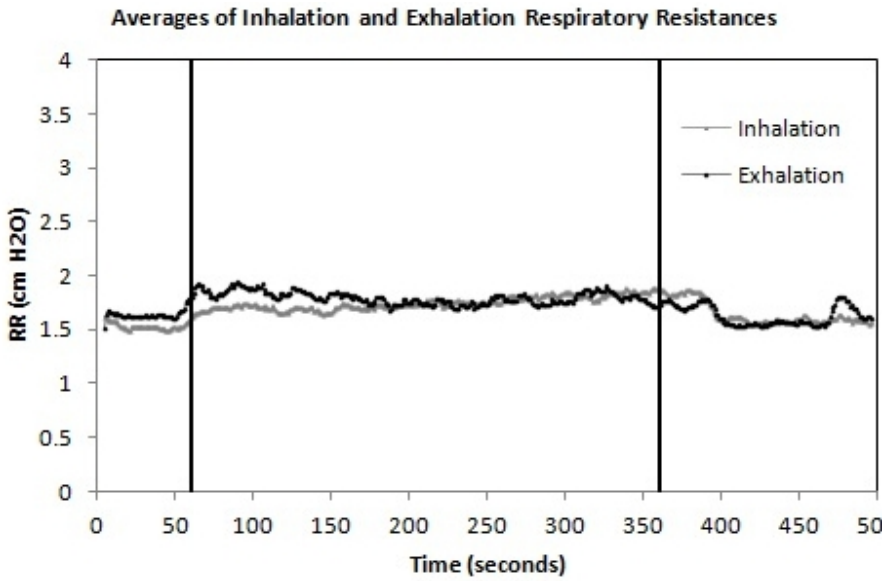


Fig. 1. Inspiratory (black) and expiratory (gray) resistance values averaged over all subject responses. Exercise began at 60 seconds and ended at 360 seconds

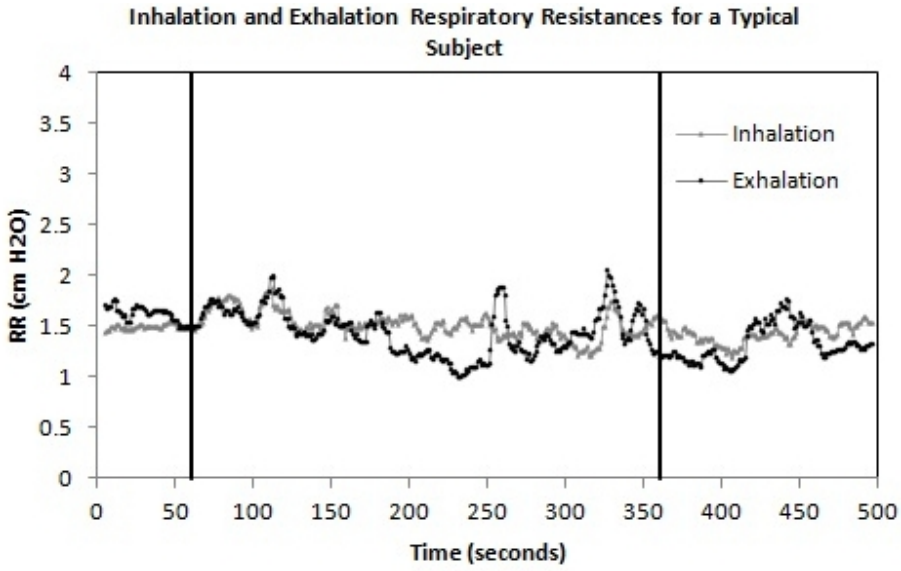


Fig. 2. Inspiratory and expiratory resistance values for subject 10, showing resistance values before, during, and after exercise

Fig. 3 shows the flow rates averaged over all subjects during the test. teady state was only reached toward the end of the exercise period.

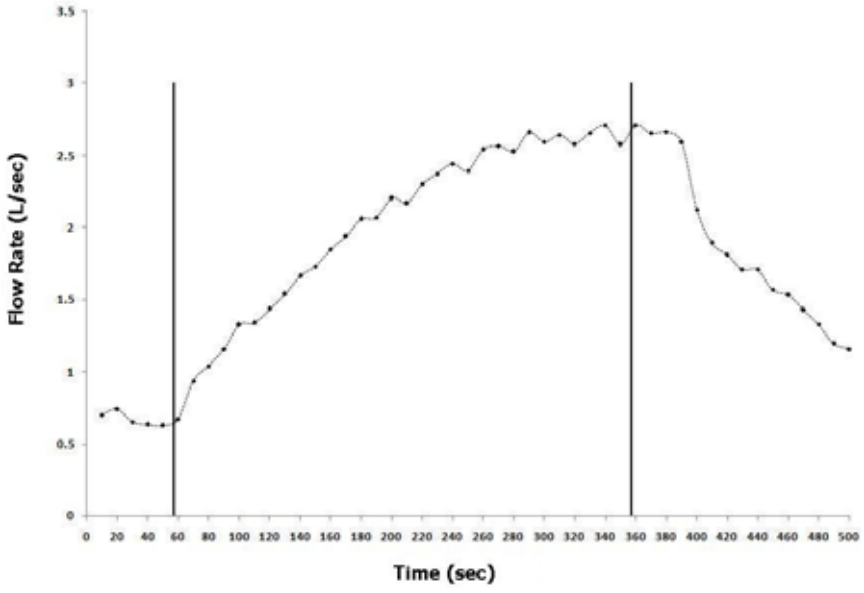


Fig. 3. Ten second averages of flow rates for all subjects

In Table 2 is a compilation of resistance differences to standard deviation ratios for each subject. No t-test run on individual subject data achieved statistical significance at the $P<.05$ level; thus individual subject resistances immediately before

and after exercise ceased can be considered the same. Although no statistical test was applied to the local ratios, they are apparently of the same order of magnitude as are the statistically nonsignificant 30 second and 60 second ratios. All resistance differences are of the order of one standard deviation or less, so resistances before and after exercise ceases will likely be within a small percentage of each other for any given person. There was no apparent trend in these ratios as more samples were averaged. Therefore, averaging resistance readings over 30 or 60 seconds appears to offer no general increase in consistency before and after exercise ceases.

The calculated t values for the entire cohort of subjects for local, 30 second averaging, and 60 second averaging are given at the bottom of Table 2. Shown are the unpaired and paired t-test values. All but one of these values are highly nonsignificant, so it can be expected that resistances for the entire cohort of subjects would show no significant differences before and after exercise ceases. The only value to achieve statistical significance was the inhalation resistance averaged over 60 seconds. This is reasonable when looking at Fig. 1, because average inhalation resistance appears to decrease significantly within 60 seconds after exercise ceases.

Based on the appearance of the data in Fig. 1, it appeared as if there was a significant shift in R_i and R_e as exercise began and also as exercise ceased. Paired observation statistical tests were performed for measurements on either side of the start of exercise and on either side of the end of exercise. For the first test, average R_i and R_e were formed for data appearing from 30 to 60 seconds and from 90 to 120 seconds. These values were compared as paired means with the intent to show whether the resistance increase at the beginning of exercise was statistically significant. The second test compared average R_i and R_e data from 330 to 360 seconds with corresponding data from 400 to 430 seconds. The intent of this test was to determine if the fall in resistances a short time after the end of exercise was statistically significant. Neither test achieved statistical significance. The variances of individual differences were very large, indicating that there was much variation from subject to subject. Some of this variance was caused by differences in response times; some subjects demonstrated the same trends, but the times for increases or decreases varied.

Table 2. Comparisons of sample differences to sample standard deviations at the end of exercise

Subject	Local ratio		30 sec ratio		60 sec ratio	
	Inh	Exh	Inh	Exh	Inh	Exh
1	1.035025	-0.20051	0.107149	-1.01713	0.898039	0.49386
2	0.00697	0.319235	-0.92187	-0.85342	0.537749	-0.89234
3	0.371235	-0.35245	0.965354	1.049834	0.898123	1.032399
4	-0.10916	-0.20051	-0.5316	-1.01713	0.414964	0.49386
5	0.153987	0.248836	-1.229165	-0.21692	0.308876	0.627609
6	-0.087439	0.542369	0.669109	1.298823	1.17987	1.397005
7	0.015388	-0.03211	0.393402	0.180411	1.119952	0.769254
8	0.009647	-0.08688	0.975555	-0.68473	1.234626	0.469874
9	-0.16222	-0.00401	1.688098	1.514769	1.074799	1.548484
10	0.198229	0.221179	0.877892	1.502858	0.428099	1.404698
11	-0.11961	-1.05996	0.735468	0.58048	0.633567	0.683837
12	-0.57798	-0.200511	-1.48109	-1.01713	0.370474	0.49386
13	0.132934	0.037933	-0.2054	0.536175	0.502232	1.196191
14	-0.22245	-0.51396	-0.33075	0.184346	0.811614	1.099917
15	-0.09744	-0.13101	0.002292	-0.04607	0.475427	0.841602
Averages (t value)	-0.07143	-0.05927	0.675099	1.073905	2.306372	1.375362
(paired t value)	-0.07143	-0.05927	0.071429	0.071429	0.159487	0.071429

Whenever statistical significance is obscured by large sample variances, nonparametric tests can sometimes be used instead. One such test is the Wilcoxon Signed Rank Test [14]. Using this test, R_i and R_e differences, both at the start of exercise and after exercise, were found to be statistically significant at the $P<.01$ level.

This study was undertaken mainly to provide evidence to support a procedure that would make the detection and substantiation of EIPVFM as measured with laryngoscope and APD able to be compared. Both require measurements to be taken at the mouth, and each can interfere with the other If not impossible, at least it would be extremely difficult to make both measurements simultaneously. What these results have shown is that APD measurements taken immediately before exercise stops can be compared to laryngoscopic measurements immediately after. Resistance differences for the entire population of subjects tested in this study differ by so little as to be statistically highly nonsignificant. The same is true for individual subjects. Any differences that appear are going to be small and not going to influence conclusions about laryngoscopy and APD comparisons. This applies to both inspiratory and expiratory resistances.

However, although R_i and R_e do not differ significantly immediately at the

cessation of exercise, resistances measured a half minute or more after exercise either begins or ends do change significantly from their former levels. Thus, resistances increase after exercise begins and decrease after exercise ceases, as shown in Fig. 1.

For many years it was believed that airway resistance did not change during exercise because any tendency to decrease would be offset by the effect of increased breathing flow rate [15]. However, de Bisschop et al. [16] measured average respiratory resistance during exercise with an IOS system and found that resistance immediately upon the cessation of exercise was higher than at rest, but lower than what would have been expected with the higher breathing flow rate. They attributed this to reflex bronchodilation during exercise. The transient resistance they measured had disappeared by the time a second resistance measurement was made 90 seconds after exercise stopped. Results from the present study show that both inhalation and exhalation resistances decrease from their high exercise values within 45 seconds of exercise cessation.

Silverman et al. [17] used an APD to measure both inhalation and exhalation resistances at the end of exercise for subjects on a treadmill. They selected resistance values for which the breathing flow rates were within a close range to resting flow rates. Thus accounting for the effects of flow rate on resistances, they demonstrated that both inhalation resistance and exhalation resistance decreased from resting values immediately following exercise. Inhalation resistance changed more than exhalation resistance. Resistances quickly recovered to their pre-exercise values. There were no statistically significant differences between pre- and post-exercise values by 50 seconds after exercise. They were not able to measure resistances changes at the start of exercise.

The results in [17] are consistent with those of [16] and those of the present study. Resistances in Figs. 1 and 2 were not corrected for flow rate differences. These are the resistances that would be measured without selection based on flow rate, as given in Fig. 3. de Bisschop et al. [16] implied that, if they could have corrected for increased exercise hyperpnea, the average respiratory resistances they would have measured would have been lower than pre-exercise values. The conclusion that can be reached is that resistance increases during exercise and decreases after, but this increase is the result of two opposing trends: the augmentation due to flow rate and the diminished resistance due to (probably) bronchodilation.

Normally, one would expect exhalation resistance to be slightly higher than inhalation resistance, at least at rest. This is because of the slight narrowing of the airways during exhalation compared to inhalation. Inhalation resistance is clearly shown to be somewhat larger than exhalation resistance in Figs. 1 and 2. This difference is not maintained throughout the exercise period.

To be clear about this study and its results, this study does not present a new replacement method for the diagnosis of exercise-induced paradoxical vocal fold motion (EIPVFM). If such a method comes about, it must be the result of careful and deliberate study. The APD could possibly become an important part of a new diagnostic method, but only after many careful steps. This is only the first of those steps. There is a problem that we have seen in applying laryngoscopic imaging to exercising patients, and an alternative may be more appropriate if it can be established that its indications are valid. The APD provides a pulmonary function measurement capability that has not previously been available to practitioners: the ability to easily measure respiratory resistance directly and separated into inhalation and exhalation phases. Spirometry does not do this and neither does forced oscillation. But, if it is to be used during exercise, then the APD must be validated for such use. If APD results are to be compared to those from the laryngoscope, then we must be sure that respiratory resistances do not change during the transition time from one measurement to the other. The results of this study confirm that respiratory resistances in normal subjects do not change immediately after exercise ceases. That is what this study has shown, and that is all this study has shown. Anything further must be tested in additional studies.

Clinical Significance: Measurements of respiratory resistance and vocal cord images during or immediately following exercise, which both require exclusive access to the mouth, cannot be made simultaneously, but this study demonstrates that both measurements can be made sequentially without loss of accuracy, as long as the two measurements are made within 30 seconds before and after the cessation of exercise. Measurements made with the APD, or other respiratory resistance measuring device, just before exercise ceases can be directly compared with laryngoscope images made soon after exercise cessation.

4. CONCLUSION

Both inspiratory and expiratory resistances increase at the start of exercise and decrease soon after exercise ceases. There is no statistically significant difference in either of these two resistance measurements immediately before and after exercise cessation.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

ACKNOWLEDGEMENTS

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COMPETING INTERESTS

The authors have no competing interests.

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Oesophageal Carcinoma: an Atypical Presentation – A Case Report

1. INTRODUCTION

Oesophageal carcinoma typically presents with dysphagia and weight loss [1], but naturally there are atypical cases also. Oesophageal carcinoma is the 9th commonest cancer worldwide with an annual incidence of 7300 cases in the United Kingdom [2] with smoking and alcohol each increasing the risk of developing the cancer fivefold. In terms of presentation the elasticity of the oesophagus means that around two-thirds of the lumen needs to be obstructed to produce dysphagia. Untreated, the tumour tends to be locally invasive and can eventually metastasise to the liver, lungs, bone and nervous system causing breathlessness in rare cases as a manifestation of a malignant pleural effusion. Treatment options include surgery and radiotherapy but the overall 5-year survival rates are approximately 20-25% for all stages [3].

Published epidemiological data regarding the presentation of oesophageal carcinoma is very scarce with no concrete figures for those that may present with respiratory signs. The authors here present a case of oesophageal carcinoma that presented with acute respiratory distress.

2. CASE

A 62-year-old Caucasian male presented to the Emergency Department after an episode of sudden collapse earlier that day. Presenting signs included extreme dyspnoea and wheeze of sudden onset with no apparent trigger. On further enquiry he had no respiratory history and his only risk factor was the fact he was a chronic

smoker. A recent weight loss of 6 kg over the previous 8 weeks was also noted. He was apyrexial but tachycardic with a respiratory rate of 24. On examination patient was in severe respiratory distress using all his accessory muscles and unable to speak in full sentences with chest auscultation revealing poor bilateral air entry but no crepitations. The clinical diagnosis at this stage was acute exacerbation of a first presentation of chronic obstructive pulmonary disease. Arterial blood gases on high flow oxygen (60%) revealed an acidosis (pH 7.29) with a degree of CO_2 retention (7.91 kPa). However these improved on 24% oxygen to pH 7.40 and pCO_2 of 5.40kPa respectively. Haemoglobin was 16.0g/dL and white cell count was 12.6 x 10 /L. Renal and liver function tests were normal. A chest radiograph revealed hyper inflated lung fields but nothing else of note.

The patient was initially managed with a course of intravenous antibiotics, steroids and regular nebulisers and his condition improved. The sudden sporadic nature of his symptoms together with the recent weight loss led one to the possibility of intermittent obstruction caused by a tumour in a main bronchus. A respiratory opinion was sought and subsequent bronchoscopy proved normal which now pointed to a possible diagnosis of acute laryngeal spasm. A CT (computed tomography) scan booked as next line investigation revealed a 3.6 x 3.2 cm mass with a density of 58 (soft tissue) causing partial mid-oesophageal obstructions with an air fluid level at the level of the carina (Fig. 1). No mediastinal lympadenopathy was seen and no surrounding fat stranding was seen at this level either. The lungs and visualised bones were unaffected and there was no evidence of metastasis or infiltration to any surrounding thoracic or abdominal structures. A subsequent barium swallow revealed there to be a 5cm irregular tight stricture in the subcarinal oesophagus with a positive apple core sign and pooling of contrast with food residue being noted also. An urgent gastroscopy showed a tight stricture beginning at 30 cm from the incisors through which the scope was unable to pass without revealing any other possible features to explain these atypical presenting symptoms. Six biopsies were taken from the site all measuring 0.2-0.4 cm each. The biopsies comprised of oesophageal mucosa and clot that was confirmed histopathologically to be squamous cell carcinoma grade G2. The tumour cells were confined to the superficial layer of the oesophagus and determined to be stage IB. Following informed

discussion of the potential treatment options with the patient he opted for a course of radiotherapy.

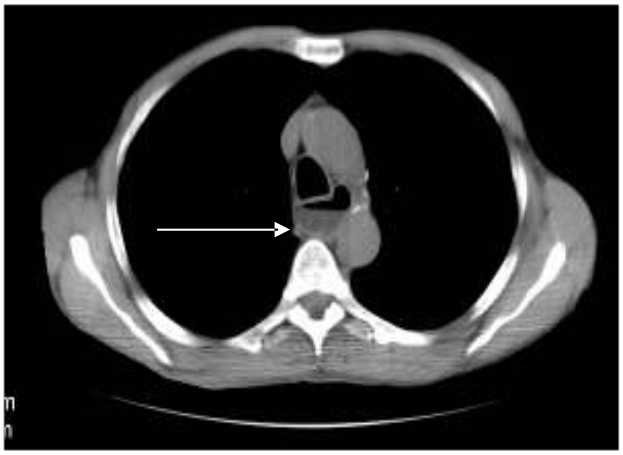


Fig. 1. CT Thorax indicating oesophageal mass (arrow)

3. DISCUSSION

The sudden sporadic onset of respiratory symptoms in this case with no prior respiratory history perplexed many of the physicians involved. Galandiuk et al. [4] have reported that dysphagia (80-90% of patients); vomiting (50%) and pain (45%) are the commonest presenting symptoms of oesophageal carcinoma but the reported patient presented with none of these. Indeed here the normal bronchoscopy findings pointed to a diagnosis of acute laryngeal spasm as the cause of the patients' respiratory symptoms in keeping with previously reported cases [5] Literature searches have revealed cases of airway obstruction [6] due to oesophageal carcinoma but they have all been caused by oesophagotracheal fistulas which this patient did not have [7].

In this case the patient presented with bizarre sudden respiratory distress sufficient to cause collapse. A respiratory cause was sought but all tests including bronchoscopy proved normal. The eventual diagnosis of oesophageal carcinoma is highly unusual in that the patient did not present with the typical symptoms. In retrospect further discussions with the patient revealed that he had avoided certain foods that had caused him to wheeze but he was never investigated for this. The

authors surmise that the sudden respiratory symptoms were due to acute laryngeal spasm secondary to overspill caused by the oesophageal tumour and this gave the picture of hypercapnoeic respiratory failure present on the initial results. The acute laryngeal spasm is highly likely to be linked in this way to the oesophageal carcinoma diagnosed by subsequent CT scan.

4. CONCLUSION

Doctors may encounter several patients with acute respiratory symptoms but subsequent investigations focused on finding a respiratory cause fail to reveal any pathology. In such cases repeated evaluations of the patient must include alternative pathologies in anatomical areas closely related to the respiratory system. Physicians should be cautious to label any patient with acute dyspnoea as having a respiratory cause without any definitive respiratory past medical history.

CONSENT

All authors declare that written informed consent was obtained from the patient for publication of this case report and accompanying images.

ETHICAL APPROVAL

Not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Trichoepithelioma Multiplex: a Study of the Relationship between the Anatomical Location and the Histopathological Features

1. INTRODUCTION

Trichoepithelioma multiplex (TEM) is a rare, benign cutaneous geno-dermatosis, best classified as poorly differentiated hamartomas of the hair germ (trichogenichamartomas). In the latest WHO classification [4] trichoepithelioma is regarded as a variant of trichoblastoma.

Since the original description of multiple trichoepitheliomas in 1892 by Brooke and Fordyce, much controversy existed about its histogenesis and biological behaviour [1, 2, 7, 9, 24] The most accepted view is that multiple trichoepitheliomas develop from the undifferentiated germinative cells of folliculo-sebaceous-apocrine units that show varying degrees of follicular differentiation [10]. The genetic basis of TEM remains elusive. Half of the cases are sporadic. Familial cases show autosomal dominant inheritance with the onset of the disease around the puberty [3, 9, 24].

TEM shows a distinct clinical appearance consisting of multiple skin coloured papules and nodules with a predilection for the central face. The condition was reported mainly in Caucasians. There were few reports in Oriental and African patients [15, 16, 17].

The course is usually benign. Complications were seldom reported (ulceration, infection, malignant transformation). Despite being benign, multiple trichoepitheliomas pose cosmetic and sometimes functional problems.

Treatment modalities are limited, with inconsistent results and frequent recurrences.

The current study aims to demonstrate whether significant histological differences exist among the trichoepitheliomas located in different body areas.

To the best of our knowledge there are no comparable data in the medical literature, particularly in patients with dark skin.

2. MATERIALS AND METHODS

The study was conducted during the period 1995-2008 at two tertiary hospitals in Pretoria area.

Eight patients were seen prospectively, 12 were assessed retrospectively.

Sixty four H & E stained sections from lesions located in different body areas were examined according to 16 histological parameters for the evidence of follicular differentiation (follicular structures, keratinous cysts, papillary mesenchymal bodies) and features useful in distinguishing trichoepitheliomafrom BCC (stromal retraction, peripheral palisading, tumor necrosis, ulceration, brisk mitotic figures) (Adnexa1).

Special stains were employed in 17 of 20 cases for the demonstration of mucin (PAS, Alcian blue), amyloid (Congo red), calcium (Von Kossa) deposits and epithelial structures (AE1/AE3- CK antibodies). Because of the lack of adequate archival tissue blocks for 3 cases, special stains were not attempted.

3. RESULTS

The study showed that trichoepithelioma multiplex was an uncommon diagnosis (20 patients entered the study).

African patients were preponderant (16 vs. 4 Caucasians) with a slight male predominance (11 males / 9 females). There was a wide age range at the time of diagnosis (13 to 74 years) with a mean age of 33 years.

The majority of the patients reported the onset of lesions at puberty.

Most of the analysed cases were sporadic (15 patients). A positive family history was identified in 3 families (5 patients). African male patients and familial cases were more severally affected (Fig. 1; Fig. 2a-2b). Thirty skin specimens were collected from the face, 13 from the scalp, 13 from the back and 8 from the neck. The face was affected in all cases, followed by scalp, back, and neck.



Fig.1. Young African man with severe disease (sporadic case)



Fig. 2a. Multiple familial trichoepitheliomas: brother and sister



Fig. 2b. Multiple familial trichoepitheliomas: mother and daughter

Note the large nodule on the forehead with telangiectatic, erosive surface covered with crusts

The analysed skin specimens showed variable histopathological patterns ranging from a lace-like network or a cribriform pattern seen mainly on the face and scalp, to a solid pattern (islands and strands of monomorphousbasaloid cells seen chiefly on the neck and upper back [Fig. 3a]. Deeply sited tumors with a desmoplastic pattern were found in 3 cases [Fig. 3b].

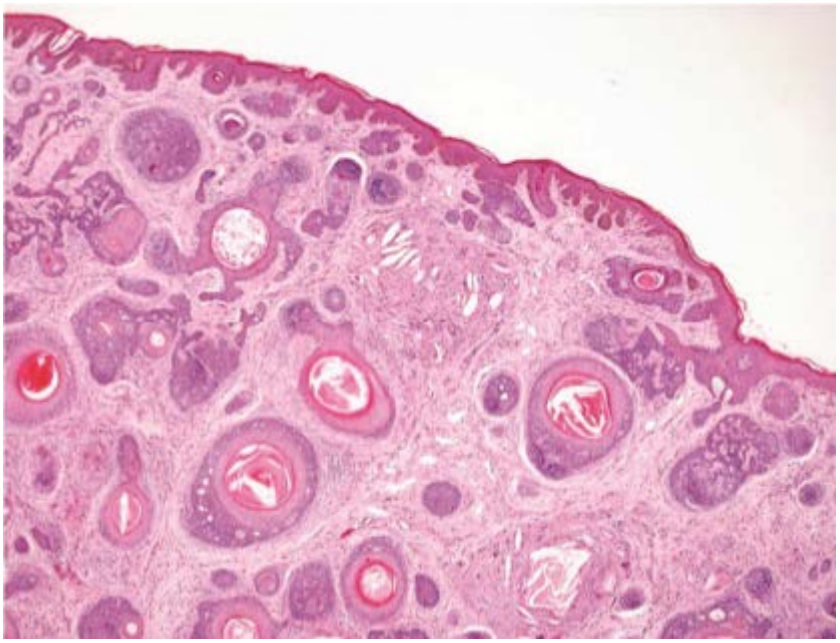


Fig. 3a. Low power view of a pattern characterized by the presence of many keratinized cysts and granulomatous foreign body reaction

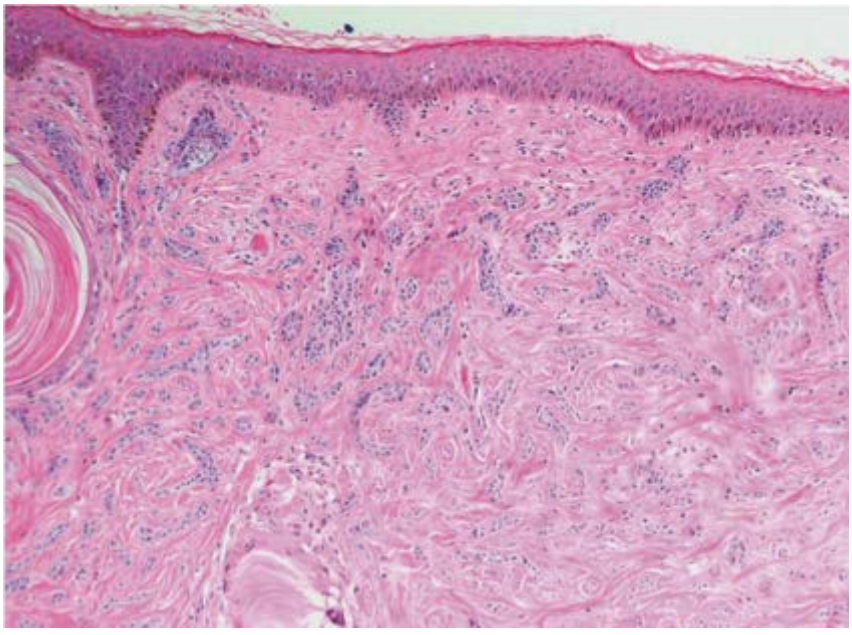


Fig. 3b.Desmoplastic trichoepithelioma

Considerable overlap between these patterns was seen resulting in a mixed histological picture.

Nearly all examined trichoepitheliomas (with the exception of 4 cases) regardless of their anatomical location, exhibited at least a hint of follicular differentiation, usually in the form of follicular germs and papillae (limited differentiation). In 28 of 64 examined specimens, the tumour aggregates assumed a more advanced degree of follicular differentiation especially lesions from the scalp and back.

Papillary mesenchymal bodies (PMB), usually common in trichoepitheliomas varied in size, shape and number. A striking difference was not found in relation to the anatomical location of the tumours [Table 1].

Keratinous cysts were present in a variable numbers and sizes in both lobules and stroma in 56 of 64 biopsies. Numerous small keratinous cysts were seen in all facial lesions (Fig. 3a). When present, large keratinous cysts were demonstrated on the upper back and neck. The scalp showed a variable number (few-to-many) and size (small-to-large) of keratinous cysts.

The vast majority of the tumour aggregates showed focal peripheral palisading of their basaloid cells (29/64); this was more evident in the lesions from face (17/30). A continuous pattern of palisading was demonstrated in deeper and larger tumours (21/64) mainly from the back (9/13).

A fibrotic stroma was demonstrated in 34 specimens (especially the lesions excised from the face (14/30) and back (13/13).

A predominantly fibromyxoidperitumoralstroma was seen on the scalp and neck (22 biopsies).

Stromal retraction from the tumour aggregates was lacking in 33 biopsies and was focally present in 27 biopsies, majority from the face (18/30).

A continuous artefactual clefting surrounding the tumour islands was seen in 4 cases, all from the face.

A sparse interstitial inflammatory infiltrate consisting predominantly of lymphocytes, with occasional plasma cells and histiocytes was seen in 28/64. Granulomatous foreign body reactions were identified in 27/64 biopsies. They were common in lesions showing many keratinous cysts in close proximity to ruptured cysts [Fig. 3a]. The reactions predominated on the face (13/30), followed by the scalp (9/13), back (4/13) and neck (1/8). However, they were more severe on the scalp.

Relevant histological findings regarding the deposition of mucin, calcium, amyloid within the tumour and/or in the stroma / foreign body granulomas are summarized in Table 1.

Table 1. The site of the lesions

Histopathological Parameters		Face	Scalp / Behind the Ear	Neck	Upper Back
1	*Epidermal continuity*	Present: 20/30 Focally present: 8/30 Absent: 2/30	Focally present: 4/13 Absent: 9/13	Absent: 8/8	Absent: 13/13
2	*Follicular structure formation*	Present: 8/30; Attempts:18/30 Absent: 4/30	Present: 12/13 Attempts: 1/13	Present:2/8 Attempts: 6/8	Present: 6/13 Attempts: 7/13
3	*Horn cysts*	Present in all ; variable sizes (S→L) ; small cysts predominate	Variable size (S→L) and number (few →many)	Variable size (S→L) ; large cysts predominate; few	Absent: 9/13 Present: 4/13 (large cysts predominate)
4	*PMBs*	Variable: absent to many	Attempts predominate 1-2 PMB present in each specimen	Attempts of PMB formation > well- formed PMBs	PMB: absent Majority: occasional attempts
5	*Peritumoral stroma*	Fibrotic : 14/30 Fibromyxoid : 11/30 Myxoid : 5/30	Fibrotic : 5/13 Fibromyxoid : 6/13 Myxoid : 2/13	Fibrotic : 2/8 Fibromyxoid : 5/8 Myxoid : 1/8	Fibrotic stroma : 13/13)
6	*Stromal retraction*	Absent : 8/30 Poorly formed : 18/30 Continuous : 4/30	Absent : 9/13 Poorly formed : 4/13	Absent : 5/8 Poorly formed : 3/8	Absent : 11/13 Focally present : 2/13
7	*Tumor pattern*	Mixed (nests, strands, cribriform, small solid aggregates)	Considerable variation (lace-like / cribriform pattern to strands/ solid pattern	Solid pattern > lace-like	Solid pattern > lace-like (small islands/nests in a desmoplastic stroma
8	*Palisading of basaloid cells*	Focally present : 17/30 Continuous : 8/30 Absent : 5/30	Discontinuous : 7/13 Well formed : 4/13 Absent : 2/13	Focally formed : 3/8 Absent : 5/8 Continuous : not seen	Partially formed : 2/13 Well formed : 9/13 Absent : 2/13
9	*Mucin deposition*	PAS+ T > S : 17/23 Alcian blue + S > T : 6/23 Lacking stains: 7 Bx.	PAS+ T > S : 8/12 Alcian blue + S > T : 4/12 Lacking stains: 1 Bx	PAS+ T > S : 4/6 Alcian blue + S > T : 2/6 Lacking stain: 2 Bx	PAS + S >T : 9/11 Alcian blue T > S : 2/11 Lacking stains : 2 Bx
10	*Calcifications*	Focal deposits: 10/23 Absent : 13/23 Not performed : 7/23	Large cyst contents : 7/12 Absent : 5/12 Not performed : 1 case	Absent : 5/6 Focally present : 1/6 Not performed in 2 cases	Present : 6/11 Absent : 5/11 Not performed: 2 cases
11	*Amyloid deposition*	Absent	Stromal deposition: 1/13	Absent	Absent

Table 1 continues …

12	*AE1/AE3 antibodies*	Highlighted all epithelial structures, tumor islands and PMB regardless of the anatomical location (Fig. 5)			
13	*Tumor necrosis*	Absent	Absent	Absent	Absent
14	*Inflammatory infiltrate*	Present : 10/30 Minimal : 12/30 Absent : 8/30	Present-mild : 5/13 Present-moderate : 7/13 Absent : 1/13	Present-minimal : 4/8 Present - moderate : 1/8 Absent : 3/8	Present-minimal: 7/13 Heavy : 3/13 Absent : 3/13
15	*Foreign body reaction*	Lack of FBR in 20/30 Present : 10/30 Heavy FBR : 3/10	Absent: 8/13 Present : 5/13 Heavy FBR : 4/5	Absent : 7/8 Present - mild : 1/8	Absent : 9/13 Present – mild : 4/13
16	*Mitoses*	Absent : 14/30 Rare : 12/30 Common : 4/30	Absent : 5/13 Scattered : 6/13 Common : 2/13	Absent : 5/8 Rare : 2/8 Common : 1/8	Many : 6/13 Rare : 3/13 Absent : 4/13

Abbreviations: T = tumour; S = stroma; FBR = foreign body reaction; Bx = biopsy

No tumor necrosis, cytological atypia or significant mitotic activity could be demonstrated in this study. Trichoepithelioma was seen in close relation to a benign pigmented intradermal nevus in one specimen [Fig. 4a and 4b] and in two elderly Caucasians, trichoepithelioma was found adjacent to a BCC.

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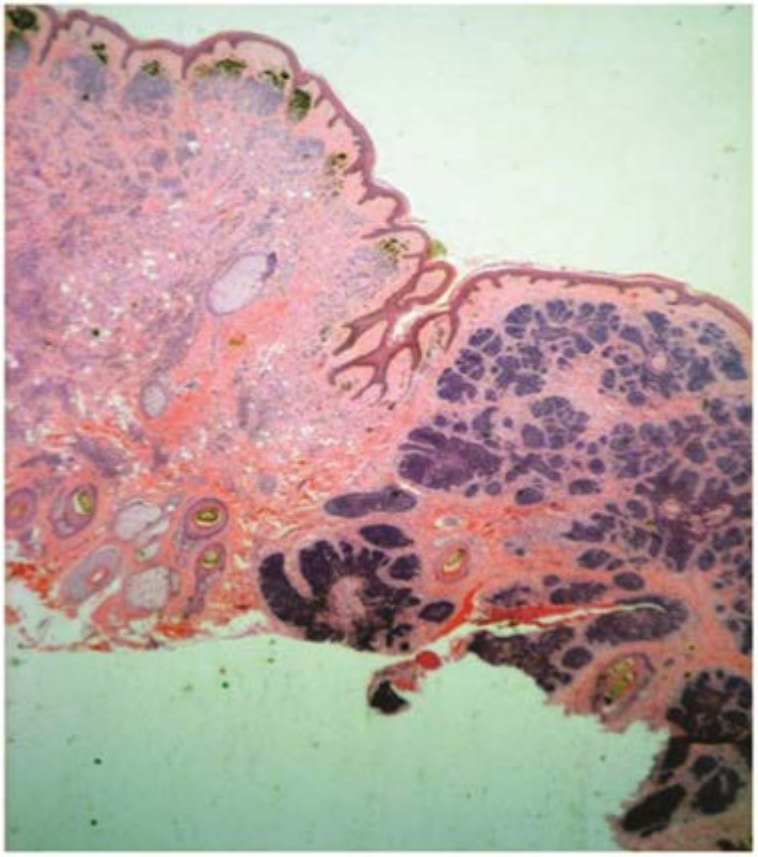


Fig. 4a. Combined trichoepithelioma and a pigmented intradermal naevus in a patient with TEM

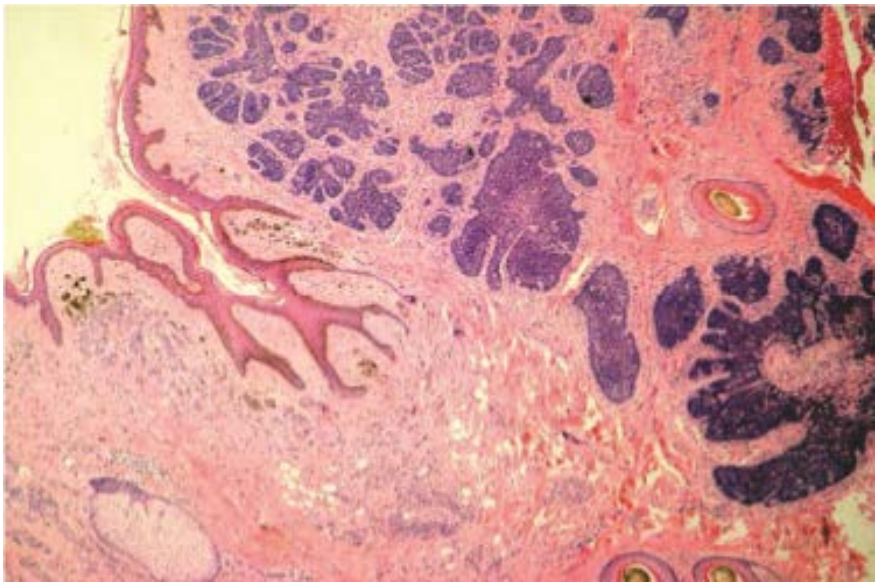


Fig. 4b. Higher magnification of figure 4a

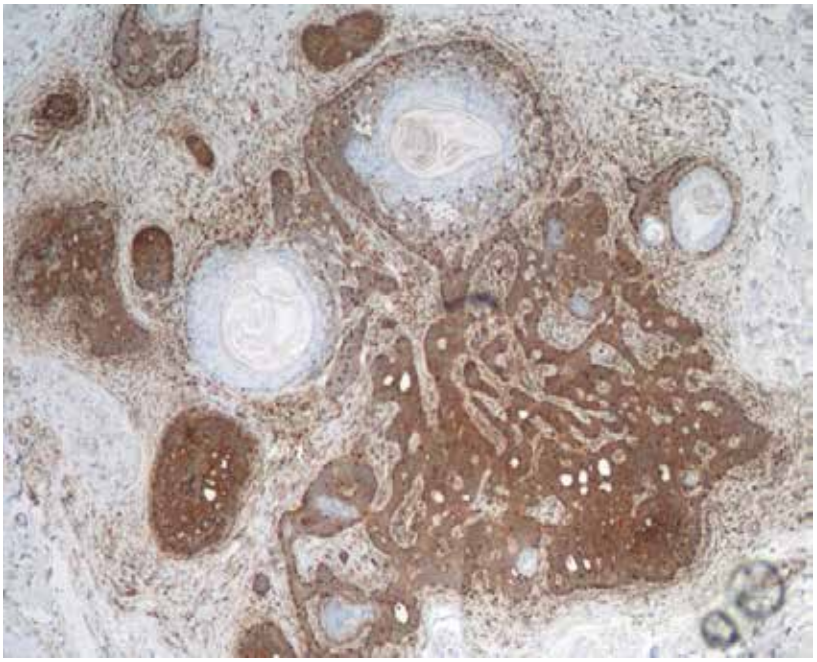


Fig. 5. AE1/AE3 antibodies highlighting epithelial structures, tumor islands and papillary mesenchymal bodies

4. ADNEXA I

Relevant features analysed in this histopathological review were as follows:

1. Epidermal continuity: assessed as present / absent.
2. Follicular structure formation: present / absent.
3. Keratinized cysts: variation in size, number; present / absent in stroma or in tumour.
4. Papillary mesenchymal bodies (PMB): present / absent.
5. Quality of peritumoralstroma: fibrous, myxoid, fibromyxoid.
6. Stromal retraction defined as the presence of clefts between the aggregates of neoplastic cells and stroma: graded as absent, focal or common.
7. Tumour pattern assessed as: lace-like or retiform, solid nests/islands, strands, cribriform.
8. Palisading of peripheral basaloid cells: present/absent.
9. Mucin deposition: present / absent, within the tumour islands or within the stroma (highlighted by PAS and Alcian blue stains.
10. Calcification: present / absent (in the tumour, in stroma, in the

foreign body reaction). Calcium deposits were highlighted by Von Kossa stain).

11. Amyloid deposits: present / absent (highlighted by Congo red stains).

12. Anti-CK AE1/AE3 antibodies used as a pan-specific cocktail of antibodies for tumour keratins to highlight the epithelial origin of trichoepithelioma as an aid to conventional histopathology.

13. Tumour necrosis and ulceration: present / absent.

14. Inflammatory response: present / absent.

15. Foreign body giant cell reaction: present / absent.

16. Mitotic figures graded semi-quantitatively as rare or common and qualitatively as cytological atypia: present / absent.

5. DISCUSSION

Trichoepitheliomas are benign cutaneous adnexal neoplasms showing poor differentiation toward follicular germinative cells and specific follicular stroma [3,7].

A family history with an autosomal dominant inheritance is usually evident in 50%-60% of the patients [8, 9, 24].

In our study however, the majority of the cases were sporadic (15 patients) with only 3 families being affected.

Whereas some early studies of patients with multiple familial trichoepitheliomas [5] suggested a role of the PTCH gene, recent studies [6,7] identified mutations in CYLD gene on chromosome 16, a gene responsible for 3 clinically distinctive genodermatoses: Familial Cylindromas, Brooke–Spiegler Syndrome, Multiple Familial Trichoepitheliomas, suggesting that these syndromes not only share a common genetic basis, but may represent phenotypic variations of the same disease [8].

Trichoepitheliomas may be also part of a constellation of rare syndromes such as: Rombo syndrome, Bazex syndrome, Rassmussen syndrome [9, 11, 12, 13].

A review of familial cases of TEM indicated no consistent associated systemic anomalies such as those described in the above mentioned syndromes [14].

In our study, only one case presented Tuberous Sclerosis as a relevant medical history.

A male predominance in this study, contrasts with the general view of decreased male penetrance and expressivity [9, 14].

Similar to other studies [9, 10, 14] the majority of the patients, reported the onset of the lesions during the childhood, with a peak at puberty. Our youngest patient was a 13 year-old African boy with the onset of the lesions at the age of 9 years.

The patients presented a wide variation of clinical involvement, but unusual configuration such as linear, dermatomal, hemifacial or in the lines of Blaschko was not seen.

Half of the patients, all of African origin presented grossly disfiguring lesions affecting most of the face.

Similar findings were reported by W K Jacyk in an African patient in 1980 [15].

There are only a few isolated reports of TEM with such a gross disfigurement, especially from Africa [16, 17]. The surface of the lesions appeared unremarkable in all patients with the exception of 2 patients, both Caucasians in whom ulceration was present (Fig. 2b - mother).

Review of the literature showed that malignant degeneration of the tumors is a rare event [18,19,20] and the presence of ulceration does not necessarily mean a malignant lesion. In one review [24] none of 192 examined lesions had microscopic features suggestive of malignant transformation.

Differential diagnosis between BCC and trichoepitelioma is usually made on the basis of the degree of the follicular differentiation (advanced in trichoepithelioma, less pronounced in BCC), the presence (in TEM) or absence (in BCC) of Merkel cells (CK20), the expression of AR-androgenic receptors in BCC as opposed to lack of their expression in TEM and bcl-2 expression (patchy and peripheral in TEM, diffuse in BCC [7, 20, 22, 23].

We employed these markers only in 3 difficult cases in which a close resemblance between TE and BCC with follicular differentiation was found. The quality of the stroma is another defining discriminant between trichoepithelioma and BCC (fibromyxoid with plump fibroblasts in trichoepithelioma, scarce with a few fibroblasts in BCC).

Previous studies [7, 14, 25] demonstrated that trichoepithelioma presented two distinctive stromal patterns. The bulk of stroma consists of spindle-shape fibroblasts associated with abundant collagen. In present study, the fibroblasts in the stroma are tightly associated with the islands of basaloid cells, encircling them, but they lack the retraction artefact typical of BCC. The other type of stroma is represented by aggregations of plump fibroblasts, which produce minimal amount of collagen, named papillary mesenchymal bodies or follicular papillae [7, 25].

In our study, there were mainly attempts of hair bulb formation and only 1-2 well differentiated primitive hair bulbs with "ball and claw" configuration.

Three male cases presented features of a desmoplastic trichoepithelioma: narrow epithelial strands, rims of compact collagen around the aggregates of basaloid cells, small keratinous cysts, sparse inflammatory infiltrate and granulomatous inflammation around ruptured cysts (Fig.3b).

Desmoplastic trichoepithelioma is associated with an intradermal/compound melanocytic nevus at a frequency of 10% [27, 28, 29, 30]. It remains unclear why this particular combination should occur repeatedly. That might represent an example of epithelial induction by melanocytic nevi [30], proliferations of components of the nevus regarded as a benign tumour [32] or as Keen suggested, the local paracrine effect of cytokine/growth factors secreted by the nevus cells accounts for the epithelial proliferations [33, 34].

In our study, a single specimen revealed a trichoepithelioma in close relation to a benign pigmented intradermal nevus [Fig. 4a and 4b]. The two components were closely intermingled and not only placed side by side. The close apposition between melanocytes and epithelial cells suggests that melanocytes might play a role in controlling epidermal growth apart from just supplying it with melanin.

Localized cutaneous amyloidosis in trichoepitheliomas is poorly documented.

It is a rare, secondary phenomenon in contrast to common amyloid deposition in BCC. Amyloid is believed to be derived from the degenerated (apoptotic) tumour cells producing excessive amounts of tonofilaments which are discharged into extracellular milieu [35, 36]. We were able to demonstrate amyloid deposition in a single patient (lesion from the scalp).

Foreign body giant cell reactions and focal calcification occur not uncommonly in relation to benign neoplasms and nevi. In our study, foreign body granulomas and focal ossification were seen adjacent to ruptured cysts implying folliculitis or follicular damage due to trauma [37].

6. CONCLUSIONS

Trichoepithelioma multiplex was an uncommon diagnosis particularly in African patients, with a low prevalence of familial cases.

A positive correlation could be established between the histopathological pattern of trichoepitheliomas and the body areas from which the lesions were removed.

In cases of diagnostic difficulties, one has to consider the usual presentations of uncommon disease (TEM) as well as the unusual presentation of common disease (BCC). In this regard, the study brings an added value in making a more accurate histopathologic diagnosis in problematic cases.

CONSENT AND ETHICAL APPROVAL

The patients were recruited according to South African lows governing participation in a biomedical research. The majority of the cases included in this study were retrospective (12). The authors declare that written informed consent was obtained for prospective cases (8). The patient data protection and confidentiality were ensured.

The protocol for this research project has been approved by the Ethics Committee of the University of Pretoria in conformity to the provisions of the revised Declaration of Helsinki (Tokio 2004).

DECLARATION

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Neurosurgical Knowledge of Interns in New Zealand: the Potential for Improvement

1. INTRODUCTION

Head injuries comprise approximately 5% of all Emergency Department presentations in Australasia and about 8% of these are found to have intra-cranial haemorrhages (ICH) on CT scans. Missed diagnoses can be potentially fatal and an ability to identify ICH on imaging is crucial for all graduated medical professionals (Fortune and Wen, 1999; US National Institutes of Health, 1998).

However, insufficient exposure of students to neurosurgery and neuroradiology has often been a matter of concern in medical schools across USA, Canada, UK and Europe (Fox et al., 2011). When taking into account the high incidence and mortality from head injuries in the form of subarachnoid and intracranial haemorrhages, it becomes evident that core knowledge in basic neurosurgical imaging and diagnoses needs to be an essential part of medical training. However, it is unclear what level of fundamental neurosurgical knowledge should be acceptable for general medical professionals and what areas require further attention and improvement during their first post-graduate year. Currently, medical students in New Zealand are required to have knowledge of only basic neurosurgical conditions. Minimal emphasis is placed on image interpretation and the management of neurosurgical emergencies.

It is also controversial, whether the amount of neurosurgical information taught by the specialist neurosurgical educators is perceived as sufficient by the junior doctors themselves (Aldana and Steinbok, 2009). A variety of educational options could be offered to medical students, including lectures, seminars, observation and clerkship but it would be prudent to identify the areas of deficiency and the potential for improvements.

Currently the average length of time set aside for dedicated undergraduate neurosurgical teaching in New Zealand medical schools ranges from approximately three days to two weeks. The aim of this study was to investigate the level of basic neurosurgical knowledge with regard to image interpretation in interns who were in their first post-graduate year in New Zealand. This would allow making adjustments to the undergraduate medical curriculum in neurosurgery and to identify the points of special attention.

2. METHODS

The consecutive group of the first year interns who completed their medical training in New Zealand were requested to answer the anonymous questionnaire about their neurosurgical knowledge. Only the medical school from which they obtained their medical degree was recorded. A prerequisite was that they had not been involved in a post-graduate neurosurgical rotation at the time of answering the questions.

All interns who were approached agreed to participate and informed consent was obtained verbally from each of them. In total, 50 interns from the three main public hospitals in the Wellington region during the course of 2011 were included in the study.

The interns were given a total of 15 minutes to fill in the questionnaire in the form of a one page handout. The method of testing involved questions that was of the matching type (Appendix A). Five CT scan images were listed in order from A to E. There were five potential diagnoses for each image and each option could only be used once.

The images were Computerized Tomography (CT) scans consisting of a normal study of the head and four obvious common neurosurgical findings: an acute subdural hematoma, a traumatic subarachnoid haemorrhage, an acute extradural hematoma and an intra-parenchymal haemorrhage. The applicants had to match the appropriate diagnoses to the images displayed.

Each question was worth a maximum of one point. Marks were given out of five. There was no negative marking for incorrect or unanswered questions. The predetermined pass mark was three out of five. In order to obtain a score from 0

to 100%, the overall mark was multiplied by 20. The examination was scored anonymously according to the validated scoring system and answer key.

Knowledge of obvious CT scan findings was tested as these were basic, and should be easily interpreted by all new post-graduate interns. The authors thought it would be futile testing detailed neurosurgical conditions as these would be referred to our department regardless. We instead focussed on basic neurosurgical image interpretation as we believe that all newly graduating doctors should be able to interpret obvious images.

3. RESULTS

The mean score for the 50 interns in their first postgraduate year was 40% (95% CI 37.3 -42.4), with a range of 0 to 80%. Thirty-six interns (72%) had a score of less than 60% and thus failed to demonstrate basic competency on the examination. None of the interns scored a full 100%.

With regards to individual component scores, the intra-parenchymal haemorrhage image was scored correctly by the majority of the interns (41 out of 50, 82%). The image of the normal CT was scored correctly by 30 of the interns (60%). The image of the acute subdural hematoma was scored correctly by 19 interns (38%) and the image of the acute extradural hematoma was scored correctly by 10 of the interns (20%). Only 4 interns correctly identified the subarachnoid haemorrhage (8%). The data analysed showed that the majority of the mistakes seemed to be confusion between extradural and subdural hematomas (44%). The second commonest mistake was misinterpretation between the normal CT and the traumatic SAH (36%).

While our study population was too small to allow any statistically significant sub-analysis, we were able to demonstrate a trend, with the interns who scored higher in the assessment coming from programmes with more time allocated to neurosurgical training and from programmes which included on-call duties for the students. The students who attended the medical school with more emphasis on neurosurgical training (i.e. two weeks) had an average score of 48%, whereby the students who graduated from the school that recommended only three days of neurosurgical training scored an average of 32%.

4. DISCUSSION

This study suggests that the vast majority of newly qualified New Zealand doctors do not have sufficient level of competence in the evaluation of basic neurosurgical imaging. At the start of their internship, with their final undergraduate medical exams recently completed, only 28% (14 out of 50) passed the test.

This number is rather alarming given the high prevalence of trauma and other neurosurgical emergencies experienced in Australasia and there could be a few potential reasons for this. First, in most medical schools, neurosurgeons are not directly involved in face-to-face student education. As a result, the vast majority of emerging medical practitioners are taught about common neurosurgical conditions either by other specialists or not at all (Resnick, 2000a). Second, the neurosurgery-related curriculum is too short and the teaching methods are not adequate to generate and maintain the knowledge of basic neurosurgical images within the minds of new medical graduates. And third, there is not enough motivation from the side of medical students to learn the interpretation of scans, probably relying too much and hoping on the opinion of qualified radiologists.

Neurosurgeons provide definitive management for several common disease processes that are encountered by most physicians regularly. The management of refractory epilepsy, lower back pain, malignancy, head and spinal trauma are but a few examples of common conditions dealt with by neurosurgeons. The majority of these patients are initially seen by junior doctors or general practitioners and referred. Our concern is of the ability to recognize neurosurgical emergencies and to render appropriate care and timely referral to the neurosurgical service. Subarachnoid haemorrhages and severe head or spinal injuries are just a few examples of conditions that may prove fatal is referral is delayed. We believe that specialists are the best source of information with regards to their particular specialty. Primary care physicians cannot be left to shoulder the burden of medical education with regard to specialist issues because primary care physicians cannot devote the same knowledge and expertise to a specific topic that specialists can.

A review of the curriculum including aspects such as content and time allocation, as well as teaching methods and skills is essential if we are to ensure that

medical students, during the course of their undergraduate training, obtain the basic knowledge and skills which will enable them to practise safe medicine in the community. Inclusion of a short neurosurgery-related curriculum as part of a combined neuroscience course has been shown to significantly improve student performance on an examination focusing on the recognition and management of common neurosurgical conditions (Resnick, 2000b). Because primary care physicians are responsible for the initial recognition and management of these disorders, the knowledge gained may lead to improved patient care.

Our findings suggest that the undergraduate medical curriculum in New Zealand should allow for more exposure to training in neurosurgery. Decreasing time devoted to neurosurgery has a clear impact on the calibre of interns today (McKeown et al., 2003; Rizzolo, 2002). The particularly poor ability to detect subarachnoid haemorrhages and extradural haematomas demonstrated by the interns in the assessment suggests that these components should receive increased emphasis in the undergraduate curriculum. Our data clearly shows trends favouring more time spent in neurosurgery.

There are limitations to this study. Our study may have been limited by sample bias, with participants coming exclusively from three hospitals in Wellington. Our intern group did however include graduates from both of the New Zealand medical schools. The questionnaire was focussed solely on imaging and no clinical vignettes were provided. This may have placed undue emphasis on imaging modalities instead of recognizing a specific problem which may have been aided by history and examination findings.

We also acknowledge that our sample size was small and would hence prefer using our study as a pilot study so as to inspire a multicentre study within Australasia and perhaps globally to compare neurosurgical teaching at undergraduate level worldwide. We feel this would be important so as to improve the neurosurgical curriculum taught to students globally. If an international multi-centre trial was to be performed, this may allow a uniform curriculum to be produced which places more emphasis on neurosurgical teaching.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images.

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APPENDIX A: NEUROSURGICAL IMAGING QUESTIONNAIRE

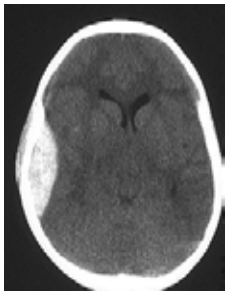
Please match the following numbers with the CT Scan images below. Each diagnosis may only be used **ONCE**.

There is no negative marking.

Time Allocated: 15 (fifteen) Minutes

1. Normal study
2. Acute extradural haematoma
3. Intra-parenchymal haemorrhage
4. Acute subdural haematoma
5. Traumatic subarachnoid haemorrhage

Image A



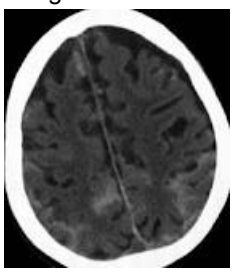
Answer__

Image B



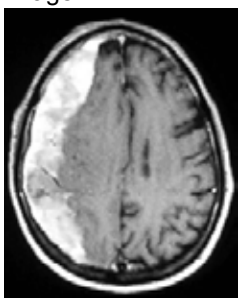
Answer__

Image C



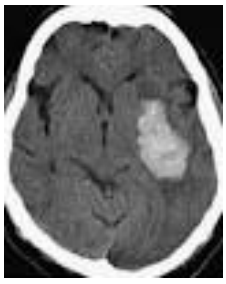
Answer__

Image D



Answer__

Image E



Answer__

Shi-Ni Lim[1], Zaheedah Yahya[2], Dimphy Zeegers[2], Thiha Moe[3], Ei Ei Phyo Kyaw[3], George SH Yeo[3], M Prakash Hande[2] and Ene-Choo Tan[1,4],

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Distribution of Telomere Length in the Cord Blood of Chinese Newborns

1. INTRODUCTION

Telomeres are specialised nucleoprotein structures made up of tandem repeats of hexamers. They act as a cap to protect chromosome ends from degradation and fusion with other chromosome ends. Telomere repeats provide a mechanism for DNA replication at the ends of chromosomes and are essential for chromosomal stability. As telomeres undergo progressive shortening with every replication, the length is frequently used as a marker for cell division and proliferative potential [1-3].

In men, short telomeres have been associated with higher risk of cardiovascular and metabolic disorders, dementia, emphysema, depression, and cancer [4-8]. Cells with critically truncated telomeres exhibit chromosomal rearrangements which eventually lead to malignancies or apoptosis. Mice with shorter telomeres have increased incidence of tumour formation [9, 10]. Hence telomere length is also a marker for organismal fitness and risk for certain diseases.

Telomere length is an inherited trait. There is inter-individual variability even when adjusted for age [11, 12]. However, it is also modifiable by environmental factors. For its association with both inherited disorders and diseases with both genetic and environmental influences, it is not clear whether the disease predisposition is due to the inherited shorter telomere length, or that the shorter telomere length is a consequence of the disease. There is no longitudinal data on telomere length in such patients.

Combined epidemiologic and clinical studies have shown that intrauterine environment affects foetal growth and development and also subsequently impacts adult health disease and survival. This is due to the fact that foetal life is associated which rapid cell division and an insult or injury during this period can have significant long-term consequences on postnatal tissue or organ function [13]. There is a significant relationship between low birth weight and later development of cardiovascular disease and impaired glucose tolerance (IGTT) in adult life [14]. Besides cardiovascular and metabolic diseases, those born with very low or low birth weight (below 2500 grams) are also more at risk for cognitive impairment, behavioural problems and higher risk of hepatoblastoma[15,16] As the spectrum of diseases overlaps with those associated with short telomeres, it would be interesting to find out whether the low weight births already have shorter telomeres at birth due to intrauterine stress.

There is no large scale study on telomere length in newborns. There is also no data on telomere length for children from our population. In this study, we investigated the telomere length of newborns from Chinese parents in a public hospital in Singapore. Our data will provide some insight into the range of telomere length at birth for children with different birth weight and gestational ages for the Asian population.

2. MATERIALS AND METHODS

2.1 Cord Blood Samples

The study protocol was approved by the Sing Health Institutional Review Board which oversees all research activities in the hospital. Deliveries involving Chinese parents were identified and the cord blood was collected in both heparin and EDTA tubes. Data on gender, birth weight, gestational age and maternal age were also collected. All newborns were singleton births, free of major congenital birth defects and not suspected of chromosomal disorders.

2.2 DNA Extraction

Genomic DNA was extracted from whole blood using DNeasy Blood and Tissue Kit (QIAGEN, Valencia, CA, USA) according to manufacturer's protocol.

The quality and quantity of extracted DNA was assessed by optical density measurement at 260 nm and 280 nm using the NanoDrop 1000 Spectro-photometer (Fisher, Wilmington, DE, USA).

2.3 Telomere Restriction Fragment (TRF) Assay

The TRF length analysis assay was performed using the Telo-TAGGG Length Assay Kit (Roche Applied Science, Mannheim, Germany). Extracted pure genomic DNA (1.5 µg/sample) was digested with FastDigest® restriction enzymes, *Hinf*1 and *Rsa*1 (Fermentas, Burlington, Ontario, Canada), for 10 minutes at 37ºC. Digested DNA fragments were fractionated by gel electrophoresis in a 0.8% agarose at 60 V for four hours. The gel was then washed in hydrochloric solution (0.25 M HCl), denaturation solution (0.4 M NaOH) and neutralisation solution (1 M Tris 7.4, 5 M NaCl). The DNA fragments in the gel were transferred to the Nytran® positively-charged nylon membrane (Sigma-Aldrich, St. Louis, MO, USA) overnight. Subsequently, DNA is cross-linked onto the membrane by ultraviolet light (Stratagene, Santa Clara, CA, USA), hybridized with Digoxgenin (DIG)-labelled telomere probe at 42ºC for three hours and washed with a series of anti-DIG alkaline phosphatase washing solutions. The membrane was incubated with avidin-conjugated horseradish peroxidase for five minutes, followed by horseradish peroxidase substrate solution, tetramethylbenzidine, for five minutes. Visualization of the DNA fragments were detected on X-ray films (Kodak, Rochester, NY, USA). The chemiluminescent signals were scanned by the Kodak Gel imaging system and analyzed by the Kodak imaging software for quantitative measurements. The mean TRF length for each lane was estimated as the weighted average of the optical density as described in the TeloTAGG kit. The DIG Molecular Weight Marker from the kit was included in every gel as size markers.

2.4 Statistical Analysis

Relationships between continuous variables were assessed with Pearson or Spearman correlation. Partial correlations were also used to control for interaction between variables. All analysis was done using SPSS 19. Statistical significance was set at $P < 0.05$.

3. RESULTS

The demographic variables of the study population by gender and TRF results are presented in Table 1.

Table 1. Distribution of variables in the study samples

Group	Males (n=96)		Females (n=88)		*P*
	Mean ± SD	Range	Mean ± SD	Range	
Birth weight (g)	3233 ± 525	610 – 5184	3226 ± 401	2200 – 4298	.921
Gestational age (days)	266.09 ± 11.10	196 – 280	267.89 ± 7.52	252 – 288	.205
Maternal age (years)	32.86 ± 4.90	18 – 42	32.32 ± 5.28	17 – 47	.843
TRF (kb)	12.32 ± 2.50	6.63 – 19.21	12.99 ± 2.35	8.19 – 18.66	.065

There was no significant deviation from normality for all the variables. There was no statistically significant difference in maternal age, birth weight and gestational age between male and female births. There was a wide range for mean TRF length with the longest almost three times that of the shortest. There was also a trend for shorter telomeres in males compared to telomeres in females although the difference did not reach statistical significance. The shortest mean TRF length was a male with birth weight of 3.73 kilogram (kg), gestational age of 273 days and the mother was 23 years old. The longest mean TRF length was of a male with birth weight of 2.89 kg, gestational age of 259 days and the mother was 42 years old. Mean TRF length of the youngest birth at 196 days and birth weight of 0.61 kg was 9.26 kilobases (kb). The heaviest birth of 5.18 kg was a male with gestational age of 266 days and the mother was 31 years old. His mean TRF length was 15.15 kb. The heaviest female birth was 4.298 g (gestational age 273 days and 26-year old mother) with mean TRF length of 11.73 kb. A representative TRF blot from whole blood DNA of nine samples is shown in Fig. 1.

There was significant inverse correlation between maternal age and gestational age (Pearson's r = –0.161, P = 0.029) with older mothers giving birth earlier. There was also highly significant correlation between higher birth weights and older gestational ages (Pearson's r = 0.385, P< 0.00). There was no statistically significant correlation of mean TRF length with birth weight or gestational age, even after controlling for maternal age. And there was no independent correlation of mean TRF length with either birth weights or gestational ages even after controlling for the other variable.

There were 143 mothers who were older than 30 years. For this group there was statistically significant correlation between maternal age and mean TRF length of the newborns (Pearson's r = 0.190, *P* = 0.023), with older mothers giving birth to newborns with longer telomeres. Similar to the whole sample set, there was again statistically significant correlation between higher birth weight and older gestational age (r = 0.417, *P*< 0.00).

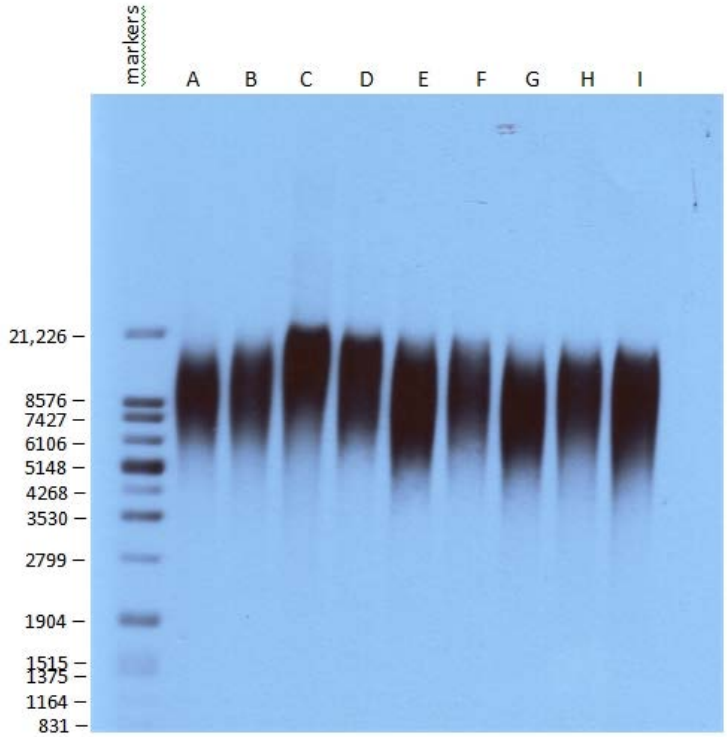


Fig.1. A blot used for TRF measurements

First lane on the left is the DIGmolecular weight markers with the sizes in basepairs, lanes (A) to (I) are cord blood samples.

4. DISCUSSION

Our data is in line with the higher incidence of earlier deliveries for older mothers [17] and the expected higher birth weight with older gestational age [18, 19]. Consistent with other studies, there is wide inter-individual variability in mean TRF length in newborns [20, 21]. Moreover, the huge variations in TRF length in newborns are as large as the variations observed in adults [22]. Hence the wide range of age-adjusted TRF length in adulthood could be attributed to strong genetic determinants that had exerted its effect *in utero* [23].

Table 2. Summary of published newborn telomere length based on Southern blot analysis of mean telomere restriction fragment (TRF) length

Reference	Origin	Sample characteristics	Tissue studied	Birth weight	Gestational age (days)	Mean TRF (kb)± SD
Akkad et al. [30]	UK	38 AG†	whole blood	3497 ± 430	276.5 ± 9.1	10.36 ± 1.6
		34 SGA†		2342 ± 433	270.9 ± 13.3	10.33 ± 1.3
Allsopp et al. [27]	USA	10 full term	White blood cells	-	-	10.0 – 12.5^
Davy et al. [31]	USA	32 growth restricted	placenta	-	259 - 280	11.50*
		36 age-matched		-		11.25*
Frenck et al. [26]	USA	12	leucocytes	-	-	16.4 ± 1.2
Friedrich et al. [24]	Germany	11 full term	leucocytes	-	> 259	8.323 ± 0.50
		15 pre-term		6 VLBW, 7 LBW	< 259	8.512 ± 0.52
Okuda et al. [20]	USA	86 blacks	white blood cells	3120 ± 57	269.5 ± 1.47	10.98 ± 0.09
		48 whites		3413 ± 74	270.2 ± 1.61	10.92 ± 0.11
		29 hispanics		3282 ± 77	270.2 ± 2.03	11.25 ± 0.10
Pipes et al. [29]	USA	5	mononuclear cells	-	-	11.2 ± 0.93
Zeichner et al. [28]	USA	9#	mononuclear cells	-	-	10.08 ± 1.45

† *AG: appropriately grown SGA: small for gestational age*
^ *Range estimated from bar graphs.*
* *Mean estimated from bar graphs.*
# *Uninfected children born to HIV-positive mothers.*

The previous largest study was from the United States in 2002 (Okuda et al) which found the mean TRF length to be 11.01 ± 0.058 kilobasepairs (kb) for cord blood [20], less than the average obtained in this study. Another study had even smaller range of 7.491 – 9.473 kb [24]. However, the sample size of that study is very small with only 26 newborns. One explanation could be that our study sample had a bigger range of birth weight (0.61 – 5.18 kg compared to 1.60 – 4.75 kg). Our average TRF length is closest to the 12.34 kb reported for 15 – 19 week old fetal tissues from 11 elective abortions [25]. One study reported even longer mean TRF length of 16.4 kb in 12 newborns [26]. Other studies had even smaller sample sizes of 10 or less [27-29]. A summary of previous studies on newborn telomere length is presented in Table 2.

The shortest sample for the US study at 8.55 kb was longer than our shortest at 6.6 kb. As our samples were anonymously collected, we did not have any clinical data for this pregnancy which was a full-term birth with regard to pregnancy complications or prenatal stress experienced by the mother which could influence telomere length in the offspring [32]. While it was much shorter than the shortest of 8.55 kb in that study, the shortest in the study by Friedrich et al was 7.49 kb for a preterm newborn while Holmes et al had two out of five preterm infants with mean TRF length in the mid-7 kb range [24,33]. There were also 11 additional samples in our study with mean TRF length of < 9 kb. Hence the short mean TRF length for this infant could just be an extreme case of natural inter-individual variation. At the other end of the range, the longest mean TRF length in Okuda et al was only 13.32 kb whereas the longest in this study was 19.2 kb. One possibility for the longer mean TRF is that some of the subtelomeric restriction sites for the enzymes used in this assay might be polymorphic in our population, resulting in over-estimation and higher mean TRF length for those samples.

Okuda et al. also reported that telomere length results were similar for males and females [20]. While we found a trend towards shorter telomeres in males, it did not reach statistical significance. Nevertheless our result is consistent with other studies which showed that telomeres are longer in females compared to males of the same age for adults [34-36]. Our data showed that this difference might already be present at birth.

The present study is in line with two previous reports that there was no

association between birth weight and mean TRF length in newborns, which had sample sizes of 72 and 68 [30,37]. However, another study reported significantly longer TRF length in "very low birth weight" pre-term compared to "low birth weight" newborns and this is based on a sampling size of 15 and 11 [24]. More studies involving larger sampling sizes are required to establish if impaired growth during intrauterine events is associated with higher telomere attrition. Postnatally, infants who were small at birth might undergo rapid growth and attain normal height and weight within a year. As telomerase activity is absent in many somatic tissues, it would be expected the telomeres in these cells would undergo more rapid attrition compared to normal birth wirght infants if the catch-up growth involved more replication and cell divisions. Longitudinal studies involving serial sampling over time during this period would be needed to ascertian if this is indeed the case.

A large proportion of small for gestational age (SGA) and intrauterine growth restriction (IUGR) cases are due to placenta insufficiency. Shorter telomeres have been reported for placental trophoblasts for pregnancies complicated by preeclampsia or intrauterine growth restriction [38,39]; while the expression of hTERT, the rate-limiting factor of telomerase activity was also found to be lower for the latter. Another group working on fetal growth retriction samples found similar results for placental telomere length and telomerase activity [31]. The reduced telomerase activity could explain the shorter telomeres found in the IUGR and FGR placentas but there was no corresponding decrease in telomere length for the FGR cord blood samples, leading them to conclude that the pathology is placental in origin. Future studies to assess levels of telomerase activity and telomere length in IUGR/FGR placentas (and fetal tissues if possible) at various stages of pregnancy would be needed to better understand the pathogenesis.

The known determinants of telomere length are genetic factors [12,40], age and gender [20,21,23,34,35,41-43]. Several findings lend support to the idea that paternal inheritance is the main genetic factor predicting telomere length, where higher paternal age is associated with longer newborn telomeres [41,44-46]. Nawrot et al. [35] further proposed the X-linked inheritance of telomere length between fathers-daughters, mothers-sons, mothers-daughters and amongst siblings. In our study, the paternal age at the time of birth of the newborns were not recorded and hence we were unable to test if there was correlation between paternal age and

the TRF length of their newborn daughters, or between mothers' age and newborn telomere length of their newborn sons after adjusting for paternal age and vice versa. We found no correlation of mother's age with the mean TRF length of their sons even after adjusting for gestational age or birth weight. Interestingly, for older mothers (> 30 years), a positive correlation was observed between maternal age and mean TRF length of their newborns. This was different from a previous study which found that paternal age but not maternal age at the time of birth is positively associated with telomere length [41]. However, a direct comparison cannot be made as the telomere length measurement was done when the subjects were aged 35-55 for that study and the observed difference could be due to different postnatal attrition rate.

Telomere length is known to be involved in aging and is associated with age-related diseases. Further research on telomere-telomerase maintenance *in utero* will lead to better understanding the factors which determine telomere length at birth. This will expand our knowledge on the impact of being born with relatively shorter telomeres and the risk of developing age-related chronic diseases associated with short telomeres.

4. CONCLUSION

To our knowledge, our study has the largest sampling size for telomere length in newborns, with 96 males and 88 females. In addition, our samples are more homogeneous in that all 184 are of Chinese ancestry. Our results showed a wide range of mean TRF length with no correlation with either gestational age or birth weight.

CONSENT

Written informed consent was obtained from women whose prenatal fetal ultrasound scan results indicated that there might be intra-uterine growth restriction. Remaining samples were collected anonymously from delivery suites with no identifier recorded.

ETHICAL APPROVAL

The study protocol was approved by the Sing Health Institutional Review Board (CIRB Ref: 2010/100/A).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Evaluating the effectiveness of therapeutic and prophylactic complex in the treatment of generalized periodontitis in elderly men

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Оценка эффективности применения лечебно-профилактического комплекса при лечении генерализованного пародонтита у мужчин зрелого и пожилого возраста

Введение. Распространенность заболеваний пародонта у пациентов пожилого возраста, по данным литературы, достигает 100% [1, 2], причем с возрастом тяжесть генерализованных заболеваний увеличивается [3].

К факторам риска развития заболеваний пародонта у лиц пожилого возраста относятся плохая индивидуальная гигиена полости рта, наличие незамещенных дефектов зубных рядов, низкая мотивация пациентов к лечению, множественная соматическая патология и употребление значительного количества фармакологических препаратов [4, 5].

Кроме того, в ряде работ показаны гендерные особенности заболеваний пародонта. Тяжесть изменений в тканях пародонта нарастает с возрастом, при этом наиболее уязвимой группой оказались мужчины в возрасте 50-59 лет [6; 7].

Учитывая неуклонный рост пациентов пожилого и старческого возраста, высокую распространенность заболеваний пародонта у них, отсутствие общепринятой программы профилактических мер с учетом возрастных инволютивных изменений в тканях пародонта и полиморбидности таких пациентов, разработка комплексных методов и способов профилактики заболеваний пародонта является весьма актуальным на сегодняшний день.

Цель исследования – повышение эффективности лечения генерализованного пародонтита у мужчин зрелого и пожилого возраста путем разработки и применения в базовой терапии лечебно-профилактического комплекса, включающего адаптогены, антиоксиданты, минералы и витамины.

Материалы и методы исследования

В клинических исследованиях приняли участие 60 мужчин (55-70 лет) с генерализованным пародонтитом I-II, II степени, которые были разделены на 2 группы по 30 мужчин в каждой: основную группу и группу сравнения. В группе сравнения лечение ГП проводили согласно протоколам лечения (базовая терапия), в основной группе кроме базовой терапии применяли лечебно-профилактический комплекс (в течение 1 месяца 2 раза в год), включающий препараты «Биоарон-С», «КальЦикор», витаминно-минеральный комплекс «Алфавит 50+». Местно в полости рта использовали квертулин-гель с модифицированными индивидуальными каппами.

Для проведения индивидуальной гигиены полости рта в домашних условиях пациентам обеих групп были назначены зубные пасты «Lacalut Aktiv Herbal» (на 1 месяц после проведенной санации) и «Lacalut Fitoformula» (на остальной срок наблюдения), а также зубной эликсир «Лизодент».

Клинические исследования проведены до лечения, через 1 и 3 месяца.

Состояние гигиены полости рта оценивали с помощью индексов Грин-Вермильона, Silness-Loe и Stallard. Для оценки состояния тканей пародонта использовали индекс PMA %, индекс кровоточивости десны, пародонтальный индекс Рассела (PI), определяли глубину зондирования пародонтальных карманов (ПК) [8].

По индексу кровоточивости рассчитывали пародонтопротекторную эффективность (ППЭ) лечебно-профилактического комплекса.

Статистическую обработку результатов проводили биостатистическими методами анализа с использованием критерия Шапиро-Уилкса, Колмогорова-Смирнова с поправкой Лиллиефорса, t-критерия Стюдента. Проверка равенства дисперсий выборок оценивали с помощью критерия Фишера и Левена.

Результаты исследований и их обсуждение. При определении уровня гигиены полости рта обследованных лиц через 1 месяц после лечения установлено, что гигиеническое состояние полости рта значительно улучшилось у пациентов обеих групп и соответствовало хорошему уровню. Количество зубного камня уменьшилось в группе сравнения на 76,23 % , в основной группе – на 87,64 %.

Индекс Silness-Loe в группе сравнения уменшился на 60,60 %, Stallard – на 61,01 %, в основной группе –на 65,09 % и на 65,65 % соответственно (табл. 1).

Через 3 месяца количество зубного камня увеличилось. Что касается индексов гигиены Silness-Loe и Stallard, то через 3 месяца они также увеличились, однако динамика в группах была разная.

До лечения у пациентов обеих групп превалировал плохой и неудовлетворительный уровень гигиены полости рта. Через 1 месяц в группе сравнения хороший уровень гигиены был зафиксирован у 15 мужчин (50 %), удовлетворительный – у 14 мужчин (46,7 %), неудовлетворительный – у 1-го мужчины (3,3 %). В основной группе большинство пациентов были с хорошим уровнем гигиены (24 мужчины, что составило 80 %).

Таблица 1

Динамика изменения гигиенического состояния полости рта в ближайшие сроки наблюдения

Показатель	Индекс Silness-Loe, баллы (M±m)		Индекс Stallard, баллы (M±m)		Зубной камень, баллы (M±m)	
Срок исследования	группа сравнения	основная группа	группа сравнения	основная группа	группа сравнения	основная группа
Исходное состояние	2,28 ± 0,17	2,10 ± 0,17 $p_1 > 0,05$	2,26 ± 0,13	2,23 ± 0,12 $p_1 > 0,05$	2,44 ± 0,12	2,31 ± 0,16 $p_1 > 0,05$
Через 1 месяц	0,91 ± 0,09 $p < 0,001$	0,74 ± 0,07 $p < 0,001$	0,90 ± 0,07 $p < 0,001$	0,78 ± 0,06 $p < 0,001$	0,61 ± 0,07 $p < 0,001$	0,34 ± 0,05 $p < 0,001$

		$p_1 > 0,05$		$p_1 > 0,05$		$p_1 < 0,05$
Через 3 месяца	1,14 ± 0,09 p < 0,001	0,84 ± 0,08 p < 0,001 $p_1 < 0,05$	1,13 ± 0,08 p < 0,001	0,89 ± 0,07 p < 0,001 $p_1 < 0,01$	1,22 ± 0,09 p < 0,001	0,81 ± 0,08 p < 0,001 $p_1 < 0,01$

Таблица 2

Динамика показателей воспаления в тканях пародонта в ближайшие сроки наблюдения

Показатель	PMA, % (M±m)		Индекс кровоточивости, баллы (M±m)		Проба Шиллера-Писарева, баллы (M±m)	
Срок исследования	группа сравнения	основная группа	группа сравнения	основная группа	группа сравнения	основная группа
Исходное состояние	47,8 ± 2,7	49,77 ± 2,64 $p_1 > 0,05$	2,20 ± 0,05	2,08 ± 0,09 $p_1 > 0,05$	2,40 ± 0,06	2,30 ± 0,09 $p_1 > 0,05$
Через 1 месяц	26,3 ± 1,4 p < 0,001	9,93 ± 0,35 p < 0,001 $p_1 < 0,001$	0,99 ± 0,04 p < 0,001	0,31 ± 0,03 p < 0,001 $p_1 < 0,001$	1,33 ± 0,04 p < 0,001	0,46 ± 0,02 p < 0,001 $p_1 < 0,001$
Через 3 месяца	28,7 ± 1,5 p < 0,001	17,41 ± 0,51 p < 0,001 $p_1 < 0,001$	1,10 ± 0,06 p < 0,001	0,62 ± 0,04 p < 0,001 $p_1 < 0,001$	1,45 ± 0,05 p < 0,001	0,81 ± 0,03 p < 0,001 $p_1 < 0,001$

Через 3 месяца изучаемые показатели в основной группе повысились больше, чем в группе сравнения по отношению к предыдущему сроку исследования, однако оставались достоверно ниже (на 39,34 - 85,16 %) показателей в группе сравнения ($p_1 < 0,001$).

Пародонтопротекторная эффективность лечебно-профилактического комплек-

са, рассчитанная по индексу кровоточивости, через 1 месяц после лечения составила 68,7 %, через 3 месяца – 43,6 %.

При определении индекса PI и глубины зондирования ПК в динамике лечения генерализованного пародонтита у обследованных лиц установлено их уменьшение (табл. 3).

Таблица 3

Результаты определения индекса PI и глубины зондирования пародонтального кармана в динамике лечения генерализованного пародонтита

Показатель	Индекс PI, баллы (M±m)		Глубина ПК, мм (M±m)	
Срок исследования	группа сравнения	основная группа	группа сравнения	основная группа
Исходное состояние	3,65 ± 0,08	3,45 ± 0,07 $p_1 > 0,05$	3,88 ± 0,14	3,98 ± 0,09 $p_1 > 0,05$
Через 1 месяц	2,92 ± 0,06 $p < 0,001$	2,24 ± 0,08 $p < 0,001$ $p_1 < 0,001$	2,91 ± 0,13 $p < 0,001$	2,24 ± 0,08 $p < 0,001$ $p_1 < 0,001$
Через 3 месяца	3,10 ± 0,05 $p < 0,05$	2,42 ± 0,08 $p < 0,001$ $p_1 < 0,001$	3,3 ± 0,16 $p_1 < 0,001$	2,42 ± 0,08 $p < 0,001$ $p_1 < 0,001$

Через 3 месяца в группе сравнения индекс PI и глубина зондирования ПК увеличиваются практически до уровня первоначальных данных, а в основной группе показатели практически не меняются и остаются на уровне предыдущего исследования.

Таким образом, результаты изучения уровня гигиены полости рта и индексной оценки состояния тканей пародонта у мужчин зрелого и пожилого возраста с ГП в ближайшие сроки наблюдения после лечения свидетельствуют о высокой пародонтопротекторной эффективности предложенного лечебно-профилактического комплекса, включающего биоарон, кальцикор, алфавит и квертулин-гель.

Выводы. По результатам комплексного лечения генерализованного пародонтита у мужчин зрелого и пожилого возраста установлено, что включение в базовую терапию разработанного лечебно-профилактического комплекса способствует улучшению гигиенического состояния полости рта (уменьшение индексов гигиены на 13,3-44,3 %, увеличение числа пациентов с хорошей гигиеной до 80 %), уменьшению воспалительного процесса в тканях пародонта (уменьшение индекса РМА % в 2,7 раз, индекса кровоточивости в 3,2 раза, пробы Шиллера-Писарева в 2,9 раз, индекса PI на 23,3 % по отношению к группе сравнения), что дало возможность получить пародонтопротекторную эффективность 68,7 % через 1 месяц после лечения.

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Factorial structure of coping strategies for skilled Greco-Roman style wrestlers

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Факторная структура копинг-стратегий квалифицированных борцов греко-римского стиля

Проблема исследования состоит в необходимости выявления психологических особенностей квалифицированных борцов греко-римского стиля

различной манеры ведения поединка в условиях повышения интенсивности противоборства.

Анализ исследований проблемы. Современный поединок в греко-римской борьбе представляет систему атакующих и защитных технико-тактических действий, применяемых борцами в различных пространственно-временных фрагментах противоборства с целью достижения победы над атлетом, обладающим индивидуальными характеристиками спортивного мастерства и нестабильным уровнем готовности к их реализации. При этом после очередного внедрения международной федерацией борьбы (UWW) изменений в правила и регламент соревнований значительно увеличилась интенсивность соревновательной встречи, что привело к смене тактической модели ведения поединка и к преобладанию реализации функциональных резервов организма над иными способами воплощения спортивно-технического потенциала борца [1-3].

В связи с новыми тенденциями соревновательной деятельности квалифицированные атлеты подвержены риску снижения спортивной результативности по причине отсутствия адекватной современным условиям психологической подготовки, направленной не только на нивелирование патологических состояний психологической сферы и уменьшения функциональных возможностей организма, но также на поиск эффективных тактических комбинаций, построенных на базе особенностей принятия оптимального решения во время выбора альтернативного технического действия с учетом индивидуально-типологических параметров психики. Но прежде чем реализовывать дифференцированную психологическую подготовку стоит изучить специфику копинг-стратегий, которые отражаются в предпочтениях реализации технико-тактических действий, скомпонованных в манеру ведения поединка [4-6].

В более ранних исследованиях нами изучены типологические особенности борцов, в частности, по критериям весовой категории и квалификации, позволяющие эффективно осуществлять управление индивидуальной подготовкой в условиях повышения интенсивности поединка [7, 8]. Однако наряду с необходимостью совершенствования психологической подготовки было отмечено недостаточное научно-методическое обеспечение тренировочного процесса борцов греко-римского стиля на основе учета особенностей ведения борьбы, что указывает на актуальность представленного исследования.

Цель исследования – определить факторную структуру копинг-стратегий квалифицированных борцов греко-римского стиля с учетом манеры ведения поединка.

Материалы и методы исследования. Изучение особенностей структуры копинг-стратегий было выполнено на кафедре физической культуры и спорта Омского государственного университета имени Ф.М. Достоевского. В исследовании приняли участие борцы 18–25 лет квалификации МС и КМС в составе 51 человека, которые условно распределены на группы с учетом манеры ведения противоборства: игровая (n=16), темповая (n=15) и силовая (n=20).

Диагностическим инструментом явился копинг-тест Лазаруса, с помощью которого были определены стратегии выхода из трудных ситуаций. Дополнительными параметрами выбраны значения шкалы экстраверсии-интроверсии и нейротизма (опросник Айзенка), а также показатели тревожности (опросник Спилберга-Ханина).

Построение факторной структуры копинг-стратегий борцов проведено при использовании программы IBM SPSS Statistics 22 [9]; выделение факторов выполнено с помощью метода максимального правдоподобия, в качестве метода вращения выбран метод варимакс с нормализацией Кайзера.

Результаты исследования и их обсуждение. По результатам факторного анализа выявлено, что у представителей игровой манеры первый фактор нагружен следующими переменными: эмоциональная нестабильность, ситуативная и личностная тревожность; второй из факторов включает стратегии планирования решения проблемы и положительной переоценки; третий фактор является односложным и состоит из копинг-стратегии избегания ситуации (табл.).

Таблица

Факторная структура копинг-стратегий борцов греко-римского стиля с учетом манеры ведения поединка

Фактор	Содержание фактора	Валидные показатели и их вес
Игровая манера ведения поединка		
1	Эмоциональная нестабильность Ситуативная тревожность	r=0,89 r=0,75

	Личностная тревожность	r=0,71 Вклад 23,6%
2	Планирование решения проблемы Положительная переоценка	r=0,87 r=0,86 Вклад 22,0%
3	Избегание ситуации	r=0,95 Вклад 14,1%
Темповая манера ведения поединка		
1	Поиск социальной поддержки Эмоциональная нестабильность	r=0,90 r=0,74 Вклад 18,7%
2	Личностная тревожность Планирование решения проблемы	r=0,89 r=0,73 Вклад 17,0%
3	Дистанцирование Ситуативная тревожность	r=0,92 r=0,85 Вклад 15,5%
Силовая манера ведения поединка		
1	Эмоциональная нестабильность Экстраверсия	r=0,97 r=0,79 Вклад 19,4%
2	Принятие ответственности Ситуативная тревожность	r=0,94 r=0,75 Вклад 15,5%
3	Дистанцирование	r=0,98 Вклад 10,1%

В структуре психологических особенностей атлетов темповой манеры отмечено внутри факторное сочетание параметров одной из копинг-стратегии с характеристикой нейротизма или тревожности. У спортсменов силовой манеры первый фактор состоит из параметров эмоциональной нестабильности и экстраверсии; второй комплексно включает значения копинг-стратегии принятия

ответственности и уровень ситуативной тревожности; в третьем факторе преобладает стратегия дистанцирования.

Таким образом, при решении проблемы борцы игровой манеры ведения поединка комплексно используют стратегии планирования решения проблемы и положительной переоценки в зависимости от уровня нейротизма и тревожности; при необходимости применяется стратегия избегания ситуации. Атлеты темповой манеры в случае возникновения проблемы поочередно применяют копинг-стратегии поиска социальной поддержки, планирования решения проблемы и дистанцирования с учетом характеристик нейротизма и тревожности. Схожая тактика поведения наблюдается у борцов силовой манеры, однако, на первом этапе конфликта атлеты действуют согласно уровню нейротизма и экстраверсии с последующим включением копинг-стратегии принятия ответственности и дистанцирования.

Представленные особенности являются важнейшим аспектом при выборе содержания вербальной гетерорегуляции, аутогенной и идеомоторной тренировки в рамках управления психологической подготовкой квалифицированных борцов.

Перспективы дальнейшего исследования связаны с более детальным анализом стратегии выбора технико-тактического приема борцом на основе полного спектра индивидуально-психологических параметров и ключевых характеристик подготовленности с учетом изменений правил судейства и регламента соревнований.

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Features improvement of coordination abilities in runners with hearing impairment on the 400 m hurdles

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Особливості удосконалення координаційних здібностей у бігунів на 400 м з бар'єрами з вадами слуху

Актуальність. В умовах науково-технічного прогресу зростає значення координації рухів, тобто прояву таких умінь людини, як: здатність швидко

орієнтуватись у просторі; тонко диференціювати свої м’язові відчуття та регулювати міру напруження м’язів; швидко реагувати на сигнали зовнішнього середовища; здатність до збереження рівноваги (В. І. Лях, Л. П. Матвєєв, В. М. Платонов [1, 2, 3].

Високий рівень розвитку координаційних здібностей (КЗ) – основна передумова оволодіння новими, складнішими видами рухових дій у спортивній діяльності. Від рівня досконалості КЗ залежить також якість виконання технічних елементів, особливо в умовах змагальної діяльності [1]. Вченими (Н.Г. Байкіна, Л.С. Виготський та ін.) доведено, що порушення слуху впливає на розвиток рухової функції, уповільнює рухові реакції, зменшує швидкість виконання рухів, призводить до порушень координації рухів, нерівномірного розподілу зусиль і в цілому до недостатньої просторової орієнтації [4, 5].

Педагогічні спостереження та експериментальні дослідження дозволяють виділити наступні особливості рухової діяльності легкоатлетів з вадами слуху: недостатньо точна координація і невпевненість рухів; відносна сповільненість засвоєння рухових навичок; проблеми збереження статичної і динамічної рівноваги; відносно низький рівень розвитку просторової орієнтації; сповільнена реакція, швидкість виконання окремих рухів і відчуття темпу; відхилення у розвитку дрібної моторики кисті і пальців рук; узгодженості рухів окремих ланок тіла у часі і просторі, диференціювання ритмічності рухів; розслаблення; відставання у розвитку певних фізичних здібностей [6].

Перелічені порушення у руховій сфері легкоатлетів з вадами слуху мають взаємопов’язаний характер і обумовлені нозологічними причинами. Водночас вчені відзначають можливість за допомогою збережених аналізаторів регулювати і здійснювати складні види рухів, впливаючи на ті чи інші функції, тим самим поліпшуючи рухові здібності легкоатлетів з вадами слуху під впливом фізичних вправ.

Разом з тим, аналіз спеціальної літератури засвідчив, що проблема удосконалення КЗ у бар’єристів з вадами слуху є недостатньо розробленою, потребує подальшого теоретичного й експериментального обґрунтування, що обумовлює її актуальність.

Мета дослідження – обґрунтування методики розвитку координаційних здібностей у бар’єристів з вадами слуху.

Методи дослідження: аналіз спеціальної науково-методичної літератури, педагогічні спостереження, педагогічне тестування, методи математичної статистики.

Організація дослідження. У тестуванні прийняли участь 7 спортсменів, віком 21–29 років які спеціалізуються у бар'єрному бігу та мають кваліфікацію (МСМК, МС).

Результати власних досліджень та їх обговорення. Велика увага в підготовці бігунів на 400 метрів з бар'єрами приділяється розвитку швидкісно-силових якостей, спеціальної витривалості, удосконаленню техніки та ритму бігу з бар'єрами, які проявляються в умовах втоми, що швидко зростає. При цьому не враховуються нозологічні особливості даного контингенту, які характеризуються недостатньою функціональною активністю вестибулярного апарату. Для вирішення цієї проблеми нами було застосовано методику розвитку КЗ з використанням вправ, які розвивають вестибулярну функцію з урахуванням наступних рекомендацій: зміна вихідного положення, а саме виконання вибігання з низького старту з різних положень; зміна способу виконання вправи, а саме подолання дистанції з бар'єрами без участі верхніх кінцівок; зміна часових та просторових параметрів вправи, а саме зменшення чи збільшення відстані між бар'єрами та відстані до першого бар'єра; дзеркальне виконання вправи (атака бар'єрів і поштовховою і маховою ногами).

Основною особливістю вправ, які ми використовували на вдосконалення КЗ, була їх складність, нетрадиційність, новизна, можливість різноманітних і несподіваних рішень рухових завдань контингенту, та індивідуальний підхід. Відносно обмежений і стандартний склад рухових дій, створює труднощі для повноцінного розвитку КЗ переважно за рахунок виконання спеціально-підготовчих і змагальних вправ. Тому в підготовці спортсменів широко використовували різноманітні комплекси вправ, загально підготовчого та складно-координаційного характеру, лежачі на підлозі, протягом 30–40 хвилин, поточним методом, з відпочинком на пояснення та показ наступної вправи. Комплекси вправ виконувалися щодня і органічно входили в програму тренувальних занять.

Окрім цього для розвитку КЗ у підготовчому періоді використовувалися рухливі ігри в баскетбол, настільний теніс, футбол та волейбол.

Велика увага приділялася виконанню вправ на розслаблення для попередження та подолання м'язової напруги. Для кращого засвоєння таких вправ застосовувався прийом контрастних завдань, чергування напруження протягом 2–3 секунд з подальшим розслабленням.

Нами також був використаний досвід напрацьований багатьма фахівцями з використання інноваційних підходів розвитку КЗ, таких як – нестандартний інвентар (платформи «BOSU» та TRX) та стретчинг (з використанням сучасних оздоровчих технологій, зокрема – пілатес та йога) [7].

Розроблена нами методика використовувалася протягом 8 місяців, окрім змагальних мікроциклів. Результати тестування КЗ у кінці експерименту дозволив нам констатувати наступні зміни.

Результати використання методики. При проведенні тесту **«Човниковий біг 4 х 9 м»** до використання запропонованої нами методики середній показник виконання цього тесту дорівнював 8,72 с, після використання він становив 8,51 с. При цьому всі спортсмени пробігли краще 9 с, на відміну від початку, коли 3 з 7 спортсменів не подолали цей бар’єр [8].

Тест **«Оцінка дистанції 7 метрів в ходьбі»** дозволяє визначити розвиток здібностей до глобальної просторової орієнтації людей з вадами слухового аналізатора. У ході тестування на початку дослідження жоден спортсмен не показав оптимальний рівень розвитку цієї якості, що становить ±15 см. Після застосування запропонованої нами методики всі спортсмени показали помилку в межах ±15 см, яка вказує на оптимальний розвиток здібності.

Результати у **5-ти кратному стрибку**, де прояв КЗ відіграє дуже важливу роль в середньому покращилися з 14,37 ± 0,10 см до 14,64 ± 0,16 см.

Впровадження розробленої нами методики дало можливість виконувати багато вправ, без використання опори, наприклад виконання присіду на одній нозі, імітування переносу ноги збоку через бар’єр, подолання різних дистанцій з нестандартною розстановкою бар’єрів та покращити результати змагальної вправи.

Висновки: Нашими дослідженнями встановлено, що у фізичній підготовленості бар’єристів з вадами слуху слабкою ланкою є координаційні здібності: рівновага, дрібна моторика, розслаблення, ритмічність рухів. Підбір засобів та методів для удосконалення КЗ у спортсменів з вадами слуху, повинен здійснюватися, насамперед, на підставі врахування нозологічних особливостей. Використання запропонованої нами методики у навчально-тренувальному процесі мали позитивний вплив на удосконалення КЗ у бар’єристів з вадами слуху.

Перспективи подальших досліджень полягають у впровадженні розробленої нами методики удосконалення КЗ у тренувальний процес бар’єристів з вадами слуху на попередніх етапах багаторічного тренування.

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The impact of seasonal rhythms on morphological status of the gallbladder wall of middle-aged people

Abstract: Seasonal rhythms strongly affect on the life activity of the human body as a whole and the functioning of its organs. The article concerns investigation of morphological changes in the membranes of the gallbladder wall of middle-aged people in terms of comparative anatomy at different times of the year.

Key words: gallbladder, cholecystitis, cholelithiasis, seasonal rhythms, chronobiology.

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Вплив сезонних ритмів на морфологічний стан стінки жовчного міхура людей зрілого віку

Анотація: На життєдіяльність організму людини, як в цілому, так і на функціонування його окремих органів великий вплив мають сезонні ритми. Стаття присвячена вивченню особливостей морфологічних змін в оболонках стінки жовчного міхура людей зрілого віку у порівняльно-анатомічному аспекті в різні пори року.

Ключові слова: жовчний міхур, холецистит, жовчнокам'яна хвороба, сезонні ритми, хронобіологія.

Вступ. Роль слизової оболонки жовчного міхура у розвитку патології гепатобіліарної системи є загальновідомою. Тому, вирішення проблеми ранньої діагностики, своєчасного лікування холециститу та жовчнокам'яної хвороби, проведення профілактичних заходів, спрямованих на попередження розвитку цих

захворювань, є дуже актуальним. За літературними даними серед причин, що ведуть до утворення жовчних конкрементів, перше місце займає застій жовчі у міхурі. Запальні процеси в жовчному міхурі призводять до змін у слизовій оболонці, внаслідок чого відбувається надлишкова продукція слизу з великим вмістом глікопротеїну та порушується абсорбція води та електролітів. Зміна фізико-хімічних властивостей жовчі стає передумовою для формування жовчних конкрементів. [1,2,3]

Однією з найбільш актуальних проблем у лікуванні жовчнокам'яної хвороби є те, що її діагностика розроблена на стадії вже сформованих каменів, а лікування починається на пізній стадії проявів клінічних симптомів і переважно хірургічними методами. [4,5,6,7] Статистично більшість хворих відмічає сезонну залежність перебігу жовчнокам'яної хвороби. Тому, вивчення морфологічних змін у стінці жовчного міхура людини в різні пори року є актуальним і дозволить зрозуміти патофізіологічні механізми виникнення захворювань жовчного міхура, саме в ту чи іншу хронобіологічну фазу, з метою подальшого попередження розвитку патологічних процесів та проведення профілактичних заходів. [8,9,10,11]

Мета дослідження. Встановити особливості морфологічних змін у оболонках стінки жовчного міхура людей зрілого віку в порівняльно-анатомічному аспекті в різні пори року, що може допомогти у вирішенні проблеми ранньої діагностики жовчнокам'яної хвороби.

Матеріали і методи. Дослідження проведені на видалених жовчних міхурах померлих людей зрілого віку, причина смерті яких не пов'язана з патологією гепато-біліарної системи. Для вивчення будови стінки жовчного міхура використовували загально-гістологічні методи дослідження (фарбування препаратів гематоксилін-еозином та інші).

При проведенні структурного аналізу елементів стінки жовчного міхура у людей зрілого віку у літню пору року визначили певні особливості. В першу чергу, привертає увагу нерівномірне розміщення складок слизової оболонки. Найбільш високі складки слизової розташовуються в ділянці тіла жовчного міхура. Суміжні складки сполучаються між собою, утворюючи численні канали, якими циркулює жовч. Якщо врахувати, що ці канали вкриті епітелієм, то зрозуміло, що площа контакту жовчі з епітелієм значно збільшується. Відповідно, функціональна активність, стосовно всмоктування води та деяких хімічних речовин, в цій частині жовчного міхура сягає максимуму. Слизова оболонка дна та шийки жовчного міхура

утворює значно меншу кількість складок на одиницю площі. Висота їх, також, помітно зменшена. В деяких випадках, складки утворюють поодинокі короткі відгалуження. Це свідчить про їх атрофію. Сполучення між складками практично відсутні, за винятком окремих випадків. Ці дані свідчать про те, що всмоктувальна функція епітелію в ділянках дна та шийки жовчного міхура значно знижена.

Необхідно зазначити, що в ділянках де сполучнотканинна основа складок слизової містить більшу кількість кровоносних судин, власна пластинка слизової оболонки виглядає більш пухкою. Також в ній зустрічаються лімфосудини різного калібру. Поряд з цим, пухкою стає і міжм’язова сполучна тканина. М’язова оболонка виглядає розшарованою і складається з окремих пучків гладком’язових волокон, або окремих волокон розмежованих пухкою сполучною тканиною. В тих ділянках стінки жовчного міхура, де всмоктувальна функція значно знижена, власна пластинка слизової оболонки та міжм’язова сполучна тканина стають щільними та стоншеними.

Як відомо, адвентиція стінки жовчного міхура складається з грубоволокнистої сполучної тканини, основу якої складають звивисті, товсті колагенові волокна. Ця оболонка містить різнокаліберні гемо- та лімфосудин, а також нервові елементи. Найбільш значні зміни відзначалися в кровоносних судинах. Так, в окремих випадках, в оболонках артеріальних судин визначалася значна гіпертрофія внутрішньої оболонки стінки. Іноді спостерігався спазм артерій, який супроводжувався гіперплазією та розволокненням внутрішньої еластичної мембрани.

На деяких гістологічних препаратах відмічена зміна форми просвіту судин. Особливо чітко таке явище можна спостерігати у відносно крупних артеріях. Дрібні артерії мають, як правило, округлий просвіт, то зі збільшенням діаметру судини, просвіт поступово стає овальним, а інколи стінки артерії зближуються повністю і судина набуває поздовжньо сплющеного вигляду. Нерідко спостерігалася гіперемія. Але це явище більш притаманне венозному руслу. Гіперемія та застій, очевидно, стають причинами порушення кровотоку і, в подальшому, утворення мікротромбів. У артеріальних судинах виникають, переважно, пристінні тромби, а у венозних - утворюються обтуруючі мікротромби. Цілком вірогідно, що вказані структурні зміни кровоносного русла порушують процеси кровопостачання оболонок стінки жовчного міхура, що веде до патологічних змін і, в першу чергу, атрофії власної пластинки слизової оболонки та м’язової оболонки стінки жовчного міхура. Таким чином, порушення кровообігу в стінці жовчного міхура викликають структурні зміни,

наслідком яких є розлади функцій окремих елементів, та в цілому стінки жовчного міхура.

Дослідженнями стінки жовчного міхура людей зрілого віку у зимову пору року, виявлено деякі особливості структурної організації складок слизової оболонки та судинних елементів, що може свідчити про зниження процесів всмоктування саме в цей період. В ділянці шийки жовчного міхура спостерігається зменшення кількості складок слизової оболонки на одиницю площі, зменшення їх висоти і ширини, сполучення між ними практично відсутні. Власна пластинка слизової оболонки в цій ділянці стінки часто стоншена та ущільнена. Такі структурні зміни свідчать про значне зниження всмоктувальної активності.

Відмічаються структурні зміни в стінках артеріальних та венозних судин, та змінюється характер їх просвітів. На поперечних зрізах венозних судин, у просвіті помітні скупчення елементів крові. Незалежно від розмірів судин, їх просвіт може бути частково, або повністю заповнений згустками крові. Частіше такі зміни зустрічаються у венах адвентиції стінки жовчного міхура. Характерно, що при наявності згустків крові у венах, в оточуючій їх сполучній тканині виникає набряк. В артеріальних судинах часто зустрічаються потовщення всієї стінки, або окремих її оболонок. Відмічається гіпертрофія та складчастість внутрішньої оболонки. Інколи, це супроводжується потовщенням і м’язової оболонки. Звісно, що такі зміни можуть призводити до звуження просвіту судин, а в подальшому до порушення кровопостачання. Поряд з цим у просвіті, як артеріальних так і венозних судин, з’являються конгломерати клітинних елементів, переважно адгезованих еритроцитів, що веде до тромбоутворення. У венозній системі переважають обтуруючі мікротромби, а у артеріальних судинах частіше зустрічаються пристінні мікротромби. Подібна перебудова стінок кровоносних судин, та утворення тромбів суттєво змінює характер кровопостачання стінки жовчного міхура, що веде до порушення його функцій.

Наслідком таких порушень є утворення округлих пігментних гранул, які нерівномірно розташовуються в стінці жовчного міхура. Як показують дослідження, елімінація пігментних гранул з порожнини жовчного міхура здійснюється клітинами покривного епітелію складок слизової оболонки до лімфатичних та венозних судин, з подальшим переміщенням їх у судини адвентиційної оболонки. На підставі цих даних можна припустити, що пігментні мікрогранули, при неналежній елімінації

вищезазначеними шляхами та накопиченні їх у жовчному міхурі можуть стати основою для утворення каменів.

Розглянемо структурну організацію стінки жовчного міхура людей зрілого віку в осінню та весняну пори року. В першу чергу, необхідно зазначити структурні особливості складок слизової оболонки. Всі складки досить високі, розгалужені і розміщені відносно рівномірно на всій поверхні стінки. Практично в усіх досліджених випадках виявлені особливості будови сполучнотканинної основи складок. Їх каркас складається переважно з еластичних волокон, між якими знаходяться щілиноподібні проміжки, що сполучають між собою верхівку та основу складок. Ми вважаємо, що такі структури створені для повноцінного відтоку продуктів функціонування епітеліоцитів слизової оболонки.

У власній пластинці слизової оболонки помітно змінюється склад сполучної тканини порівнянно зі сполучнотканинною основою складок. В ній переважають колагенові волокна і значно зменшена кількість еластичних волокон. В товщі власної пластинки слизової оболонки часто знаходяться тонкостінні судинні структури, які за діаметром та будовою стінки належать до лімфатичних судин. Часто ці судини, об’єднуючись, утворюють більшого діаметру колектори. Останні на препаратах представлені переважно поперечними зрізами. Можна зробити висновок, що основна маса цих судин має поздовжній напрямок. Крім того, у власній пластинці іноді знаходяться і циркулярні лімфатичні судини. Між шарами м’язової оболонки зустрічаються прошарки пухкої сполучної тканини. В таких прошарках сполучної тканини розміщені дрібні лімфатичні судини. Можна припустити, що за рахунок скорочення м’язової оболонки відбувається пасивне переміщення лімфи в лімфатичних судинах.

Найбільш показовими є зміни структурних елементів в адвентиції стінки жовчного міхура. Ця оболонка складається з щільної сполучної тканини, в якій переважають грубі колагенові волокна. Кровоносні судини різного калібру, як артерії так і вени, на поперечних зрізах виглядають округлими або овальними. Просвіти таких судин виглядають пустими. Це свідчить про нормальну реологію крові в них. Такий же вигляд мають і крупні лімфатичні судини даної оболонки.

Результати дослідження. Встановлено наявність структурних змін у слизовій оболонці жовчного міхура, які спостерігались в літню та зимову пори року. Складки слизової оболонки різних анатомічних відділів жовчного міхура відрізнялися висотою,

шириною, та щільністю розташування. У ділянці тіла жовчного міхура слизова оболонка утворювала більшу кількість складок та більш високих, ніж в ділянках дна та шийки. В осінню та весняну пори року, складки слизової оболонки на всій площі стінки розташовувалися відносно рівномірно, та були більш високими і розгалуженими.

В артеріальних судинах різного калібру спостерігалося потовщення стінки, деформація просвітів за рахунок зовнішнього здавлювання, гіперемія, стаз та утворення пристінкових мікротромбів. У венах, переважно крупного калібру, відмічалися гіперемія та стаз. Часто у венозному руслі спостерігалися обтуруючі мікротромби. В осінню та весняну пори року кровоносні судини стінки жовчного міхура на поперечних зрізах виглядали округлими або овальними, а їх просвіти пустими.

Відмічалася характерна реакція лімфатичних судин на вплив факторів зимової та літньої пори року. В лімфатичних судинах спостерігалися явища лімфостазу та розширення відповідних судин. Виявлено порушення стану жовчі, які полягають в утворенні на поверхні слизової оболонки округлих дрібних коричневих гранул, які також можна спостерігати в епітелії складок слизової оболонки та в просвіті лімфатичних судин стінки жовчного міхура. Подібні пігментні гранули часто виявляються у цитоплазмі адипоцитів. В осінню та весняну пори року зрізи крупних лімфатичних судин мають округлу або овальну форму.

На основі проведених досліджень виявлені морфологічні зміни стінки жовчного міхура людей зрілого віку в різні пори року. Встановлено, що найбільш виражені структурні зміни відбуваються в слизовій оболонці в літній та зимовий періоди, що може привести до виникнення патологічних процесів у стінці жовчного міхура.

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Clinical laboratory parameters of the norm In children cariology

Abstract.

At the current stage of dentistry development, a considerable baggage of knowledge about pathological changes in the mouth cavity has been accumulated; however, the data defining the norm in dentistry are scarce. The purpose of this research is to determine clinical and laboratory parameters of the norm in children cariesology. In line with the WHO recommendations, to achieve the purpose set we formed three age groups, each clinically homogenic and consisting of caries resistant children aged 5-6 years old, 12 years old, and 15 years old. The children background check and dynamic examination (for two years) were carried out using information research methods for dentistry. Clusterization results allowed finding "the perfect" values of caries resistance and creating mathematical models which formed the foundation for computer software. The software is aimed at children examination during prophylactic periods in order to prescribe them individual prophylactic strategies.

Key words: caries resistant children, clinical laboratory parameters, forecasting, mathematical models, computer software.

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Клинико-лабораторные показатели нормы в кариесологии детского возраста

Резюме

На современном этапе развития стоматологии накоплен большой багаж знаний, касающийся патологических изменений в полости рта, но при этом очень мало данных о норме в стоматологии. *Цель исследования:* определение клинико-лабораторных показателей нормы в кариесологии детского возраста. Согласно рекомендациям ВОЗ для достижения поставленной цели были сформированы 3 возрастные клинически однородные группы, состоящие из кариесрезистентных детей 5-6-ти, 12-ти и 15-ти лет. Проведено фоновое и динамическое (2 года) стоматологическое обследование детей с использованием информативных методов исследования в стоматологии. Итоги кластеризации позволили определить «идеальные» цифры кариесрезистентности и создать математические модели, которые легли в основу программ для ЭВМ. Программы предназначены для обследования детей в диспансерные сроки наблюдения с целью назначения индивидуального комплекса профилактических мероприятий.

Ключевые слова: кариесрезистентные дети, клинико-лабораторные показатели, прогнозирование, математические модели, программы для ЭВМ.

Актуальность:

Кариес зубов остаётся одним из самых распространённых заболеваний среди детского населения всего мира. Остаётся актуальным на сегодняшний день совершенствование и поиск эффективных и доступных путей профилактики кариеса зубов в детском возрасте.

На современном этапе развития стоматологии накоплен большой багаж знаний, касающийся патологических изменений в полости рта, но при этом очень мало данных о норме в стоматологии. Только знание возрастной нормы даст возможность прогнозировать риск возникновения и развития заболевания и позволит снизить заболеваемость кариесом зубов в детском возрасте.

Цель исследования: определить клинико-лабораторные показатели нормы в кариесологии детского возраста.

Материал и методы: Согласно рекомендациям ВОЗ для достижения поставленной цели были сформированы 3 возрастные клинически однородные группы, состоящие из кариесрезистентных детей 5-6-ти, 12-ти и 15-ти лет. Проведено фоновое и динамическое (2 года) стоматологическое обследование детей с использованием информативных методов исследования в стоматологии для возможности, в дальнейшем, применения их на практике в стоматологических клиниках.

Стоматологическое обследование проводилось по методике, рекомендуемой ВОЗ (1989) [11]. Клинические методы исследования включали в себя сбор анамнеза, осмотр полости рта, определение индексов интенсивности кариозного процесса (кп, КПУ+кп, КПУ); индекса РМА; индекса гигиены Грина-Вермиллиона; ТЭР-тест, КОСРЭ-тест в модификации Г.Г. Ивановой. Родителями заполнялась анкета, подписывалось добровольное информированное согласие [9, 10].

В лаборатории исследовались физико-химические параметры ротовой жидкости по известным методикам [3,6,13]. Определяли общий кальций, фосфор; активный калий и натрий; вязкость и скорость секреции слюны; pH слюны; деминерализующую активность и утилизирующую способность осадка ротовой жидкости; удельную электропроводность (УЭП) и тип микрокристаллизации слюны (МКС), вычисляли произведение растворимости (ПР) и массу осадка ротовой жидкости.

Тип МКС слюны определялся по методике, учитывающей не только типы кристаллизации, но и их подтипы [5].

Статистическая обработка полученных данных проводилась при помощи программ SPSS Statistics 17.0, SPSS Statistics 20.0, Microsoft Exeel. При оценке статистической значимости полученных результатов использовали двухвыборочный тест для связанных выборок (Paired – Samples T test). Корреляционный анализ проводился с помощью коэффициента ранговой корреляции Спирмена. При проведении факторного анализа использовался метод VARIMAX. Использовался быстрый кластерный анализ, носящий название метода «k-средних» [1, 5, 12, 14, 15, 20, 22, 23].

Вычисления производились при помощи ПВЭМ Pentium P-II-266 в среде Microsoft WINDOWS 2010.

Языком программирования, который использовался при разработке программ для ЭВМ, является «python» [16]. Для реализации интефейса пользователя был использован порт библиотеки «Qt4» на «python» «PyQt4» [17]. Сборка Windows-приложений осуществлялась с помощью приложения «py2exe» [18, 19].

Результаты и их обсуждение: В результате проведённого исследования получены фоновые клинико-лабораторные показатели состояния полости рта у кариесрезистентных детей 5-6-ти лет, 12-ти лет, 15-ти лет.

В процессе динамического наблюдения установлены статистически значимые различия (значимость менее 0,05) не только внутри возрастных групп, но и между группами по однотипным параметрам. Это говорит о нестабильности обменных процессов, проходящих в здоровой полости рта растущего организма и созвучны с нестабильностью обменных процессов в организме ребёнка в целом.

При определении типа микрокристаллизаци слюны в возрастных группах кариесрезистентных детей установлены закономерности. Однозначно преобладание во всех возрастных группах 2-го типа МКС; по мере взросления организма ребёнка снижается процент лиц с 3-м типом МКС; процент 1-го типа МКС возрастает по мере формирования прикуса, как временного, так и постоянного. Во время нестабильности зубочелюстного аппарата ребёнка (12 лет) 1-ый тип МКС встречается наиболее редко, лишь в 7% случаев.

Результаты дисперсионного анализа клинико-лабораторных показателей гомеостаза полости рта кариесрезистентных детей 5-6-ти лет показал, что кластеры клинико-лабораторных показателей гомеостаза полости рта кариесрезистентных детей 5-6-ти лет значимо отличаются по показателям МКС ($p<0,01$), общего кальция

и общего фосфора ротовой жидкости ($p<0,05$), по клиническим индексам ИГР-У, РМА, ТЭР-теста, КОСРЭ-теста, ЭП-1 ($p<0,0001$) и ПР ($p<0,0001$).

Согласно полученным данным, кластеры клинико-лабораторных показателей гомеостаза полости рта кариесрезистентных детей 12-ти лет значимо отличаются по показателям ИГР-У ($p<0,05$), РМА ($p<0,0001$), МКС ($p<0,05$), ПР ($p<0,05$), pH налёта после нагрузки ($p<0,005$), УЭП ($p<0,05$), ΔCa ($p<0,05$).

Кластеры клинико-лабораторных показателей гомеостаза полости рта кариесрезистентных детей 15-ти лет значимо отличаются по показателям ΔpH ($p<0,005$), ИГР-У ($p<0,05$) и РМА ($p<0,0001$), по показателям МКС ($p<0,05$), ПР ($p<0,05$), pH налёта после нагрузки ($p<0,05$), общего кальция ($p<0,05$), СПЗ ($<0,005$), активного натрия ($p<0,001$), активного калия ($p<0,0001$), общего фосфора ($p<0.01$), ПР ($p<0,01$), УЭП ($p<0,0001$). Наиболее широкий спектр статистически значимо отличных лабораторных показателей гомеостаза полости рта 15-тилетних детей говорит о высокой ценности данной возрастной группы в плане прогнозирования развития кариозного процесса [4, 8, 9].

Необходимо помнить, что при анализе результатов дисперсии кластерного анализа, значения F-статистики следует использовать только как индикатор по причине того, что кластеры выбирались так, чтобы максимизировать расхождения между наблюдениями из разных кластеров. Наблюдаемые уровни значимости не скорректированы соответственно, и потому их нельзя применять для проверки гипотезы о равенстве средних значений кластеров. По этой причине для объективного определения параметров нормы в детской кариесологии мы наложили результаты кластерного анализа на результаты клинического наблюдения в каждой возрастной группе. В итоге образовалось по два искусственно синтезированных кластера в каждой возрастной группе: кластер кариесрезистентных лиц и кластер кариесподверженных лиц.

Центр кластера кариесрезистентных лиц составили средние цифры фоновых клинико-лабораторных показателей гомеостаза полости рта у детей, кариесрезистентность которых была установлена статистически путём кластерного анализа и подтверждена клинически в результате динамического наблюдения (таблица 1). Именно эти цифры и являются клинико-лабораторными параметрами нормы в детской кариесологии, которые легли в основу созданных нами математических моделей для прогнозирования риска развития кариеса зубов у

Таблица 1

Клинико-лабораторные показатели центра кластеров кариесрезистентных детей

Возраст	5-6 лет	12 лет	15 лет
МКС (баллы)	4,2 ±0,5	3,7 ±0,1	3,0 ±0,4
pH нал.до	5,90 ±0,3	5,80 ±0,3	6,01 ±0,3
pH нал.по	5,68 ±0,2	5,45 ±0,3	5,30 ±0,3
СМ (баллы)	0,2 ±0,05	1,7 ±0,04	1,6 ±0,04
ЛБ (баллы)	0,5 ±0,03	0 ±0,03	0,5 ±0,03
pH сл.	7,20 ±0,2	7,10 ±0,2	7,06 ±0,2
Вязкость (СПЗ)	0,823 ± 0,01	0,795 ± 0,01	0,844 ± 0,03
aNa (г/л)	0,238 ± 0,05	0,240 ± 0,05	0,313 ± 0,05
aK (г/л)	0,769 ± 0,05	0,821 ± 0,06	0,801 ± 0,08
Ca (г/л)	0,0343 ± 0,005	0,0393 ± 0,009	0,0415 ± 0,004
P (г/л)	0,125 ± 0,02	0,135 ± 0,02	0,109 ± 0,02
УЭП ($Ом^{-1} \cdot см^{-1} \cdot 10^{-3}$)	2,390 ±0,4	4,193 ±0,4	2,943 ±0,4
ΔpH	0,518 ±0,5	2,293 ±0,5	1,983 ±0,5
ΔCa (г/л)	0,005 ± 0,01	0,020 ± 0,02	0,0294 ± 0,01
ПР (ПР·10^7)	2,68 ±0,7	3,12 ±0,3	2,74 ±0,3
Масса осад (мг/мл)	27,98 ±9,0	48,57 ±9,0	36,5 ±10,0
ИГР-У (баллы)	0,3 ±0,09	0,4 ±0,09	0,8 ±0,05
РМА (%)	1,7 ±0,08	12,0 ±0,06	10,0 ±0,06
ТЭР-тест (мкА)	3,84 ±0,3	0,33 ±0,3	0,78 ±0,3
КОСРЭ-тест (мкА)	0,68 ±0,08	0 ±0,06	0,05 ±0,06
ЭП-1 (мкА)	0,7 ±0,06		

Примечание: ИГР-У – индекс гигиены полости рта; аК – активная концентрация ионов калия; КОСРЭ-тест – тест для оценки скорости реминерализации эмали; ЛБ – Lactobacillus; МКС – микрокристаллизация ротовой жидкости; ПР – произведение растворимости; Р – общая концентрация ионов фосфора; РМА – папиллярно-маргинально-альвеолярный индекс (индекс гингивита); СМ - Streptococcus mutans; СПЗ – сантопуазы (вязкость ротовой жидкости); ТЭР-тест – тест эмалевой резистентности; УЭП – удельная электропроводность ротовой жидкости; ЭП-1 – электропроводность эмали временных зубов; pH нал. до – pH зубного налёта до углеводной нагрузки; pH нал. по – pH зубного налёта после углеводной нагрузки; pH сл. – pH ротовой жидкости; ΔpH (pHосад) – утилизирующая способность осадка ротовой жидкости; ΔCa (Ca осад) – деминерализующая активность осадка ротовой жидкости.

детей 5-6-ти лет, 12-ти лет, 15-ти лет [1, 6, 14, 15]. Математические модели апробированы в клинике стоматологии детского возраста и легли в основу разработанных программ для ЭВМ «Стоп-кариес» [9]. Программы предназначены для комплексного стоматологического обследования детей в диспансерные сроки наблюдения с целью назначения индивидуального комплекса профилактических мероприятий.

Установленные показатели нормы в детской кариесологии позволят глубже взглянуть на природу заболеваемости кариесом в детском возрасте и предоставляют возможность профилактировать заболевание на донозологическом этапе его развития.

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Seeking ways to improve mental performance adolescents in secondary schools

Annotation. School studied the possibility of working with adolescent students to improve their mental health by means of tourist and regional studies. Received convincing evidence the crucial role of an integrated approach to the comprehensive development of the younger generation and high efficiency of tourist and regional studies to improve his mental health.

Key words: mnemcheskie and perceptual functions, tourist and local lore activity intensification.

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Поиск путей повышения умственной работоспособности подростков в условиях общеобразовательной школы

Аннотация. Исследованы возможности школы в работе с учащимися подросткового возраста по улучшению их умственной работоспособности средствами туристско-краеведческой деятельности. Получено убедительное подтверждение решающей роли комплексного подхода к всестороннему развитию подрастающего поколения и высокой эффективности туристско-краеведческой деятельности в улучшении его умственной работоспособности.

Ключевые слова: мнемческие и перцептивные функции, туристско-краеведческая деятельность, интенсификация.

Актуальность изучения роли туристско-краеведческой работы с подрастающим поколением сомнению не подлежит. Получив заслуженное признание. [9; 12; 13] и являясь организованным в педагогических целях комплексом воспитательных, образовательных и оздоровительных мероприятий, она направлена на активное познание [4] и преобразование молодым поколением окружающей действительности [9], материальной и духовной общественной культуры [2; 12; 13], эстетическое освоение природы, всестороннее развитие физических [6] и духовных сил учащихся в условиях активного отдыха [1; 3; 10], связанного с передвижением в туристских коллективах [5]. Она объединяет усилия школы по всестороннему воспитанию школьников [6; 7], предполагающему гармоничное сочетание нравственного, умственного, трудового, физического и эстетического воспитания, что возможно лишь при комплексном подходе к воспитанию, обеспечивающему единство всех его сторон [1; 9; 13].

Туристско-краеведческая деятельность школьников, являясь одним из видов общественной деятельности, повышает культурный уровень, нравственно и физически совершенствуется, рационально используя свободное время [5; 10].

Целью наших исследований было изучение возможности использования туристско-краеведческой деятельности школьников для совершенствования их мнемических и перцептивных функций.

Для этого был проведен двухгодичный педагогический эксперимент, в котором приняли участие будущие учителя физической культуры. В первых числах сентября

во время педагогической практики были организованы туристско-краеведческие секции, в состав которых вошли только не занимающиеся спортом учащиеся 11-12-летнего возраста, составив опытную группу в количестве 32 человека (19 девочки и 13 мальчиков). Контролем служило 23 учащихся (14 девочек и 9 мальчиков из тех же классов и школ).

По опыту предыдущих исследований для обеспечения регулярной работы с детьми за такими секциями закрепляли по 3-4 студента-практиканта, что обеспечивало регулярную работу с учащимися на протяжении всего времени педагогического эксперимента.

На первых порах в работу туристско-краеведческих секций включали экскурсии в музеи, на природу (походы выходного дня) с играми на местности а позже и с соревнованиями по ориентированию, с преодолением усложняющейся со временем туристской полосы препятствий. Эта работа уже через два-три месяца показала необходимость в тренировочном процессе, так как пришедшие в туристско-краеведческие секции не занимающиеся ранее спортом дети имели в большинстве своем слабую физическую подготовку. И интерес к работе в туристско-краеведческой секции повлек их на тренировочные занятия, предусматривающие улучшение их общей физической подготовки, что в последствии сказалось на уровне их физических качеств, а так же повышение умственной работоспособности участников педагогического эксперимента.

Во время школьных каникул учащиеся опытной группы проводили многодневные походы с учетом сезона, во время которых дети принимали участие в разнообразных играх по ориентированию на местности с помощью компаса и топографических карт местности, которой проходил маршрут очередного похода. Такие игры проводились с учетом поставленной цели. Игры по ориентированию на местности с компасом и картой должны были способствовать развитию у детей внимания и памяти.

В туристских мероприятиях за пределами территории школы охотно принимали участие родители ребят, что делало такие мероприятия более интересными и безопасными.

Эффективность туристско-краеведческой работы, в плане поставленной цели, изучена в естественном длительном преобразующем педагогическом эксперименте [8] с использованием методов экспериментально-эмпирического и теоретического уровней.

Динамика умственной работоспособности изучалась методикой дозирования работы во времени с помощью таблиц В.Я. Анфимова.

Результаты педагогического эксперимента. О влиянии туристско-краеведческой работы на умственную работоспособность подростков судили по динамике мнемических и перцептивных функций в течении недели, текущего учебного года и по результатам исследования двух лет педагогического эксперимента.

Анализ результатов педагогического эксперимента показал, что до средины недели у учащихся обеих групп наблюдалось улучшение как перцептивных так и мнемических функций, о чем судили по динамике продуктивности внимания, количеству ошибок внимания, по объему памяти и количеству ошибок памяти. Со второй половины учебной недели фиксировали снижение уровня изученных показателей с явным их ухудшением к концу учебной недели у школьников обеих групп, но менее выраженное у учащихся опытной группы. К концу учебной недели перцептивные и мнемические функции учащихся опытной группы находились на более высоком уровне, о чем свидетельствует более высокая продуктивность внимания учащихся и объем памяти при более низких показателях ошибок внимания и памяти. Так, у учащихся 13-ти лет опытной группы в последний день учебной недели продуктивность внимания была на 26, 8 % выше по сравнению с аналогичным показателем ровесников контрольной группы, у 14-летних школьников – на 15,9%. Выше у школьников опытной группы был и объем памяти соответственно на 9,1%, на 6,3%.

Ошибки внимания и памяти у учащихся опытной группы контрольных возрастов к концу учебной недели были меньше по отношению к ровесникам контрольной группы.

Представляла интерес динамика мнемических и перцептивных функций школьников в течение учебного года. Анализ результатов исследования показал, что к концу третьей учебной четверти у учащихся контрольной и опытной групп наблюдалось снижение продуктивности внимания а также снижение показателей объема и ошибок памяти, более выраженное у ровесников контрольной группы. Следует отметить, что ухудшение показателей мнемических и перцептивных функций учащихся обеих групп продолжалось до конца учебного года, оставаясь лучше таковых у учащихся опытной группы. Так, к концу учебного года показатель

продуктивности внимания учащихся 13-ти лет опытной группы был лучше по отношению к ровесникам контрольной группы на 5,2%, 14-летних – на 8,8% .

Показатель объем памяти учащихся опытной группы к концу учебного года был больше по отношению к контрольной группе соответственно на 2,9%, и 9,8% . Ошибки внимания к концу учебного года были выше у учащихся контрольной группы соответственно на 9,3% и на 13,2%. Показатели ошибок памяти составили соответственно 27,3% и 38,3%.

Таким образом, учащиеся опытной группы на протяжении всего учебного года сохраняли более высокую умственную работоспособность по сравнению с учащимися контрольной группы.

К концу педагогического эксперимента изученные показатели обеих групп школьников сохранили тенденцию годичных изменений, но оставались более высокими у школьников опытной группы.

Выводы и практические рекомендации. Комплексный подход к воспитанию, исключая односторонность в работе педагогов, недооценку отдельных воспитательных задач, способствует оптимизации учебно-воспитательного процесса и достижения поставленных целей, а учет результатов воспитания дает возможность педагогу видеть плоды своей работы, обнаружить упущения, недостатки и устранить их. Благодаря такому учету, в центре внимания учителя оказывается реальное состояние всестороннего развития каждого из его воспитанников, что имеет решающее значение для индивидуализации процесса воспитания, для научного обоснования планирования воспитательной работы. Кроме того, появляется возможность получения конкретных данных об эффективности производимой работы, решающей определенные задачи.

Таким образом, решая задачи поиска путей улучшения умственной работоспособности подрастающего поколения, можно отдавать предпочтение регулярной туристско-краеведческой деятельности, показавшей на практике свою убедительную эффективность.

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Health students: features and perspectives of physical rehabilitation in higher education

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Стан здоров'я студентів: особливості та перспективи використання фізичної реабілітації в системі вищої освіти

Актуальність дослідження. За даними офіційної статистики, здорове населення України становить на сьогоднішній день приблизно близько 5-10%. У суспільстві зберігається споживацьке ставлення населення до власного здоров'я, не формується відповідальність і мотивація щодо його збереження і зміцнення.

Особливою загрозою майбутньому країни є нинішній стан здоров'я і способу життя найбільш перспективних у віковому аспекті категорій населення - дітей та молоді. В даний час кожна п'ята дитина народжується з відхиленнями у стані здоров'я [1, 2, 9, 13].

Великі розумові і статистичні навантаження в ВНЗах, відсутність додаткової рухової активності, малорухомий спосіб життя, нераціональне харчування, та звички тютюнопаління приводять до того, що в більшості студентів погіршується діяльність серцево-судинної і дихальної систем, зір, порушується обмін речовин, зменшується опірність організму до різних захворювань, що приводить до погіршення стану їхнього здоров'я [5, 7, 14].

За літературними даними [2, 10, 11] в Україні більше половини (52 %) студенів взагалі не займаються фізичною активністю; близько 28 % займаються фізичною активністю менше 150 хв на тиждень, при цьому фізична активність має не регулярний характер, в основному за рахунок прогулянок та ранкової гімнастики. Лише 20 % студентів мають регулярний характер рухової активності, за рахунок відвідування спортивних секцій, спортивних студій та фітнес центрів. В той же час, серед європейських студентів 43% мають рухову активність високої інтенсивності, 59% - помірної інтенсивності. Серед американців 49% мають рухову активність, серед них помірної інтенсивності - 21%, середньої інтенсивності - 28% [10].

Все це производить до того, що в Україні від 50% до 75% студентів мають незадовільну фізичну підготовленість, низькі функціональні показники, прискорені темпи біологічного старіння [1, 7, 12]. 65% юнаків за станом здоров'я не можуть бути покликаними до служби в армії [1, 9, 11]. Більш того, все частіше ми спостерігаємо випадки раптової смерті, причому не тільки серед професійних спортсменів, а й серед школярів і студентів під час занять оздоровчою фізичною культурою. Спостерігається зростання інвалідності після перенесених захворювань і травм [10].

Дослідження, проведені в Україні, показали, що сьогодні біологічний вік молодих людей 17-18 років в 2-3 рази перевищує їх вік по паспорту [1, 5, 10, 14]. В середньому по Україні у юнаків біологічний вік становить 40-44 роки, у дівчат 35-38 років [1, 5, 10, 14].

На думку провідних фахівців [2, 3, 9, 12, 14], досягнення оптимального рівня здоров'я молоді повинно відбуватися шляхом правильної організації і побудови занять з фізичного виховання у вищих навчальних закладах, особливо в спеціальних навчальних відділеннях, відсоток яких, на жаль, постійно зростає.

Таким чином, зважаючи на все вище викладене, у сучасних умовах важливим завданням в роботі ВНЗів зі зміцнення здоров'я, є мотивація у студентів стійкого інтересу до занять фізичними вправами. У зв'язку з цим необхідно використовувати

всі форми фізичного виховання, а також самостійні заняття фізичними вправами вдома з метою підвищення рухової активності, зміцнення здоров'я, поліпшення фізичної підготовленості студентів-підлітків. Це в свою чергу передбачає наявність спеціалістів, які здатні надати методичні та практичні рекомендації з організації занять з фізичного реабілітації, планувати та впроваджувати в практику освітньої діяльності запропоновані рекомендації, планувати та проводити, а також контролювати навчальних процес студентів спеціального навчального відділення у вищих навчальних закладах освіти.

В свою чергу все вище сказане обумовлює актуальність проведеного дослідження.

Мета дослідження – обґрунтувати необхідність використання індивідуальних засобів фізичної реабілітації в системі вищої освіти на основі оцінки стану здоров'я, рівня фізичного розвитку і фізичної підготовленості студентів спеціального навчального відділення.

Завдання дослідження:

1. Визначити особливості способу життя та наявні захворювання студентів спеціального навчального відділення.
2. Оцінити стан здоров’я, рівень фізичного розвитку та фізичної підготовленості студентів спеціального навчального відділення.
3. Обґрунтувати необхідність використання засобів фізичної реабілітації в системі вищої освіти.

Матеріали та методи дослідження: аналіз науково-методичної та спеціальної літератури з існуючого питання, вивчення документальних матеріалів та існуючих моніторингів щодо стану здоров’я студентів спеціального навчального відділення, оцінка стану соматичного здоров’я за методикою Г.Л. Апанасенко [6], визначення інфекційного індексу (кількість перенесеної ГРВІ протягом року), рівня фізичного розвитку (ІФР) за методом індексів [15] та фізичної підготовленості студентів [6]. Статистична обробка отриманих результатів здійснювалася за допомогою програми STATISTIKA 6.0.

Організація дослідження. Дослідження проводилося на базі Національного медичного університету ім. О.О. Богомольця (медичного та медико-психологічного факультетів) – 76 студентів, Дніпропетровської державної медичної академії (лікарняного факультету) – 84 студенти, Запорізького національного технічного

університету (електротехнічного, транспортного та машинобудівного факультетів) – 124 студенти, Запорізького національного університету (історичного, математичного та фізичного факультетів) – 78 студентів. В дослідженні прийняли участь 362 студента 1-3 курсів зазначених вищих навчальних закладів освіти. Середній вік студентської молоді склав від 18 до 20 років (19,24±1,36). Жінок було 170, чоловіків - 192. Серед обстежених до спеціального навчального відділення було віднесено 143 студенти (39,5%) з них 74 (51,75%) жінки та 69 (48,25%) чоловіки.

Аналіз індивідуальних медичних карт студентів спеціального навчального відділення здійснювався за згодою студентів, що була отримана письмово.

Результати дослідження та їх обговорення.

За результатами проведеного аналізу медичних карт з метою диференціації засобів фізичного виховання в групі спеціального навчального відділення всі студенти були розподілені на чотири підгрупи [3, 4]. До підгрупи «А» було віднесено 69 студентів (48,25%) з серцевими захворюваннями (ревматизм, ревмокардит, ревматоїдні компенсовані пороки серця), з тонзилокардіальним синдромом, хронічними захворюваннями бронхів, легенів, нирок. Підгрупу «Б» склали 37 студентів (25,87%), які мали захворювання шлунково-кишкового тракту, хвороби залоз внутрішньої секреції, функціональні розлади центральної нервової системи. До підгрупи «В» увійшли 14 студентів (9,8 %), які мали порушення опорно-рухового апарату, а до підгрупи «Г» - 23 студенти (16,08%), які мали судинні розлади: гіпер- та гіпотензію, вади зору (табл. 1).

Таблиця 1

Розподіл студентів спеціального навчального відділення за підгрупами (n=143)

№ з/р	підгруппа	«А» (n=69)		«Б» (n=37)		«В» (n=14)		«Г» (n=23)	
		n	%	n	%	n	%	n	%
1	чоловіки	34	49,27	17	45,94	10	76,92	8	34,78
2	жінки	35	50,73	20	54,06	4	23,08	15	65,22

Аналізуючи розподіл студентів за підгрупами слід зазначити, що здебільшого студенти I – III курсів мають серцеву патологію та патологію в системі зовнішнього дихання; друге місце по чисельності мають захворювання шлунково-кишкового тракту, хвороби залоз внутрішньої секреції, функціональні розлади центральної

нервової системи; найменш поширені серед студентів травми опорно-рухового апарату та порушення органів зору.

Аналіз оцінки стану соматичного здоров'я та інфекційного індексу студентів спеціального навчального відділення дозволив констатувати, що загальний інфекційний індекс дорівнював 3,07. Це є вище норми і може бути провокуючим фактором загострення хронічних захворювань внаслідок перенесених гострих респіраторних вірусних інфекцій. Високий інфекційний індекс було визначено у студентів «А» та «Б» підгруп (3,19 та 3,43 відповідно). В той час, як в підгрупах «В» та «Г» інфекційний індекс був вірогідно нижчим (2,32 та 2,60 відповідно $p<0,05$), але перевищував норму.

Переважна кількість студентів спеціального навчального відділення мала низький та нижче за середній рівень соматичного здоров'я (53,8% та 33,6% відповідно). Середній рівень було констатовано у 17 студентів (11,9%). Вище за середній та високий рівні соматичного здоров'я не визначено у жодного зі студентів.

Серед студентів різних підгруп найгірші показники стану соматичного здоров'я було констатовано в підгрупі «А», що пояснюється характером, ступенем та особливістю протікання хронічних захворювань, і, внаслідок цього більш жорстким обмеженням щодо фізичних навантажень. Так, низький рівень мали більше половини студентів (56,5%), рівень нижче за середній було констатовано у 28,9% та середній рівень - лише у 14,5% студентів.

Аналогічну динаміку в стані здоров'я констатовано у студентів підгрупи «Б», що пояснюється особливістю протікання хронічних захворювань. Так, низький рівень соматичного здоров'я було визначено серед 28 студентів (75,7%), 8 студентів (21,6%) мали рівень нижче за середній, і, лише 1 студент (2,%) мав середній рівень соматичного здоров'я. При порівнянні рівня соматичного здоров'я чоловіків та жінок цієї підгрупи суттєвих відмінностей не визначено.

Студенти підгруп «В» та «Г» мали суттєво кращі показники соматичного здоров'я, ніж представники перших двох підгруп. В основному вони мали нижче за середній рівень соматичного здоров'я.

Подібну динаміку було визначено при оцінці фізичного розвитку студентів спеціального навчального відділення. Серед обстежених студентів спеціального навчального відділення половина (50,3%) була віднесена до IV групи ФР. III та V групу фізичного розвитку склала однакова кількість студентів, і тільки 5 студентів

(3,5%) були розподілені до II групи ФР. Слід зазначити, що V та IV групи ФР переважно склали студенти підгруп «А» та «Б». Студенти двох останніх підгруп увійшли до III та II груп за індексом фізичного розвитку. Найкращі показники фізичного розвитку було отримано в студентів підгрупи «В», що зумовлено характером захворювання – травми опорно-рухового апарату, яке не є стійким і в більшості випадків, з часом, студенти переходять до підготовчого та основного навчального відділення з фізичного виховання. Порівняльний аналіз індексу фізичного розвитку чоловіків та жінок суттєвих відмінностей не визначив.

Оцінка фізичної підготовленості студентів здійснювалась за допомогою апробованих тестів для спеціального навчального відділення, що передбачало оцінку рівня розвитку фізичних якостей: сили, витривалості, гнучкості, швидкості та координаційних здібностей. Отримані показники перераховувались у бали, що і було критерієм оцінки визначення рівнів підготовленості студентів. Так, за даними обстеження, переважна кількість студентів – 87 чоловік (60,8%) мала низький рівень фізичної підготовленості. В основному це були студенти підгрупи “А”, “Б”. Нижче за середній рівень було констатовано у 38 студентів (26,6%), більшість з яких були з підгрупи “В” і “Г”. 18 студентів (12,6%) мали середній рівень фізичної підготовленості. Слід зазначити, що вище за середній та високий рівень фізичної підготовленості не мав жоден зі студентів.

На основі аналізу отриманих даних було запропоновано зміст і спрямованість засобів фізичної реабілітації при плануванні занять з фізичного виховання спеціального навчального відділення, а також були розроблені та впроваджені загальні та приватні рекомендації щодо організації занять з фізичного виховання студентів.

Загальні рекомендації:

1. Розподіл студентів за підгрупами в залежності від існуючих хронічних захворювань.

2. Забезпечити необхідний рівень рухової активності, що відповідає загальним і індивідуальним вимогам за тривалістю, інтенсивністю, спрямованості фізичних вправ.

3. Строго дотримуватися медичних рекомендацій, не використовувати протипоказані засоби фізичного виховання.

4. Чітка диференціація цілей і завдань фізичної реабілітації, зважаючи на аналіз можливостей, що забезпечують відновлення м’язової сили й координації рухів, попередження й усунення контрактур, вироблення самостійного пересування, розвиток здібностей до маніпулятивних дій, нормалізацію обміну речовин, подиху, установлення контрольованих основ сечовипускання й дефекації, вироблення нових професійних навичок.

5. Інтерактивне використання в комплексах фізичної реабілітації різних інтерактивних методик.

6. Диференціація методики із застосуванням гімнастичних вправ, спортивних і рухливих ігор, вправ прикладного характеру.

Приватні рекомендації в залежності від існуючого захворювання та підгрупи:

1. Для підгрупи «А» та «Б» рекомендували проводити заняття тільки у щадному режимі. До комплексу вправ впроваджували ідеомоторні вправи та вправи на координацію. До 30% вправ - вправи на розслаблення, аутотренінгу. Рухливі та спортивні ігри, пов’язані з бігом, стрибками, метальними рухами, ударами, швидкими різноманітними діями учасників, що передбачали високу інтенсивність виконання не використовували.

2. Для підгрупи «В» з метою усунення дефектів опорно-рухового апарату (хребта, грудної клітки і стоп) рекомендували застосовувати методи корекції. Для зміцнення м’язового корсета хребта, м’язів спини використовували коригувальну гімнастику. З метою відновлення рухливості в суглобах, полегшення рухів, зміцнення м’язів, підвищення загальної працездатності рекомендували механотерапію. Тренування проводили в щадно-тренувальному та тренувальному режимах.

3. Студентам підгрупи «Г» не планували виконання вправ, що вимагають різких рухів з високим напруженням м’язового апарату. Заняття проводилися тільки в щадному та щадно-тренувальному режимах.

Всі запропоновані заняття складалися з 4-ох частин: вступної, підготовчої, основної та заключної.

Впровадження запропонованих засобів фізичної реабілітації в системі фізичного виховання студентів ВНЗів дозволило на 13,2% знизити кількість студентів віднесених до спеціального навчального відділення (табл. 2). Визначена тенденція до зменьшення кількісного складу студентів підгруп «А», «Б» та «Г». А в підгрупі

«В» переважна кількість студентів була розподілена з спеціального до підготовчого навчального відділення на заняттях з фізичного виховання.

Таблиця 2

Розподіл студентів спеціального навчального відділення до та після впровадження засобів фізичної реабілітації

№ з/р	підгруппа	«А»		«Б»		«В» (n=14)		«Г» (n=23)		Всього	
		до	після	до	після	до	після	до	після	до	після
		n=69	n=66	n=37	n=33	n=14	n=7	n=23	n=18	n=143	n=124
1	чоловіки	34	32	17	17	10	5	8	7	69	61
2	жінки	35	34	20	16	4	2	15	11	74	63

Повторний аналіз та оцінка соматичного здоров’я, індексу фізичного розвитку та рівня фізичної підготовленості підтвердив ефективність запропонованих практичних рекомендацій, що позначилося на рівні вищезазначених показників.

При оцінці стану соматичного здоров’я студентів спеціального навчального відділення констатували позитивні зміни. Низький рівень констатовано на 25,6% рідше, ніж на початку дослідження, рівень нижче середнього зустрічався на 18% частіше, а середній рівень фізичного здоров’я мали на 9% більше студентів. Достовірна динаміка соматичного здоров’я визначена в усіх підгрупах як чоловіків, так і жінок.

Аналогічна динаміка спостерігалася в показниках фізичного розвитку та фізичної підготовленості студентів.

Істотний перерозподіл кількості студентів за групами фізичного розвитку визначили в підгрупах “Б”, “В” та “Г”. Слід зазначити, що після впровадження засобів фізичної реабілітації 1% студентів було розподілено до I групи фізичного розвитку та кількісний склад II групи фізичного розвитку збільшився на 25,9% (за рахунок перерозподілу студентів підгрупи “Г”). Істотно збільшилась кількість студентів віднесених до III групи ФР (в підгрупі “А” на 18,9%, в підгрупі “Б” на 15,2%, в підгрупі “Д” на 15,8% і в підгрупі “Г” на 5,2%). Значно знизилася кількість студентів віднесених до IV групи фізичного розвитку (в підгрупі “Б” на 7%, в підгрупі “В” на 8,1% і в підгрупі “Г” на 26,8%).

Також, було визначено перерозподіл кількості студентів за рівнями фізичної підготовленості серед підгруп «А», «В» та «Г». Слід зазначити, що студенти вищезгаданих підгруп після проведення дослідження мали здебільшого середній та вище середнього рівні фізичної підготовленості (табл. 3).

Таблиця 3.

Оцінка фізичної підготовленості студентів спеціального навчального відділення до та після впровадження засобів фізичної реабілітації

Рівень ФП	Етап дослід ження	Всього		Підгрупа «А»		Підгрупа «Б»		Підгрупа «В»		Підгрупа «Г»	
		n	%	n	%	n	%	n	%	n	%
низький	до	87	60,8	56	81,2	17	45,9	2	14,3	12	52,2
	після	47	37,9	29	43,9	11	33,3	–	–	7	38,9
нижче за середній	до	38	26,6	13	18,8	8	21,6	6	42,85	11	47,8
	після	33	26,6	24	36,4	7	21,2	–	–	2	11,1
середній	до	18	12,6	–	–	12	32,4	6	42,85	–	–
	після	38	30,6	12	18,2	12	36,4	5	71,4	9	50,0
вище за середній	до	–	–	–	–	–	–	–	–	–	–
	після	6	4,8	1	1,5	3	9,1	–	2	28,6	–
високий	до	–	–	–	–	–	–	–	–	–	–
	після	–	–	–	–	–	–	–	–	–	–

Таким чином, зміни, що були впроваджені в процес фізичного виховання студентів ВНЗів є доцільними та вимагають наявності спеціалістів здатних забезпечувати процес фізичного виховання студентів спеціального навчального відділення.

Висновки.

Відсутність додаткової рухової активності, малорухомий спосіб життя, нераціональне харчування, та звички тютюнопаління приводять до погіршення стану здоров'я молоді, що позначається на збільшенні кількості студентів, віднесених до спеціального навчального відділення.

Запропоновані зміст і спрямованість засобів фізичної реабілітації при плануванні занять з фізичного виховання спеціального навчального відділення дозволили на 13,2% знизити кількість студентів у відділенні та підвищити їх стан соматичного здоров’я, фізичного розвитку та фізичної підготовленостів.

Необхідна підготовка фахівців – «фізичний терапевт», здатних вирішувати складні спеціалізовані завдання та практичні проблеми, пов'язані з порушенням функцій органів та систем, здатних планувати, організовувати та проводити заняття з фізичного виховання в спеціальних навчальних відділеннях з урахуванням індивідуальних особливостей стану здоров'я, фізичного розвитку та фізичної підготовленості студентів в залежності від існуючих захворювань.

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Isometric training and swimming in children with spinal deformities

Summary. The modern lifestyle and the reduced locomotor activity are factors promoting the appearance of abnormal posture and a variety of deformities of the spine and the thorax. The aim of the present study was to monitor the effect of isomeric training and swimming in children with spinal deformities on the buildup of a strong muscular corset. Study subjects consisted of 8 children with first-degree scoliosis and marked kyphosis (first group) and 7 children with first-degree scoliosis and marked lordosis in the lumbar region (second group), all of them 10-14 years of age. In the beginning and the by the end of the survey period, measurements and tests of the mobility of the spine and the thorax, manual muscle testing of the abdominal, back and gluteal muscles; Chizhin plantography were conducted. As a result of the training programme, the posture and gait of children were corrected, and a substantial improvement of the functional state of the entire locomotor apparatus was achieved.

Key words: *bad posture, scoliosis, training programme, general strengthening.*

INTRODUCTION

The proper posture depends on the anatomical structure of the vertebral column, the thorax and the shoulder, lower extremities and the normal functioning of the body, muscles and locomotor skills (Momchilova, 2009).

The physical development of children and adolescents correlates with their locomotor and nutritional regimen, their body constitution, their hardening, the early detection, prevention and treatment of acute and chronic growth-related disorders (Karaneshev, 1987). Spinal deformities are among the commonest juvenile diseases. They are only partially caused by urbanisation, acceleration and forced hypodynamia, proper of contemporary lifestyle. The rickets and bad posture are also possible reasons, which could enhance the appearance of a potential deformity (Karaneshev, 1991).

The formation of scoliosis is a complex pathological event. The first appearance is the lateral curving of the vertebral column. For a single curvature, it is related only to altered intervertebral disk shape within the physiological limits of the vertebral column. This type of scoliosis is reversible and in most instances, is believed to occur as a result of static and dynamic disturbances.

Modern lifestyle creates preconditions for the high prevalence of habitual scoliosis. It is among the commonest scoliosis types in infancy and adolescence, which could have an adverse evolution (Sokolov, 1991).

The early diagnostics, regular monitoring, treatment and proper locomotor regimen contribute to the favourable outcome of initial deformities in children. The good management of treatment measures including complex rehabilitation and swimming, as well as regular surveys of treatment outcome are of primary importance to prevent severe spinal deformities and secondary complications which could lead to significant disability.

The aim of the present research was to monitor the effect of isometric training and swimming in children with spinal deformities on posture improvement and buildup of a strong muscular corset.

MATERIAL AND METHODS. *The studied subjects were* 8 children with first-degree scoliosis and marked kyphosis (first group) and 7 children with first-degree scoliosis and marked lordosis in the lumbar region (second group), all of them 10-14 years of age, treated at the Kinesi-3 Rehabilitation Centre, Stara Zagora. All children underwent a 6-month treatment consisting of 30 sessions of kinesitherapy, massage and physical therapy, 40–60 min of duration, performed three times per week. Tice weekly, children practiced supervised swimming in a pool. Rehabilitation protocols of both groups were structured and described.

Research methods – in the beginning and the end of the study period, the following measurements were performed: thoracic mobility (thoracic circumference during rest, during maximum inspiration and during maximum expiration - $Hirtz_1$, $Hirtz_2$, and $Hirtz_3$); mobility of the cervical and thoracic spine (Ott's test; Moshkov's quad), trunk flexion test of Tom Mayer, lumbar spine mobility test of Schober (Sokolov, 1001); manual muscle testing (MMT) of abdominal, spinal and gluteal muscles (Bankov, 1985), Chizhin's plantography.

The measurements and test results in children from group I indicated: shoulder contour asymmetry with elevated right shoulder, more prominent right scapula, enhanced thoracic kyphosis, reduced anterior-posterior thoracic diameter. Positive signs of an upper crossed syndrome were present – weakness of deep cervical flexors, m. trapezius and m. serratus anterior; slightly shortened m. trapezius, m. levator scapulae, m. pectoralis major and m. pectoralis minor (L.Chaitov et al., 2006, Kraydzhikova, 2011), weak abdominal and

gluteal muscles. While standing straight and not moving, the children partially compensated the curvature. There were no signs of flat foot as confirmed by plantography. *The tests in children from the second group revealed:* a slight shoulder asymmetry with elevated left shoulder, reduced anterior-posterior thoracic diameter, asymmetry of waist triangles with elevated left iliac crest, enhanced lumbar lordosis. Lower crossed syndrome signs were positive – weak abdominal and gluteal muscles, shortened m. erector spinae lumbalis, m. iliopsoas and m. rectus femoris (L. Chaitov et al., 2006, Kraydzhikova, 2011). The abdomen is prominent, while the hip is anteriorly rotated. While standing straight and not moving, children compensated partly the scoliosis, but lordosis was enhanced. There were no signs of flat foot as confirmed by plantography.

Rehabilitation protocol applied in the first group: *The emphasis is placed on isometric training of weak muscles and buildup of a strong muscular corset through*: posture and gait mobilising and correction exercises; breathing exercises – dynamic and static; spine stretching and mobilisation exercises in supine position; isometric exercises for strengthening gluteal, abdominal and spinal muscles consisting of 6-8-second contractions and 8-second pauses (Koleva 2010, 2011); exercises for equilibrium and coordination from kneeling and sitting position with a large therapeutic ball /Fit-ball/ (Gencheva, 2003); stretching of shortened muscles; post isometric relaxation (PIR) for shortened muscles (Dimitrova, 2008); treatment with a cushion under the thoracic spine; exercises for muscle strengthening. Other procedures applied were: ma*ssa*ge and *manual mobilisation techniques* for reduction of thoracic spine pain and compensation of muscle disbalance (Kraydzhikova, 2011); *physical therapy for trophic stimulation and muscle tone improvement:* medium-frequency (interference) current therapy for trophic stimulation; ultrasound therapy and phonophoresis for local trophic improvement and pain reduction (Koleva, 2009); *sport elements* – swimming (twice per week).

Rehabilitation protocol applied in the second group: *The emphasis was put on isometric training of weak muscles without massage and manual mobilisation techniques through application of*: vertebral column mobilising exercises, in standing or supine position with flexed lower extremities; posture and gait correcting exercises; breathing exercises – dynamic and static; isometric exercises for strengthening gluteal, abdominal and spinal muscles lying on the back with flexed lower extremities, in lateral and prone positions; exercises for equilibrium and coordination from kneeling and sitting position with a large therapeutic ball /Fit-ball/ (Gencheva, 2003); stretching of shortened muscles; post isometric relaxation (PIR) for shortened muscles /lumbar spine extensors/ (Dimitrova, 2008); isometric exercises for upper extremities strengthening with 1-kg dumbbells; exercises for lower extremities strengthening with 2-kg weights (Koleva, 2010, 2011); *physical therapy for trophic stimulation and muscle tone improvement:* medium-frequency

(interference) current therapy for trophic stimulation; electrostimulation for improvement of locomotor deficiency (Koleva, 2009). Swimming sessions were performed twice per week.

METHODICAL INSTRUCTIONS. The load is compliant with the physical abilities of children and age-related features. Isometric exercises were done in an anti-gravity position, but the vertebral column was not loaded (face up, face down, lateral and kneeling positions). They were combined with dynamic breathing exercises and were strictly dosed depending on individual locomotor abilities of children. Exercises were performed symmetrically for both spine halves (concave and convex) with equal muscle contraction and pause durations. In the beginning of the treatment course, isometric training of upper extremities were without weights in series of 10 repetitions, and 1-kg weights were gradually included in two series of 10 repetitions each. In the subsequent sessions, the load was increased. Te training of equilibrium reactions was performed by standing on one leg only with stretched arms, recording the stay duration in seconds. *The applied methodic is different from all others in that no gymnastics for spine flexibility, relaxing exercises and crawling were performed. Also, kinesitherapy and swimming within the same day were not practiced.*

RESULTS AND DISCUSSION. The application of both rehabilitation programmes in the two groups resulted in substantial positive effect with regard to posture correction, strength and equilibrium reactions. As could be seen from Fig. 1, the scoliosis was corrected in 77% of children from the first experimental group and 55% from the second group. This provided evidence that the regular dosed loading improved muscle tone and corrected the deformity. This result was achieved by spine correction exercises and equilibrium training, combined with swimming.

Equilibrium exercises are essential for proper posture build up. They develop the sense for maintaining the vertical position of the vertebral column (Chernogorova, 1995).

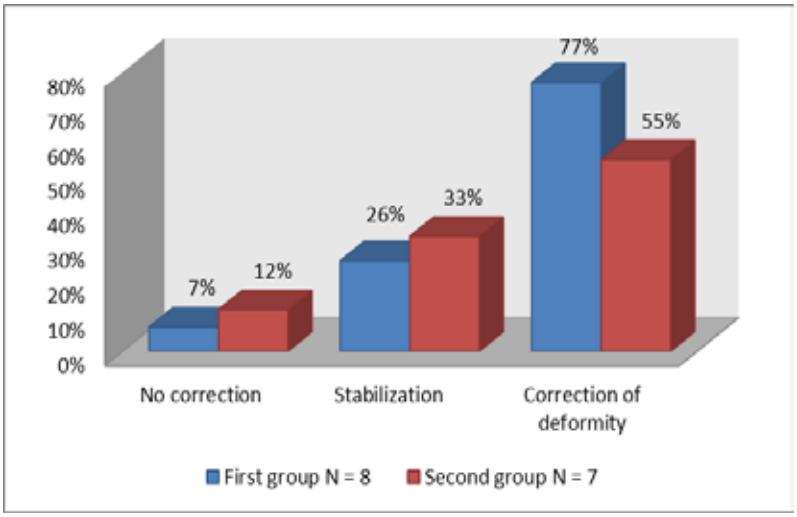


Fig. 1.Correction of deformity

The comparison of relative shares of corrected deformities in both studied groups, a statistically significant difference between them was observed (Milkov, 1996) – in this specific case, U= 2.21 (U>2.13; α=0.05) confirmed the hypothesis that the first experimental group benefited more from the applied training.

By the end of the period, MMT showed an improvement of muscle tone of weak abdominal muscles (Fig. 2). Only about 10% of both groups did not improve much and exhibited MMT scores of 2. The other 63% of group I and 57% of group 2 exhibited MMT scores 4 and 5. This was achieved by isometric exercises for abdominal muscles, alternated with diaphragmatic resistive breathing.

Pearson's test results for abdominal muscle MMT scores 4 and 5 (Milkov, 1996) showed a moderate correlation between groups (r=4.8; p<0.05). This way, the isometric training combined with swimming contributed to the formation of a strong muscular corset.

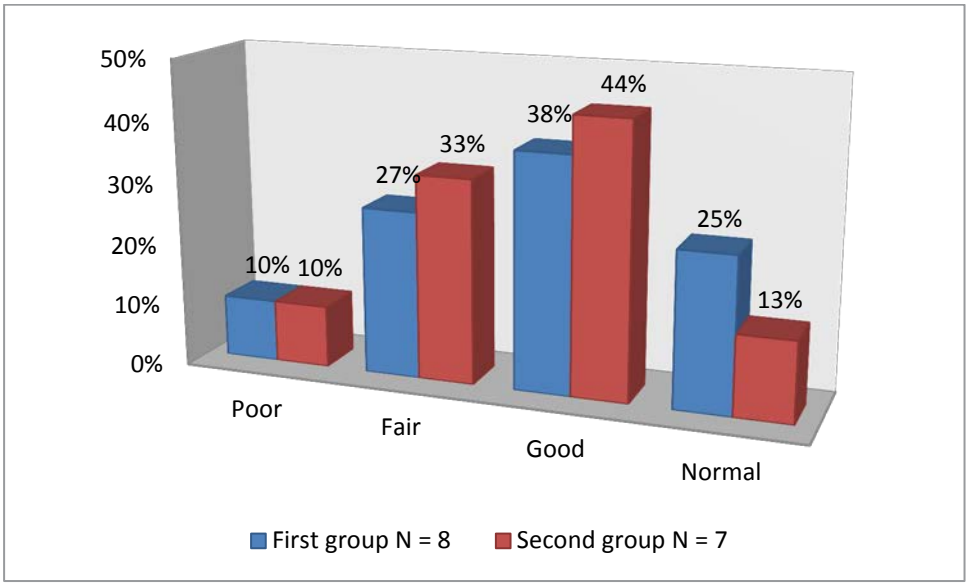


Fig. 2. Abdominal muscle MMT scores

Spinal muscle tone was also improved (Fig. 3). The results were better in group I, where 80% of children had MMT scores 4 and 5 as compared to the second group, where the percentage of MMT scores 4 and 5 was 68%. Therefore, the effect of isometric training for improvement of the strength of weak spinal muscles was beneficial.

The correlation between compared groups with regard to spinal MMT scores of 4 and 5 (r=6.8; p<0.05) was assessed as significant in the Pearson's test (Milkov, 1996). The

rehabilitation programme combined with swimming improved considerably the muscle tone and body equilibrium.

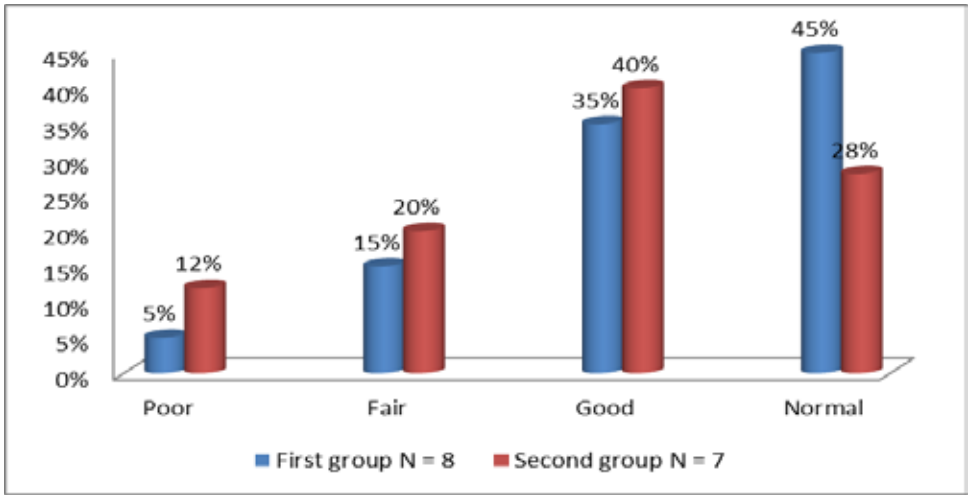


Fig. 3. Spinal muscle MMT scores

The chest mobility and pulmonary function was improved by dynamic breathing exercises from various positions of the body and resistive diaphragmatic breathing (Fig. 4).

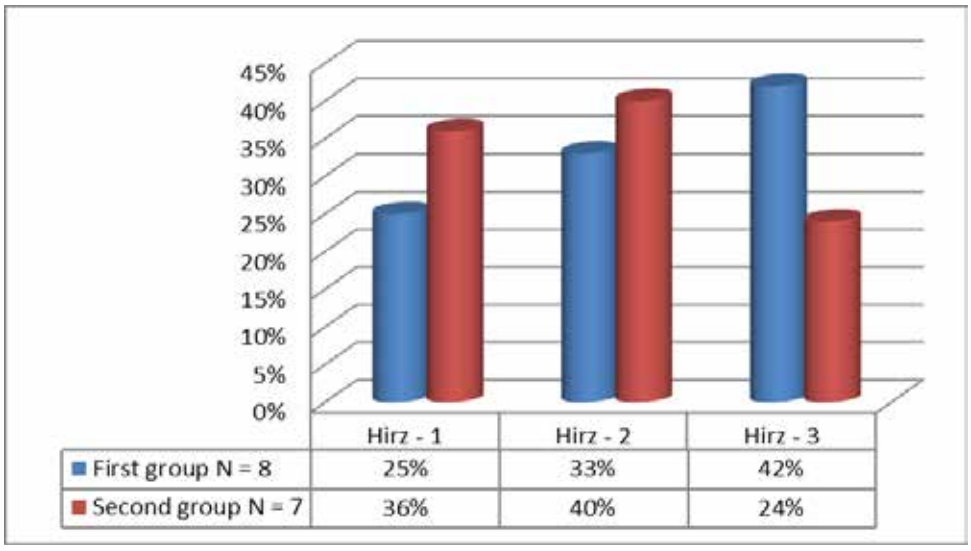


Fig. 4. Chest circumference

This was observed in both experimental groups by measuring the thoracic circumferences. In the first group, the best results were those of the $Hirtz_3$ measurement, whereas in the second group – of the $Hirtz_2$ measurement. Thus, the systemic homeostasis was improved as well as the respiratory volume of lungs.

The results about the mobility of the different parts of the spine (Fig. 5) are important from a practical point of view. Children from the first group exhibited improved thoracic spine flexion (Ott's and Tom Mayer's tests), whereas children from the second group – lumbar spine flexion (Schober's and Tom Mayer's tests). In both studied groups, the spine motility was positively influenced with respect to flexion, extension and lateral slopes.

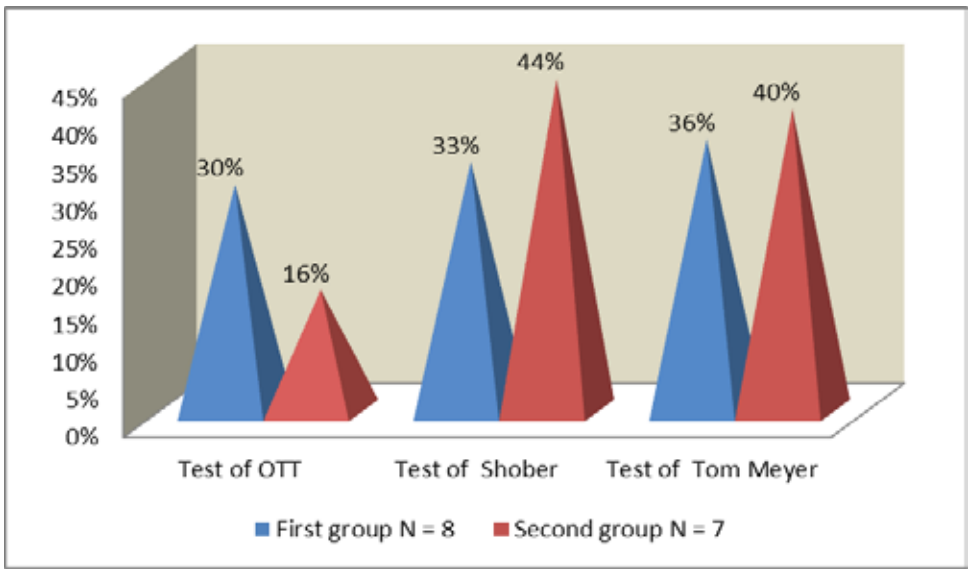


Fig. 5. Tests for evaluation of vertebral column mobility

Comparing the relative shares of Ott's test results in both groups (Fig. 5), there were statistically significant differences with U=2.32 (U>2.13; α=0.05) between the two groups. The first group benefitted more from the applied rehabilitation programme combined with swimming.

CONCLUSIONS. After the complex rehabilitation programme combined with swimming, it could be concluded that:

- The specific combination of isometric exercises contributed to enhancement of the tone of weak muscles and for the build up of a strong muscular corset in both studied groups of children;
- The dynamic breathing exercises and diaphragmatic breathing improved the mechanics of breathing and chest mobility in both studied groups;
- The special correction exercises resulted in mobilisation of the vertebral column and correction of the posture and gait of children;

- The good therapeutic effect of the rehabilitation programme was achieved in combination with swimming.

The applied rehabilitation programmes in both studied groups resulted in stabilisation of the equilibrium, general strengthening of the body and stimulation of the psycho-emotional tone of children. The therapeutic effect, in comparison with routine rehabilitation protocols used in children with spinal deformities, was better.

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Rehabilitation programme for surgery of hidradenitis suppurativa

Summary. Hidradenitis suppurativa (HS) is a chronic inflammation of the skin. It usually starts after the puberty and results in substantial worsening of life quality of patients and disability. HS affects areas rich in apocrine glands and terminal hair follicles – mainly the axillae, inguinal folds, and the gluteus. It is manifesed with painful, reddenned exudating nodules, forming fistula tracts and rough cicatrices with subsequent contractures. The treatment is complex, depending on the HS stage. The wide excision with healing by secondary intention is the gold therapeutic standard. The rehabilitation is an important part of the treatment of HS patients and is aimed at overcming the muscle imbalance, to imporve the function of affected limbds, preventing the risk of formation of post operative pathological cicatrices, education in activities of daily living and performance of various therapeutic occupational activities.

Key words. *Hidradenitis suppurativa, complex treatment, rehabilitation programme, functional recovery, activities of daily living*

INTRODUCTION

Hidradenitis suppurativa (HS) is a chronic recurrent inflammation affecting primarily the terminal hair follicles in skin regions with plenty apocrine glands. The diagnosis is mainly clinical on the basis of the presence of painful nodules, abscesses and fistulae in

axillae, inguinal folds, perineum, and less frequently, the genitals, submammary folds and thighs. The disease could last for tens of years if left untreated and could have important sequels for the patients, both systemic manifestations and cosmetic disfiguring changes and psychic deviations.

In major part of HS patients, especially in advanced stages, the only treatment with good outcome is the surgery. In severe anogenital clinical forms, the surgery is a cornerstone (Wollina U. 2011;1-8). Wide excision with spontaneous healing of the lesions by secondary intention is used.

The extent and number of interventions should be precise to avoid recurrencies. The surgery does not alter the spontaneous evolution of the disease, and new lesions could possibly appear at previously unaffected sites (Weyandt G. 2005, 56:1033-1039). Other measures accompanying the therapy include weight reduction, smoking refusal, wearing wide clothes, avoiding wet shaving, coping with stress.

The rehabilitation is an important part of the complex treatment of patients with Hidradenitis suppurativa and is aimed at overcoming the muscle imbalance, improvement of the function of affected limbs, prevention of the risk of formation of post operative pathological cicatrices, education in activities of daily living and performance of various therapeutic occupational activities. The main physiological effects of rehabilitation on the body are associated to improved circulation, supply, tissue metabolism, neuro-muscular functions, enhancing of muscle strength, effect on muscle imbalance, better coordination of movements, stimulation of regeneration and overcoming of impaired functions (Koleva I. 2009 p.168; Koleva I. 2011 p.317).

Aim. Development and implementation of a rehabilitation programme in preoperative, early and late postoperative periods including physiotherapy for reduction of the pain, overwhelming the muscle imbalance, improvement of impaired function and patient's quality of life.

MATERIAL AND METHODS. The study was performed with a 25-year-old woman, with 5-year history of HS, been subjected to two operative interventions in 2015. Before the start of the rehabilitation, a dermogenic contracture in the regions of both armpits with obvious bilateral muscle imbalance in the shoulder complex region. The post operative recovery was done within 6 months. Due to the reduced locomotor activity and the prolonged treatment, the patient was overweight. Three courses of *physiotherapy* were

performed in the different periods with individual programme for in-home rehabilitation combined with low-calorie diet were conducted.

Methods of examination. In the beginning of the course of treatment, for determination of rehabilitation potential, the patient was subjected to anthropometric measurements of arms (girths measurements), measurement of range of motion of joints and manual-muscle test of shoulder joints (Bankov S. 1985, 236 p.). The active and passive mobility of affected joints were investigated (Popov N. 2003). For evaluation of results, these measurements were repeated at the end of the rehabilitation programme.

The methods in this rehabilitation programme were developed and presented for the first time in Bulgaria. The emphasis of the programme was the stimulation of regeneration and overcoming the post operative scars; improvement of the motility of both shoulder joints, overcoming the muscle imbalance and recovery of the scapulo-humeral rhythm of the shoulder complex, restoration of present contractures, psycho-emotional stimulation. To this end, purposeful physical exercises, activities of daily living of various intensity and recreational occupational activities for increasing the locomotor activity of the patients in the early and late post operative periods were included.

Rehabilitation programme in the early post operative period:

Physiotherapy for relaxation of shoulder complex muscles with high tone via appropriate muscle inhibitory techniques (Dimitrova E. 2006 151-172), pendulation exercises for reduction of the pain and maintenance of joint motility and proper supply; passive and actively assisted exercises from supine and dorsal recumbency without eliciting pain (Popov N., E. Dimitrova 2007;105-129); analytical exercises for shoulder joint with elimination of the gravity for improvement of locomotor activity; extension of contracted muscles by stretching and postisometric relaxation for m.pectoralis major, m.latissimus dorsi, m.teres major (Paskaleva R. 2013, p. 146); breathing exercises, exercises for equilibrium and coordination; exercises for mobilisation of the spine and improvement of body position (Krajdzhikova L. 2011 p.177); isometric exercises for strengthening of gluteal, abdominal and spinal muscles; exercises for equilibrium and coordination with a large therapeutic ball /Fit-ball/ (Gencheva N. 2003, p.64); exercises for improvement of the muscle strength of the shoulder complex (Koleva I., 2010, 264 p.); manual mobilisation techniques for pain reduction and overcoming of muscle imbalance, exercises in open kinetic chain (Popov N., E. Dimitrova 2007;105-129); sift tissue

techniques for reduction of the high muscle tone and relaxation of contracted structures (Dimitrova E. 2008; c.223). All activities with the patient were individually performed.

Ergotherapy: activities of daily living aimed at self-service and overwhelming of psycho-emotional barriers, recreational ergotherapy (painting, colouring, modelling), and restorative ergotherapy (flower growing) (Vacheva, D. 2011; vol 5; 68-69).

Methodical guidelines: In the beginning the exercises were done slowly until the possible range of motion with obligatory observation of the principles for gradual load increase, and follow-up of the patient status (Paskaleva R. 2013, p. 146). The patient was advised to continue the rehabilitation at home through active participation in activities of daily life, velo training and recreational ergotherapy.

Rehabilitation programme in the late post operative period: To the exercises from the previous period were also included: Gradual increase of the load and time of exercises in closed kinetic chain and exercises in rhythmic stabilisation; increase in the load of eccentric exercises to the maximum extent (Popov N., E. Dimitrova 2007;105-129); 15-20 min velotraining every other day; exercises with appliances from different positions with simultaneous increase of the load; walking outside; walking therapy (500-2000 m.) (Petkov I., E.Dimitrova, D. Ganchev, S. Popova, 2008, 7-11).

Ergotherapy: Training in complex locomotor activities with daily application of various activities of daily life in different situations and loading with untrained movements. These are the primary factor for complete recovery of the patient combined with recreational occupational therapy (flower growing, gardening, different crafts) .

RESULTS AND DISCUSSION. For evaluation of the results form the therapy, the patient was examined in the beginning and at the end of the period.

The measurements done in the beginning of the therapy revealed: bilateral swelling of the arms (Fig. 1 and 2.); *limited range of motion of both affected shoulder joints with greatest limitation of the flexion and abduction* (Fig. 5 and 6.). The affected upper extremities were not shortened; the manual muscle testing showed perihumeral muscle weakness of m. deltoideus, m. biceps brachii and m. triceps brachii; increased muscle tone of m.pectoralis major, m.latissimus dorsi, m.teres major. Due to the limited use of the arm in everyday activities, a slight muscle weakness was observed during elbow joint motion.

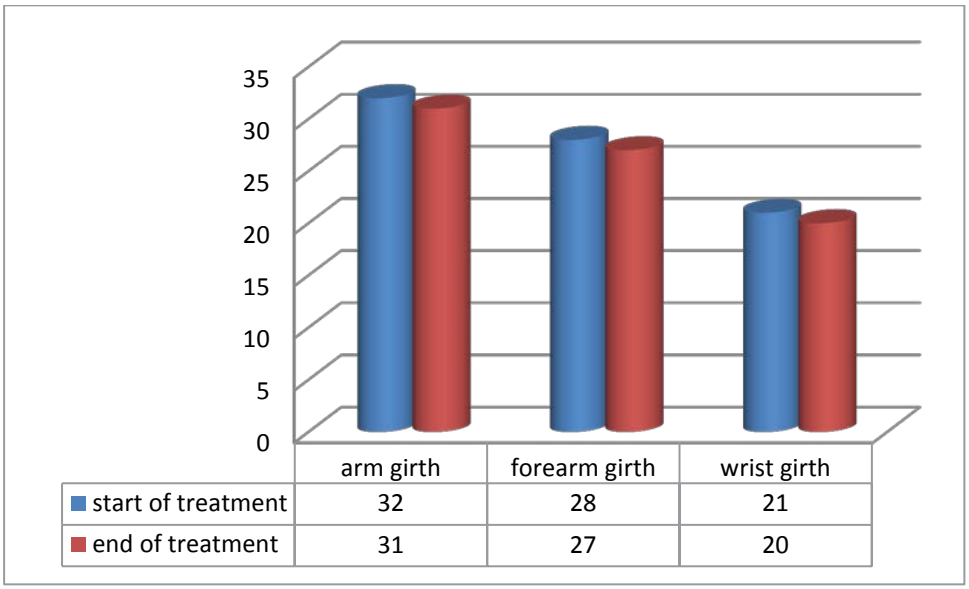


Fig. 1. Girth measurements of the left upper extremity

The rehabilitation programme developed and applied by us led to improvement of the general quality of kinematics and in particular, the range of motion of both shoulder joints.

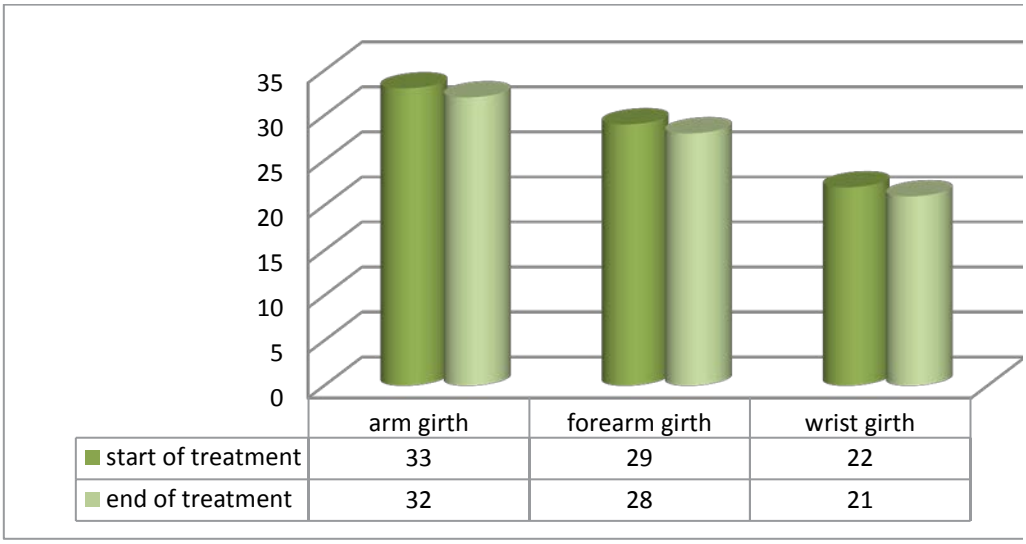


Fig. 2. Girth measurements of the right upper extremity

The results showed that the application of appropriate muscle inhibitory techniques – stretching and postisometric relaxation for m.pectoralis major, m.latissimus dorsi, m.teres major combined with soft tissue techniques and exercises in open kinetic chain during the early post operative period stimulated the regeneration and facilitations the

correction of the muscle imbalance. At the end of the programme, the range of flexion and abduction was considerably increased from 20^0 to 50^0 for both joints (Fig. 3 and 4.)

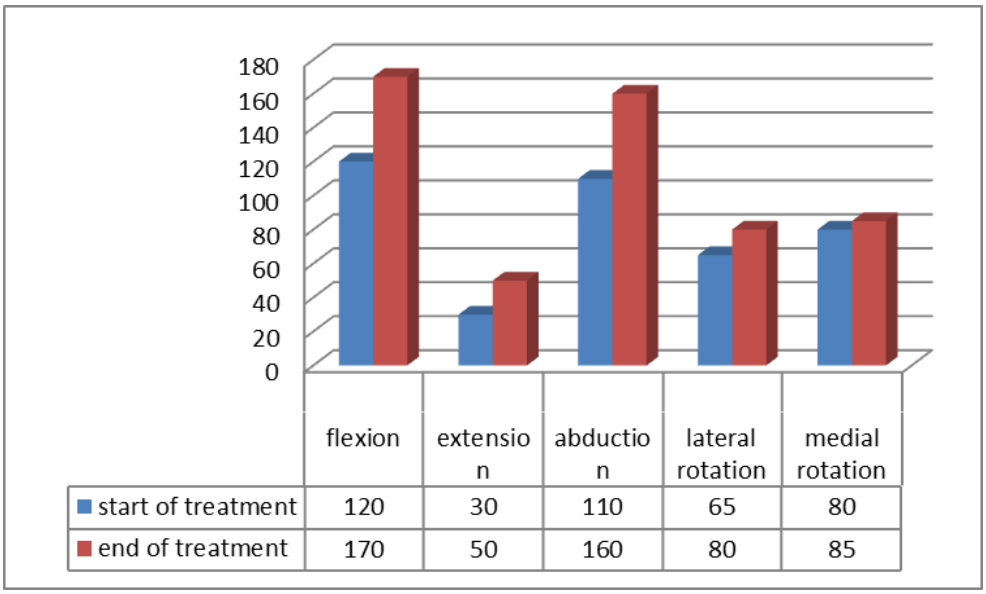


Fig. 3. Range of motion of the left shoulder joint

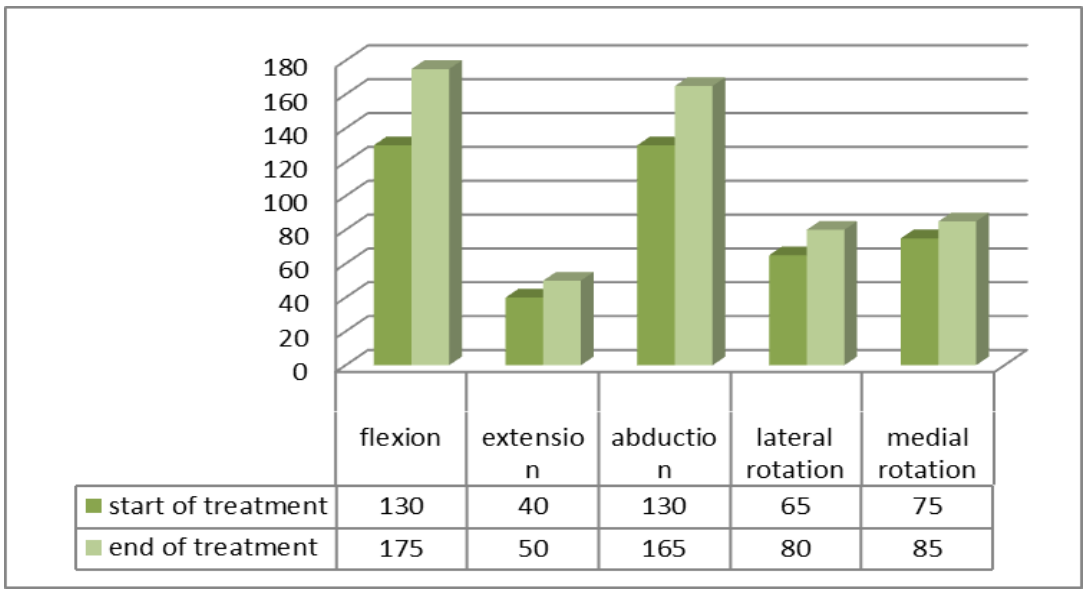


Fig. 4. Range of motion of the right shoulder joint

The inclusion of occupational therapy in the rehabilitation programme stimulated the functional state of upper extremities and their use in activities of daily living, the self-esteem of the patient was also stimulated. The swelling of axillae was reduced (Fig. 1 and 2). The equilibrium and daily activity of the patient were improved, the vitality and desire to be involved in different occupations were considerably enhanced.

CONCLUSIONS

The application of complex programme for rehabilitation of Hidradenitis suppurativa during the different recovery periods had a maximum effect on affected extremities and stimulated the overall locomotor activity:

- The range of motion of affected joints of arms was recovered to the best possible extent for flexion and abduction;
- The muscle imbalance was corrected, the scapulo-humeral rhythm of muscle motion in the shoulder complex was restored;
- The trophic disturbances were overcome, and tissue regeneration in the regions of armpits was stimulated;
- The upper extremities were fully included in activities of daily living;
- The participation of the patient in ergotherapy occupations aimed at building new skills was more active.

The continuation of rehabilitation programme in home conditions and in specialised rehab centres to full recovery was recommended.

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Professionalization issues of concern as a factor of sports games globalization (basing on basketball)

Formulation of scientific problem and its significance. The high level of competition, the concentration of highly skilled players, extremely high fans interest and media interest lead to commercialization of competitions sponsored by FIBA. The above-mentioned demands appropriate professional status of basketball players that allows to regulate more tightly relations between investors, leagues, basketball clubs and their owners, athletes and coaches. It is implemented in terms of legislationin the relevant regulations and competition rules, collective agreements between basketball clubs and the professional basketball league, in players and coaches contracts. As a rule, the national association (federation) of basketball governs such relations. This situation requires fundamental analysis of contract relations between players, coaches and basketball clubs, which are considered as a factor of professionalization in terms of high performance sport globalization.

Research analysis. Having analyzed the globalization impact on the sports industry scientists have selected areas of sport, where there are legal relations between its subjects. [1] It is obvious the international law is prioritized comparing with the national legislationprovisionsand this often leads to contradictions in the legislative framework. [3] Researchers should pay extra attention to legal regulation of relations between athletes and coaches with basketball clubs prescribed in the contracts [2]. Optimization of problematic components in contracts of professional sportsmen will increase the efficiency of training and competitive activity of highly skilled basketball players in terms of globalization factors influence on high performance sport.

Objective is to investigate and determine the issues of concern in contracts and

agreements between athletes and clubs, taking into account the current state of sports games professionalization (basing on basketball).

Task:

1. To investigate and summarize legal features of the contractual arrangements between the clubs owners and athletes.

2. To identify the key issues of concern in the analyzed contracts regarding employment optimization of Ukrainian basketball players.

Presentation of themain material and the argumentation of the research results. The analysis of contractual arrangements details in modern basketball allows stating that modern conditions of sports games development needs improvement in determining the rights and obligations between clubs and professional athletes. Analyzed contracts of skilled basketball players signed over the last 10 years have provided an opportunity to identify the following problems and important positions:

- in most cases, the existing contracts do not have full understanding concerning the agreement of the parties;
- contracts do not clearly outline the financial side of the agreement, there are opportunities to fail the fulfillment of financial obligations;
- most contracts have no specific funding mechanisms (medical insurance, club commitments etc.) for the players health state in case of injury and its subsequent treatment.

Since Ukraine has become independent as a sovereign state, sport has rapidly gained professional features on its territory introducing the contract system of relations among basketball clubs with players, coaches and managers.

Under these conditions, the basketball clubs management, athletes and coaches received their own experience of legal coordination of the training and competitive activities highlights. Because of this confrontation between clubs, athletes and coaches for getting more favorable drafting in contracts in their favor, there are situations that provoke discontent on both sides of the conflict. For example, trainers of sports games in terms of establishing and development of professional relationships began to experience a gradual loss of control over athletes and reduce the efficiency of the team management. To simplify the way out of this situation, they introduced fines system for nonfulfillment of specified in the contract range and efficiency of competitive activity (model characteristics for a certain role player). This led to the breach of team principles in players' interaction,

because the importance of personal achievements has become a priority. As a result, individual technical and tactical characteristics under the existing contracts have become more important for professional athletes compared to team results.

Nowadays owners and top managers awareness of this issue allows clubs to contract with athletes taking into account the great majority of issues of concern on behalf of basketball clubs (employers). Professional athletes have the right to choose signing relevant documents (contracts and additional agreements). Global migration also has a positive side resulting into a competitive opportunity for professional athletes to get a job in financial and stable basketball club that plays for the league of higher-levelor is getting higher.

In addition, the study and analysis of professional basketball contracts revealed a number of important and similar features that are shown below in general terms:

- contracts have official and supplementary agreement, the athlete has no right to disclose their terms.

It is generally known that the financial terms of sports stars contracts are open and public. If information about an agreement between the athlete and the club management is closed, there is a number of arguable assumptions: the contract can not be submitted to a legal entity that protects the athlete interests; the contract is not valid or these arrangements can be fulfilled not in full; the conditions depend on further possible situations spelled out in a way that protects only the interests of the basketball club.

- contracts with foreign clubs are in English or with English translation that has approximately the following stylistic form - "in case of inconsistencies between the English and Ukrainian version English version will prevail."

It is possible to comment his item of the contract only understanding the underlying difference between the legal terms "de jure" and "de facto".

- "arrears of wages for more than 20 days can be considered as a breach of contract by the Club. In this case, the player has the right to terminate the training process until the full payment. If within 14additional days financial arrangements are not fulfilled and the parties cannot resolve the dispute out of court the player has the right to unilaterally terminate the agreement, while the club is obliged to repay the debt.

In other words, due to the formulated statements, the Club has the right to change the player during the seasonin a so-called "civilized" way, when it is problematic for the player to employ to another club due to the transfer rules set by the sports federations in

various countries. Moreover, it is impossible in case of a long break of athlete’s training process because of new contract searching.

- "in case of athlete’s disability because of trauma for more than 30 working days, the Club has the right to withdraw financial payment according to this document or withdraw the Agreement."

Most Clubs governing bodies having a difference in the number of working daysignore taking responsibility for a traumatized athlete. There are many cases when serious injuries require surgery and subsequent long and qualified recovery process, which players cannot afford themselves because of insufficient funding.

There is no item in all the analyzed contracts concerning athletes’ participation in the national sport teams. This indicates an open question as for player’schallenge, which will be decided regarding relevant circumstances and the desire of club management. Nationalsport teams conduct qualifying matches for the UEFA final during the season. Entering the national team is very prestigious for most European clubs, it evidences while discussing the candidates for the national team. When professional athletesopen such questions in the course of the season, the club management is considering this fact as a broken training process, having regard to the players’ responsibility for the result of participation in the national championship.

Studying athletes employment migration it is cleared up that each athlete as a rule has an agent to coordinate arrangements arising in finding and signing a contract with a professional basketball club. A major problem of Ukrainian sportsmen is the player’s further support (both in Ukrainian and in foreign clubs). Agents affect clubs management rather indirectly; the club can delay or not pay athlete’s wages and break contracts with injured players without defending and often even not being competent to defend the athlete’s rights in the judicial legal conflict.

M. Brodskiy the President of Ukrainian Basketball Federation by his open official statement at FBU web site dated 03/08/16 expressed his concern about the existing problems of Ukrainian clubs debtors: "Unprincipled approach to budgeting of some basketball clubs threatens Ukraine Championship 2016-2017 and questions the existence of most clubs. Typically, dubious financial guarantees lead to failure of the contracts conditions, athletes’ discontent and their unjustified outflow to work for foreign basketball clubs, and eventually to penalties of FIBA and FBU to the clubs."[4].

Conclusions.

1. Research and analysis of available contracts make it possible to find out the main issues of concern that are pre-formulatednot in the athlete's favor.

2. Ukrainian sports legal system needs a total revision of contracts and agreements points to strengthen financial coordination of the interactions between the clubs owners and athletes, providing athletes with medical support during the contract and their participation in the national teams of Ukraine in the qualifying stages of the European Championship.

Prospects for further research in this area are based on the necessity for profound study and analysis of athletes' contracts in terms of migration, professionalization and commercialization as components of sport globalization.

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Conjugacy of cellular and humoral immunity cooperation in experimental generalized purulent-inflammatory process caused by Pseudomonas aeruginosa

Abstract. The study of conjugacy of cellular and humoral immunity cooperation in experimental generalized purulent-inflammatory process caused by *Pseudomonas aeruginosa* was carried out. It was specified that functional activity of cellular link of immune system is reduced. The results analysis allowed to substantiate marker indicators of animals' immunological responsiveness evaluation: essential reduction of $CD3^+$, $CD4^+$, $CD8^+$, $CD19^+$ - lymnphocytes in blood, IgA, IgG, IL-2, IL-4, IL-8; insignificant growth of IgM and reliable growth of TNF-α, IL-1β, IL-6.

Keywords*:* purulent-inflammatory process, *Pseudomonas aeruginosa,* cellular and humoral immunity.

Approaches to adequate and effective therapy of purulent-inflammatory processes in organism dictate the necessity of early diagnostics of immunological responsiveness violations under the influence of *Pseudomonas aeruginosa* aggression factor. Long action of microorganism pathogenicity factors reducing immunological responsiveness leads to possible microorganism disadaptation. An adequate work of immune system plays an important role in favorable outcome of the diseases. It provides control, mobilizes

defenses and ability of the organism to resist the pathogenic microorganisms influence [1, 2].

Wide and not always acquitted use of antibiotics, including prophylactically, in manufacturing and in impatient needs cellular and humoral immunity state complex study in purulent-inflammatory processes caused by multiresistant to antibacterial preparations of *Pseudomonas aeruginosa* nosocomial strains and criteria-significant indices of immune insufficiency substantiation which constitutes a medico-biological problem [3]. All this substantiates urgency of immune homeostasis violations study in contamination of a patient in inpatient conditions by multiresistant *Pseudomonas aeruginosa* strains.

Purpose of the given research was the study of functional activity and conjugacy of cellular and humoral immunity cooperation in experimental generalized purulent-inflammatory process caused by *Pseudomonas aeruginosa.*

Materials and methods of the research. The experiment was carried out on 40 mice of C57Bl/GJSto inbred lines in accordance with the standings of «European Convention for the protection of vertebratae animals used for experimental and other scientific purposes» [4]. Maximum permissible for statistical processing and receiving of relied results number of animals in the group was used in the work as well as minimally sufficient for goal achievement number of experimental groups [5]: 1 group (control) – intact mice (n=20); 2 group – infected animals (n=20). Immunofluorescence method was used while studying the immunological responsiveness [6, 7] for quantitative assessment of immunity cellular link. General population of T-lymphocytes ($CD3^+$), subpopulation of T-lymphocytes – T-helpers ($CD4^+$), T-suppressors ($CD8^+$) – and B-lymphocytes ($CD19^+$) were assessed in blood. Activity of T- and B- lymphocytes in blood was assessed by rosetting method (E-POK), B-lymphocytes – by complementary rosetting (EAC-POK). Humoral link of mice immunity was estimated by A, M и G immunoglobulins content in blood serum by immunoassay analysis according to provided instructions on immunoassay analyzer. Immune system mediators – interleukins (IL-1β, IL-2, IL-4, IL-6, IL-8) and the tumor necrosis factor-α (TNF-α) – were defined in blood serum with the help of enzyme-linked immunosorbent assay and diagnostic test-system of "Protein contour" firm use. The «Statistica» program for personal computer was used for statistical processing of the results [8].

The results of the research and their discussion. In septic process caused by *Pseudomonas aeruginosa,* the following peculiarities were found in mice blood: reduction

of cellular immunity parameters (table 1): sufficient changes are found in $CD3^+$ number, the index of which decreases in 2,5 times (341,1±2,3 pcg/ml) in comparison with the control group (862,3±2,4 pcg/ml); decrease of $CD4^+$ in 3,7 times (98,4±1,6 pcg/ml) in comparison with control (362,4±1,9 pcg/ml). A clearly traced tendency of $CD8^+$ number decrease is marked – lymphocytes in 2,8 times (102,4±1,4 pcg/ml) in comparison with intact mice (283,2±1,8 pcg/ml). The level of $CD19^+$ is acutely lowered (121,3±1,7 pcg/ml) in comparison with intact animals (344,8±2,1 pcg/ml).

The analysis of infected animals immunoglobulins levels allowed to set that indices of IgA (57,7±1,4 pcg/ml) and IgG (84,1±1,8 pcg/ml) were lowered in 2,3 and 2,04 times consequently in comparison with intact animals. The concentration of IgM (49,2±1,6 pcg/ml) did not reliably differ from the same in intact animals and had a tendency to slight increase.

Table 1

Cellular and humoral immunity indices in generalized process caused by *Pseudomonas aeruginosa*

Indices of pcg/ml	Control group	Experimental group
T-lymphocytes (СД3)	862,3±2,4	341,1±2,3*
T-helpers (СД4)	362,4±1,6	98,4±1,6*
T-suppressors (СД8)	283,2±1,8	102,4±1,4*
B-lymphocytes (СД19)	344,8±2,1	121,3±1,7*
IgA	57,1±1,4	24,8±0,6*
IgM	49,2±1,6	52,1±1,4*
IgG	84,1±1,8	41,2±0,9*

Note: p<0,05 in comparison with control group.

In definition of cytokine status it was stated that IL-6 concentration (182,1±1,9 pcg/ml) increased in 4,7 times in comparison with intact animals group, the alike increase of IL-1β concentration was found (282,6±1,6 pcg/ml) and TNF-α (492,3±1,8 pcg/ml), the IL-2 concentration (28,3±1,2 pcg/ml) and IL-4 (22,8±1,2 pcg/ml) are 2 times lowered, and IL-8 (21,3±1,8 pcg/ml) - in 2,9 times in comparison with intact mice group (table 2).

Thus in experimental sepsis in mice blood changes of cytokine status and cellular immunity were found with sufficient reduction of concentration meanings of all subpopulations of T-lymphocytes in blood serum.

Sufficient increase of TNF-α inflammatory cytokine is an important and reliable index of inflammatory reaction in the given infection because this cytokine is an important mediator which causes septic shock development.

Cytokine stage activation (TNF-α, IL-1β and IL-6) as a hyperactivity manifestation is the basis of sepsis development; moreover their levels are reliably increased.

Table 2

Cytokine balance indices in experimental generalized process caused by *Pseudomonas aeruginosa*

Indices of pcg/ml	Control group	Experimental group
TNF-α	135,8±1,6	492,3±1,8*
IL-1β	58,4±1,2	282,6±1,6*
IL-2	56,4±1,7	28,3±1,2*
IL-4	46,3±1,4	22,8±1,2*
IL-6	38,4±1,2	182,1±1,9*
IL-8	62,1±1,6	21,3±1,8*

Note: p<0,05 in comparison with control group.

Mononuclear cells cytokine producing ability suppression was confirmed by IL-2, IL-4, IL-8 concentration reduction which was proved by immunity cellular link inhibiting and the processes connected with intercellular mediatory interconnections directed on immune system homeostatic function support. The considered IL-4 level reduction in blood serum is accompanied by the process of antigen stimulation of T-lymphocytes and B-lymphocytes suppression as IL-4 is inducing $CD4^+$ differentiation of T-lymphocytes and T-helpers of the second type, stimulates proliferation and B-lymphocytes differentiation.

The observed inhibiting of IL-2 and IL-8 production is one of the main mechanisms of cellular and humoral immunity suppression as effector factor of immune reactions is not fulfilled, namely phagocytic activity and bactericidal action in neutrophils and macrophages is blocked. Intracellular mediatory communications allow stating that the reduction of the content of T-cytokine lymphocytes is observed in infected animals from which NK-cells and T-killers are differentiated during cellular immune reactions which are able to have a direct effect on *Pseudomonas aeruginosa*. The receptors to IL-2 are expressed on big granular

lymphocytes through which their stimulation is possible. The reduction of IL-8, IL-2 level in blood serum of infected by *Pseudomonas aeruginosa* animals can be one of the main pathogenic links in inhibiting mechanisms violation of functional activity of NK-cells, T-killers, which have a cytokine effect on target cells by both contact lysis and through factors secreted in the way of granules or substrates being in these cells in free state.

The sufficient inhibiting of immune system mediators production including IL-2 being a mitogen for T-lymphocytes and IL-8 synthesis reduction fulfilling the function of stimulator of adhesive properties of neutrophils and T-lymphocytes chemotaxis also proves about violation of cooperative communication of cellular and humoral immunity on the background of immunological insufficiency formation. Taking into account that IL-2 and IL-4 provide cellular component of adaptive immunity, functional activity of B-lymphocytes and immunoglobulins content in blood serum are analyzed. The study results demonstrated the essential reduction of B-lymphocytes and immunoglobulins: IgG, IgA, and unreliable increase of IgM, which can be connected with functional activity of B-lymphocytes, plasma cells inhibiting which are main producers of antibodies.

Thus, the research results allow to come to the following conclusion about evaluative indices of cooperative communication of cellular and humoral immunity: function activity of immune system cellular link is reducing, respectively the content of general population of T-lymphocytes ($CD3^+$), subpopulation of T-lymphocytes - T-helpers ($CD4^+$), T-suppressors ($CD8^+$) and B-lymphocytes ($CD19^+$) is reducing in blood serum of experimental animals. The synthesis of regulatory cytokines is suppressed on the background of immune system cellular link inhibiting which is associated with antibody-forming function of immunocompetent cells suppression and cellular and humoral immunity cooperative communication violation. The analysis results allowed the substantiation of marker indices of immunological responsiveness estimation: reliable lowering of $CD3^+$, $CD4^+$, $CD8^+$, $CD19^+$-lymphocytes content, IgA, IgG, IL-2, IL-4, IL-8; slight increase of IgM and reliable increase of TNF-α, IL-1β, IL-6.

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Modeling the regimens of physical activity for junior schoolchildren

Introduction. Today the problem of implementing physical activity to enhance physical health in the European region and in particular in Ukraine has become a global character. In general, the WHO European Region lives every fifth person is characterized by a low degree or no physical activity, especially among children and adolescents [1, 2].

Due to limited physical activity of children appropriate to make greater use of energy-relevant exercises at the organization of the physical education process in the regime of the school day for physical education classes, extracurricular, after-school forms, etc. [3, 4, 5].

Research hypothesis: it is assumed that the results obtained allow to simulate modes of physical activity of schoolchildren and to predict the required level of energy consumption for primary school children.

Aim: analysis modes of physical activity of varying intensities of junior schoolchildren.

Methods: analysis of scientific literature; physiological methods (chronometry, monitoring of heart rate, ergometry, gas analysis), mathematical and statistical methods for processing the results of the study.

Results and discussion. Complex testing features of children was carried out on the basis of laboratory theory and methodology of sports training and backup capabilities athletes Scientific Research Institute the National University of Ukraine on Physical Education and Sport.

Studies in laboratory conditions using a highly informative equipment (treadmill LE-200 CE, a fast automatic analyzer of the type "Jaeger", Germany, the remote sensor «Sport Tester Polar», Finland) was performed to analyze the dynamics of indicators characterizing the state of the cardiovascular and respiratory systems function during physical activity of 7-9 year old boys (n = 36) in a wide range of physical activity (Fig.1).



Figure 1. The process of test loads

Functional features of the child's body clearly reflected in the reactions of adaptation to physical stress, which is manifested in the adaptation of the cardiovascular and respiratory systems, limiting the manifestation of physical performance [6, 7, 8].

Computer processing of the data set is made of test loads, which served the children of primary school age in real time with an interval of 10 s. Values were obtained by the following physiological parameters: pulmonary ventilation (VE, ml·min^{-1}), respiratory frequency (fT, min), tidal volume (VT, l), oxygen consumption (VO_2, ml· min^{-1}), the level of carbon dioxide CO_2 (VCO_2, ml·min^{-1}), gas exchange ratio (VCO_2/VO_2), ventilation equivalent for O_2 ($EQO_2 = VE/VO_2$) and CO_2 ($EQCO_2 = VE/VCO_2$), oxygen pulse (VO_2/HR, ml· bmp $^{-1}$).

In the practice of physical education primary school children revealed dependence allows to estimate the intensity of substantiated physical activities offered in different forms of exercise, physical load on the performance of their energy value.

Correlation between heart rate and VO_2 (r = 0,81-0,89), bearing the linear character, allowed to enter the model to calculate VO_2 consumption depending on heart rate during physical exercise for primary school children of 7-9 years (Table 1).

Table 1

Models of oxygen consumption boys 7-9 years

Age, years (n=36)	Linear regression equation to determine the oxygen consumption	Correlation coefficient, r	Coefficient of determination, r^2	Standard error of estimation models, ε	Level of meaningfulness, p
$\dot{V}O_2$, ml·min^{-1} by the average HR of work					
7	$Y = -678,651 + 9,336 \times X_1$	0,87	0,76	-2,96	p<0,01
8	$Y = -808,686 + 10,453 \times X_1$	0,89	0,80	-2,88	p<0,01
9	$Y = -800,456 + 10,786 \times X_1$	0,81	0,66	-2,88	p<0,01
$\dot{V}O_2$, ml·min^{-1} because the total cost ΣHR of work					
7	$Y = -23,45+0,92 \times X_2$	0,75	0,52	1,70	p<0,01
8	$Y = -26,91+ 0,98 \times X_2$	0,77	0,60	1,70	p<0,01
9	$Y = -29,88 + 0,99 \times X_2$	0,79	0,65	1,70	p<0,01

Notes: Y– value of oxygen consumption during physical activity (ml·min $^{-1}$); X_1– average heart rate during physical activity (bmp·min $^{-1}$); X_2 – total pulse rate during physical activity (bmp).

The use of models for calculating VO_2, heart rate, depending on energy value allowed the calculation of physical activity in physical education lessons and other forms of organization of exercise with the younger students in Ukraine.

Knowing the pulse energy cost of various physical exercises, you can pick up these muscle load, which would be optimal for maintaining physical health of schoolchildren during the day.

Conclusions: Comprehensive studies of the functional state of the cardiovascular and respiratory systems younger schoolchildren in the laboratory were of great importance for the understanding of the functioning of regulatory systems. The results of the study allowed to determine the heart rate or ΣHR as indicators that can be used for operational monitoring of energy consumption in primary school children during physical exercise.

Based on the results of research can develop new or improved traditional forms of organization of physical education students, the optimization of their physical activity to achieve maximum health effect.

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FURAMAG action for the prevention of chronic pyelonephritis in infants

Abstract: The effect of FURAMAG (FURAGINUM soluble) on planktonic forms and biofilms of *Klebsiella pneumoniae* isolated in acute and chronic forms of pyelonephritis in infants was studied. It was shown that the drug in the therapeutic dose found to be effective on planktonic forms in acute pyelonephritis and after action on the primary biofilms to avoid formation of secondary biofilms either in acute or chronic forms of pyelonephritis in children. Thus the drug may be effectively used to prevent the development of pyelonephritis.

Keywords: biofilms, *K. pneumoniae,* FURAMAG, pyelonephritis.

Introduction. Today diseases caused by opportunistic pathogens are common, and among causative agents *Klebsiella* occupies a leading position. Depending on the human immune system state this pathogen can cause different infectious diseases, including pyelonephritis [1, 2]. Pyelonephritis is the leader in children renal diseases and remains one of the most actual medical and social problems. According to the research data

microbial-inflammatory lesions are dominated in the structure of urinary tract infections, and pyelonephritis varies from 26.3 to 61.9 % among them [3]. In pediatrics patients with recurrent pyelonephritis are the biggest problem due to the formation of dense biofilms [4, 5], which from one hand serve as microbial defensive reaction to unfavorable environmental factors, but on the other hand are pathogenicity factors [6]. Recurrent pyelonephritis on the background of urological abnormalities often leads to chronic renal failure and therefore the search for new approaches in treatment and prevention of pyelonephritis is very relevant. [7]

The aim of the study was to study the ability of *K. pneumoniae* strains isolated from infants with pyelonephritis to form biofilms under the action of FURAMAG in therapeutic dose.

Material and methods. To achieve this aim bacteriological method was used (identification of microorganisms using conventional isolation and identification schemes) [8]. The ability of isolates to form biofilms was studied in 96-wells polystyrene plates. The optical density of formed biofilms was measured by reader "Multiskan EX 355" [9, 10]. The sensitivity of microorganisms to FURAMAG was performed using polystyrene plates [11, 12]. For statistics of results the programs "Statistica 6" and "Biostat" for the PC were used [13, 14].

Results and discussions. The results of the study showed that *K. pneumoniae* isolates from children under the age of 3 years treated for pyelonephritis in State pediatric clinics № 16 of Kharkiv possess the ability to form daily biofilms. *K. pneumoniae* strains isolated in acute pyelonephritis were able to form biofilms with a density of 3.21 ± 0 27 units of optical density, isolates from chronic forms - 4,56 ± 0,28 units of optical density with an active production of planktonic cells (2,14 ± 0,14 and 3,06 ± 0,19 units of optical density respectively), which form a dense secondary biofilms with higher resistance to antimicrobial drugs (Fig. 1, 2).

During studying of *K. pneumoniae* isolates susceptibility to FURAMAG therapeutic dose in planktonic form and in the form of biofilms it was found that FURAMAG was effective against planktonic forms either of isolates from acute (0,048 ± 0,006 units of optical density) or chronic (0,061 ± 0,004 units of optical density) forms of pyelonephritis in infants (Fig. 3).

Antibacterial action of FURAMAG on *K. pneumoniae* planktonic cells was shown together with ability to form daily biofilms (0,041 ± 0,003 units of optical density in acute pyelonephritis and 0,058 ± 0,004 units of optical density in chronic pyelonephritis.

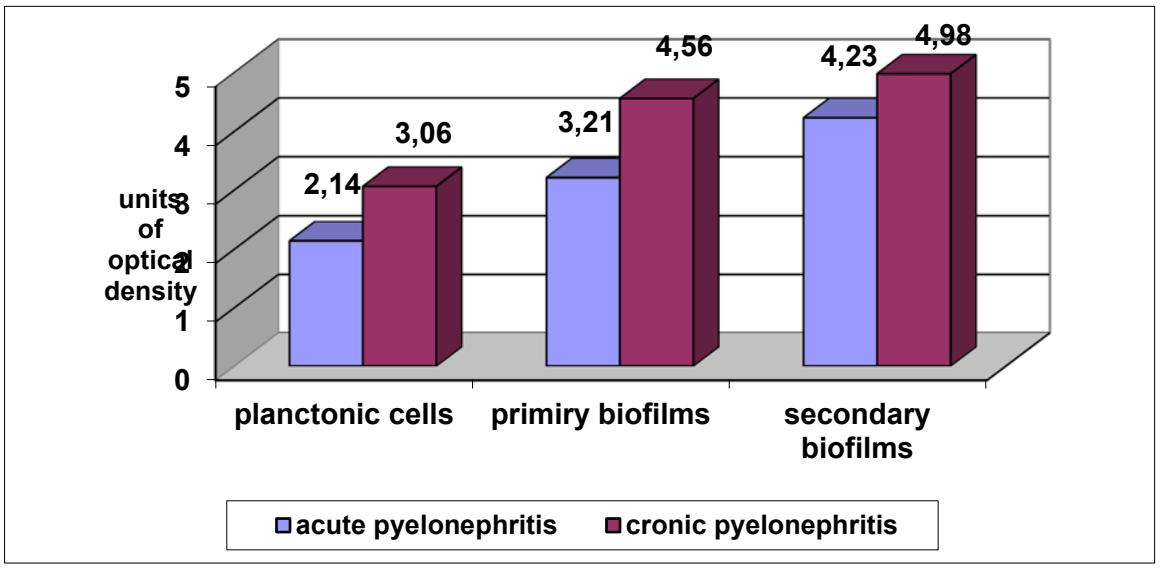


Figure 1. The ability of *K. pneumoniae* isolates to form biofilms.

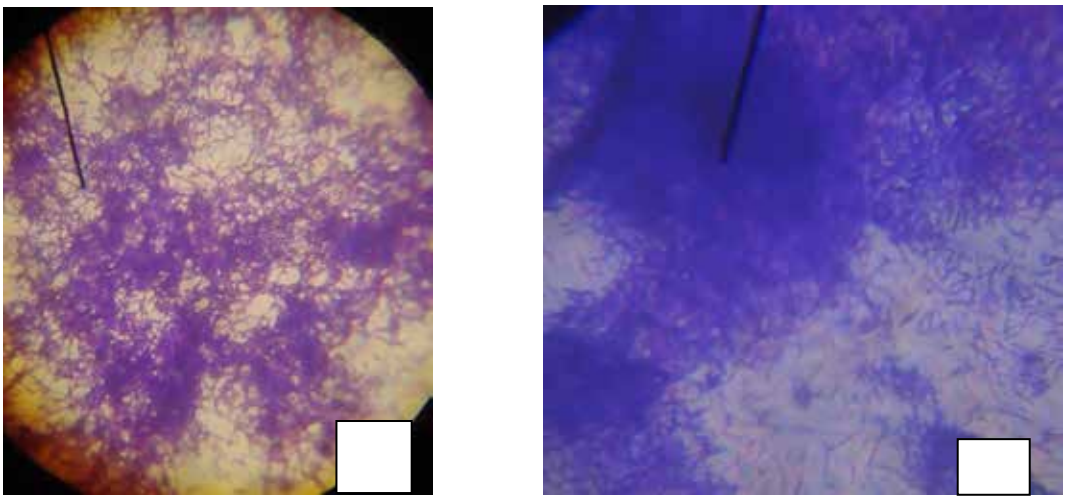


Figure 2. Biofilm formation by *K. pneumoniae* isolated in acute (A) and chronic (B) pyelonephritis.

It was found that FURAMAG action on *K. pneumoniae* primary biofilms almost not lead to reduced optical density. Thus in acute pyelonephritis it was 3,21 ± 0,27 and 3,14 ± 0,16 units of optical density and in chronic pyelonephritis 4,56 ± 0,28 and 4,42 ± 0,24 units of optical density, but produced new planktonic cells were unable to form dense secondary biofilms 1,45 ± 0,09 and 1,64 ± 0,08 units of optical density respectively (Fig. 4, 5).

Conclusions. The study of FURAMAG action on planktonic forms and biofilms of *K. pneumoniae* isolated in infants with acute and chronic pyelonephritis showed that the drug in therapeutic dose was effective on planktonic forms in acute pyelonephritis and after action on the primary biofilms to avoid secondary biofilm formation either in acute or chronic forms of pyelonephritis in children. The drug may be effectively used to prevent the development of pyelonephritis.

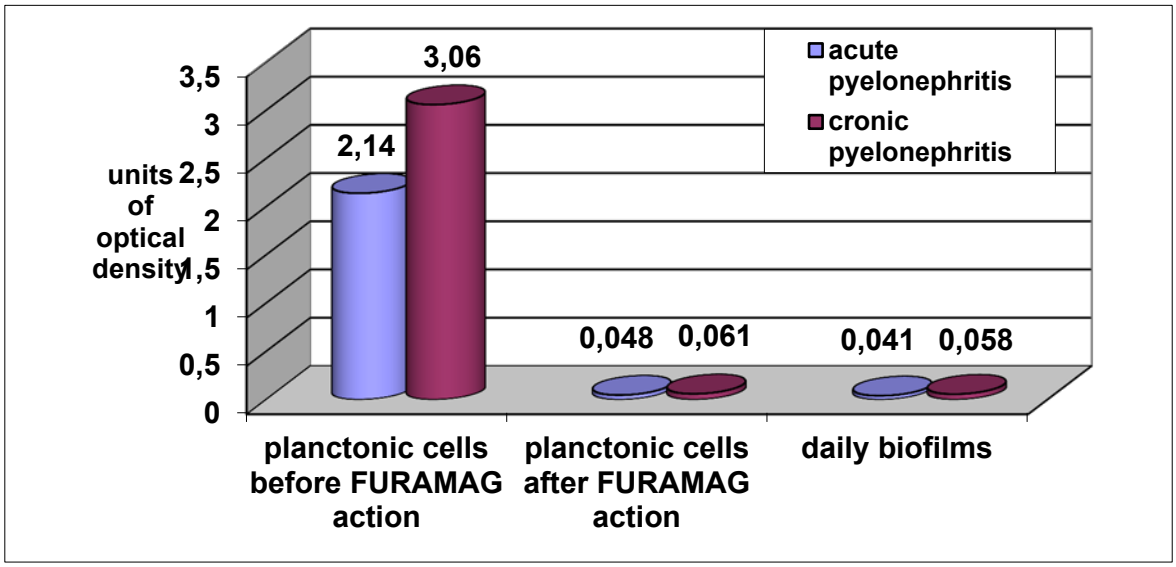


Figure 3. FURAMAG action on planktonic cells of *K. pneumoniae*.

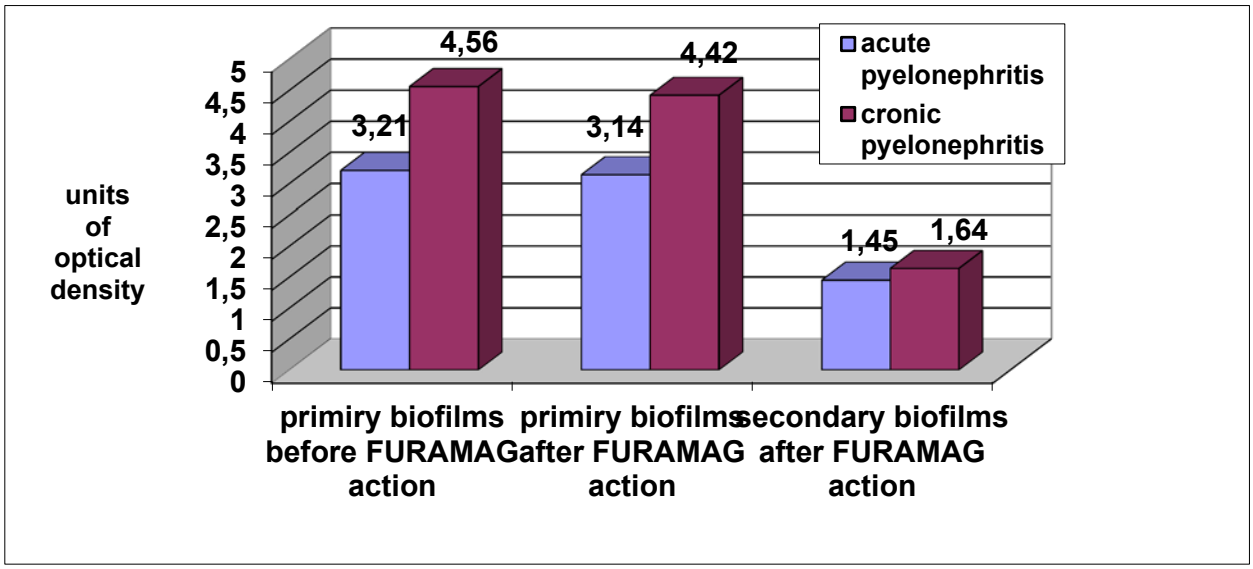


Figure 4. The ability of *K. pneumoniae* planktonic cells produced by the primary biofilms after FURAMAG action to form secondary biofilms.

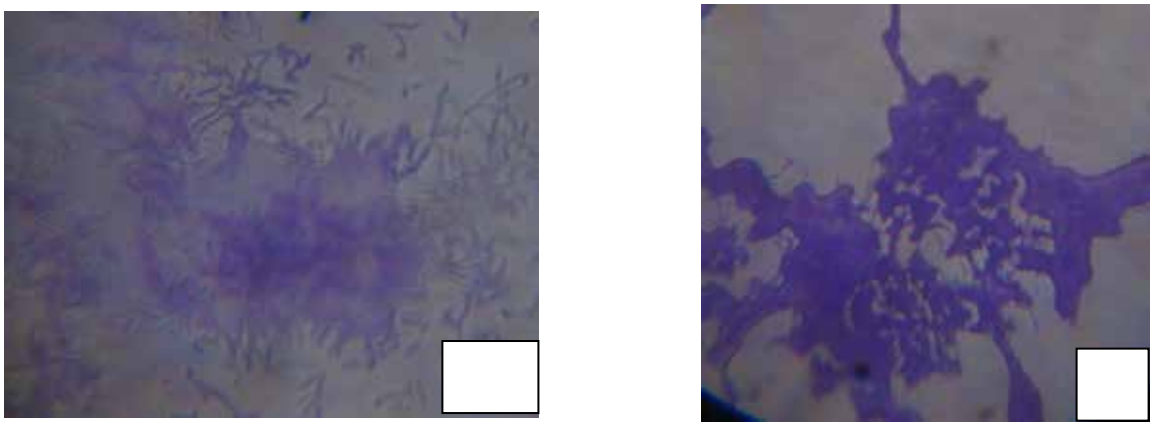


Figure 5. Formation of secondary biofilms by *K. pneumoniae* isolated in acute (A) and chronic (B) pyelonephritis.

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Section 8. Mathematics,Technologies & Engineering

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Influence of Bioaerosol Source Location and Ceiling Fan Direction on Eggcrate Upper-room Ultraviolet Germicidal Irradiation

1. INTRODUCTION

Upper-room ultraviolet germicidal irradiation (UVGI), an engineering control method that uses 254-nm wavelength ultraviolet light to inactivate microorganisms, reduces the airborne transmission of infectious diseases such as tuberculosis [1]. UV radiation must be confined to the upper room because it is irritating to the eyes and skin of room occupants [2]. To this end, upper-room UV fixtures have tightly spaced louvers that horizontally collimate the UV beam [2] in order to minimize UV radiation in the lower room. Unfortunately, these louvers greatly reduce the UV emission rate from the fixture [3].

Recently, Linnes et al. [4] tested an alternative concept using two unlouvered UV fixtures having a 25-W "bare" lamp, a 2.4-m high UV screen composed of open-cell eggcrate panels supported in a frame designed for a conventional suspended ceiling, and an 1.3-m upward-blowing ceiling fan hung from the center of the ceiling above the eggcrate panels. This eggcrate UVGI system maximizes the UV emission into the upper room while preventing harmful UV levels in the occupied lower room. They were able to inactivate 82% of airborne *Bacillus atrophaeus* spores

in a 42-m^3 test room, a marked improvement over the 37% inactivation they obtained with two state-of-art, conventional, commercially available, louvered UV fixtures (Hygeaire model LIND 24-EVO UV, Atlantic Ultraviolet Corp., Hauppauge, NY). Each of these fixtures contained a 25-W lamp and ballast identical to what had been used in the eggcrate UVGI system. In these tests, bacterial spores were released in the center of the room directly beneath the upward-blowing ceiling fan, whereas in real-world settings, infectious particles would usually be emitted elsewhere in the room. In this configuration, it is likely that the majority of airborne bacterial spores were immediately drawn into the irradiation zone by the fan prior to being mixed with the air in the room. If this was true, the inactivation due to UVGI may have been significantly higher than it might be for other source locations or for a downward blowing fan. In the present study, we tested this hypothesis.

2. METHODOLOGY

The apparatus and testing methodology used in the present study were identical to that of Linnes et al. [4] with the following three exceptions:

1. In the Linnes et al. [4] study, the 1.3-m, five-bladed, ceiling fan (model 28415, Hunter Fan Company, Memphis, TN) was always blowing upward at its highest speed (176 rpm), whereas in the present study the same ceiling fan was blowing at its highest speed in the same direction or downward.

2. In the Linnes et al. [4] study, the bacterial spores were released at a height of 1.5 m in the center of the room, whereas in the present study, they were released either at the same location or in the corner, 280mm from the longer wall and 580 mm from the shorter wall (square G1 in Fig. 1), and at a height of 1.2m.

3. In the Linnes et al. [4] study, the 0.61-m by 0.61-m eggcrate panels had 7.75-mm long vertical flow channels with a 14.6-mm by 14.6-mm cross section (Thincell TC Economy eggcrate panels, SLP Lighting, Fenton, MO). Two UV fixtures mounted on 0.61-m by 0.61-m aluminum plates were placed at locations B2 and F4 in Fig. 1 in place of eggcrate panels.

In the present study, two different types of eggcrate panels were used: a) either the same eggcrate panels used in the Linnes et al. [4] study or b) 0.61-m by 0.61-m eggcrate panels having 15.2-mm long flow channels with a 7.7-mm by 7.7-mm cross section and oriented at a 45є angle from the vertical direction (Eggcrate Core, American Louver Skokie, Illinois). When eggcrate panels with 45є angled

flow channels were used, the two UV fixtures mounted on 0.61-m by 0.61-m aluminum plates were placed at locations D2 and D4 in Fig. 1 in place of eggcrate panels, rather than their previous locations of B2 and F4.

In both studies, a suspension of *Bacillus atrophaeus* spores were aerosolized in a six-jet Collison nebulizer. After steady-state conditions had been reached, samples from the room's exhaust airflow were collected on a single-stage viable Andersen impactor with the UV fixtures turned either on or off, followed by incubation and counting of colonies.

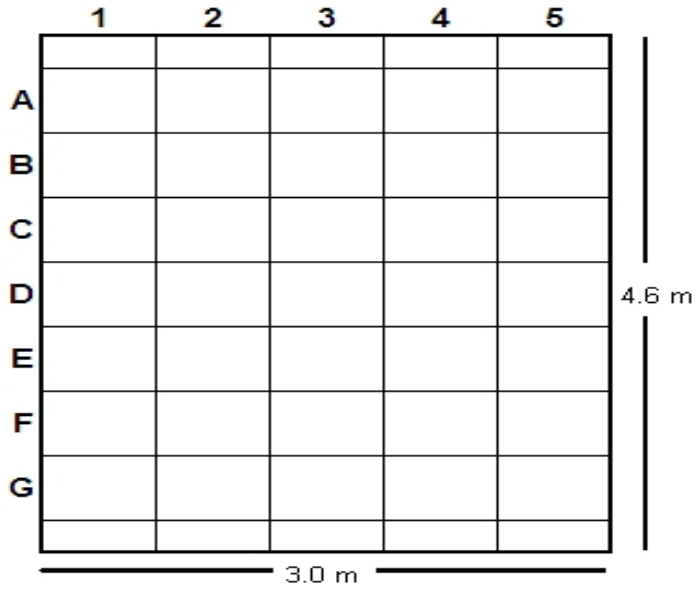


Fig. 1. Top view of schematic diagram showing the locations of 0.61-m by 0.61-m eggcrate panels in a test room with a 3.0-m high ceiling

3. RESULTS AND DISCUSSION

In the present study, as shown in Fig. 2A, 84% of *Bacillus atrophaeus* spores were inactivated using eggcrate UVGI when the source was directly beneath an upward blowing ceiling fan, in good agreement with the 82% inactivation measured by Linnes et al. [4] whereas 72% were inactivated when the fan settings were left unchanged, but the source was moved to the corner of the room. The greater inactivation when the source was in the room's center compared with the corner is statistically significant at 95% confidence (P=0.01). When the ceiling fan was blowing downward and the source was either in the center or corner of the room, 72% and 73% inactivation were measured, respectively. The difference is not statistically significant at 95% confidence (P=0.67). These results suggest that there

is an advantage having the bioaerosol source directly below an upward blowing ceiling.

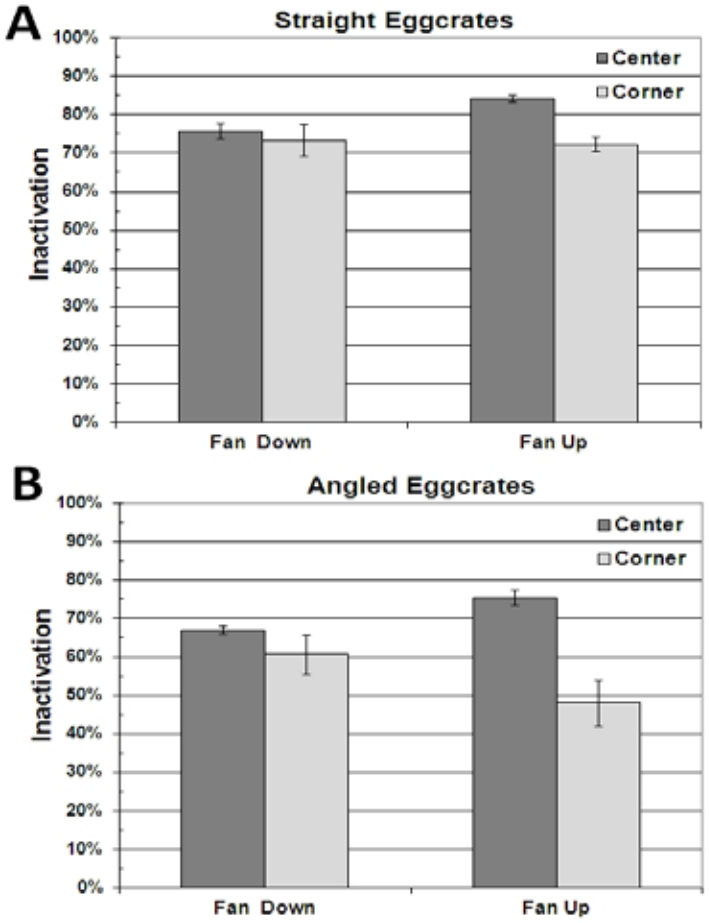


Fig. 2. Bioaerosol tests using eggcrate panels having vertical flow channels, i.e. "straight eggcrates" (A) and eggcrate panels having 45є angled flow channels, i.e. "angled eggcrates" (B). Error bars indicate standard error of the mean for independent tests

To confirm these findings, these tests were repeated with eggcrate panels having 45є angled flow channels. Because the angled flow channels have a smaller cross-sectional area and a longer length than the panels with vertical flow channels, airflow resistance was greater, making it more difficult for the air to flow between the upper and lower room. This additional airflow resistance resulted in less inactivation, as apparent in a comparison of Fig. 2A and 2B. Nevertheless, as shown in Fig. 2B, the same pattern remained. When the fan was hung from the center of the ceiling and blowing upward, 75% of bacterial spores were inactivated with the source in the center of the room compared to 48% with the source in the corner of the room, a difference that is statistically significant at 95% confidence (P=0.02). When the

ceiling fan was blowing downward, there was 67% inactivation with the source in the center of the room directly below the fan compared to 61% inactivation with the source in the corner of the room. This difference was not statistically significant at 95% confidence (P=0.32). These results again support the hypothesis that having the bioaerosol source directly beneath an upward blowing ceiling fan results in greater inactivation than any of the other scenarios evaluated.

4. CONCLUSION

The likely explanation for the UVGI efficacy being highest when the source was directly beneath an upward blowing ceiling fan is that the fan pulls the airborne bacterial spores immediately into the UV beam prior to being mixed with the air in the room. This is somewhat analogous to local exhaust ventilation in which the contaminant is removed prior to being mixed with the air in the room. When the source is in the corner of the room and the fan is blowing upward or downward, the bacterial spores become mixed with the air in the room before reaching the UV beam. Likewise, when the source is in the center of the room and the fan is blowing downward, the bacterial spores will likely be mixed with room air prior to reaching the UV beam. Only when the source was directly beneath an upward blowing fan could the bacterial spores enter the UV beam with minimal prior mixing of the spores and room air. Because tests conducted by Linnes et al. [4] were all done with the source directly beneath an upward blowing ceiling fan, their results do not have general applicability. They apply only for very specific scenarios, such as when a bed-ridden infectious patient is directly below an upward blowing ceiling fan. For other scenarios, the percentage reduction would be expected to be less than reported by Linnes et al. [4]. Nevertheless, the use of eggcrate panels as a UV screen in place of louvers on the UV fixtures results in a marked improvement in the efficacy of upper-room UVGI compared with commercially available louvered UV fixtures as reported by Linnes et al. [4].

CONSENT

Not applicable.

ETHICAL APPROVAL

Not applicable.

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Evaluation Studies for Shore Protection Design

1. INTRODUCTION

The coastal landscape west of Alexandria is one of the most attractive recreational sites in Egypt. The coastline is characterized by wide beaches consisting of white Oolitic carbonate sand. The shore is generally linear with few protective configurations. However, the beach is not suitable for swimming because of the steep beach profile ranging from 1:30 to 1:50 [1]. Strong offshore direct rip currents regularly lead to hazardous situations, and at some locations swimming is prohibited for a considerable time of the year especially during summer storm. The swimming may be prohibited at locations where the wave height is too large or the rip shore currents are too strong. So, these conditions may have adverse effects on recreational facilities along the coast. [2] concluded that breaker heights smaller than 0.6 m and current velocities smaller than 0.2 m/s are considered as comfortable swimming conditions, but it is hard to swim against a rip current of 0.5 m/s and breaker height greater than 2.0 m even for good swimmers.

The current study concentrates on the use of perched beach. This scheme was tested by Delft Hydraulics, Netherlands as an ideal scheme in the Al-Arab Bay zone in 2003 to create safe swimming conditions. This scheme consists of a submerged breakwater enclosing a sheltered basin. The top level of the offshore part of the submerged breakwater is close to the sea water surface level to ensure water flow from open sea to the basin and to prevent obstruction of the sea view, i.e. minimal visual impact. Basins enclosed by submerged breakwaters exist naturally, e.g. a rocky submerged shoal enclosing a shelter basin, such as at Stanley beach in Alexandria (named "Al Bahr al Sagir") and artificially or semi-artificially, such as at Sela beach in Bat-Yam, as illustrated in (Fig. 1).



Fig. 1. Sela beach development scheme at Bat-Yam, constructed since 1969

The enclosed basin at Sela beach is 400 meters alongshore by 175 meters perpendicular to the shoreline. The breakwater followed the lines of existing submerged beach rock to minimize construction costs; the submerged breakwater was partially constructed on a sandy sea bed. Outside the enclosed basin, accretion fillets take place on both sides. The accretion fillets undergo seasonal changes due to the offshore/onshore sand movement. The littoral drift bypass around the breakwater results in a negligible impact on the neighboring shoreline evolution due to breakwater construction. Periodic water quality tests had been performed since the construction of the Sela beach scheme in 1969, showing that water quality inside the enclosed basin is similar to the open sea due to the outflow of water mainly through the rubble mound breakwater as the still water level is higher inside than outside the basin. This was due to the inflow of water by currents generated by waves breaking on top of the submerged breakwater. Wave height inside the enclosed basin were significantly reduced compared to the open sea. Wave heights are about 0.5 meters inside against 1.5 meters outside the basin. During winter storms, wave heights in the basin may reach up to 1.0 to 1.5 meters and currents of significant velocities were reported by good swimmers [3].

During most days of the summer months, the eastern coast of the Mediterranean Sea is exposed to onshore wind resulting in waves having heights from 0.6 to 1.2 meters and sometimes up to 2 meters, as indicated by [3], based on long term observations. Prior to the construction of the Sela beach breakwater, the nearshore bar was sounded and found to have a crest elevation of about 1.0m below the sea water surface level quasi-

parallel to the shoreline, as illustrated in (Fig. 2). Wave breaking occurs on the sea side or on the top (crest) of the sand bar and almost the entire width of the foreshore is covered by surf. The area between the coastline and the inner (onshore) side of the bar acts as a velocity field in which flow takes place in all directions (Fig. 2). Along the near shore bar there are breaks (channels) or rip passes through which rip currents are forced out to the sea. On top of the bar the water seemed to be air entrained, absorbing currents from both sides. The bar configuration, rip passes, currents velocities and directions are changing under different waves conditions. This flow field, the rhythmic bathymetry and the difficulty of returning to the shore due to rip currents are the reasons of drowning accidents, conditions very similar to the north western Egyptian Mediterranean coast.

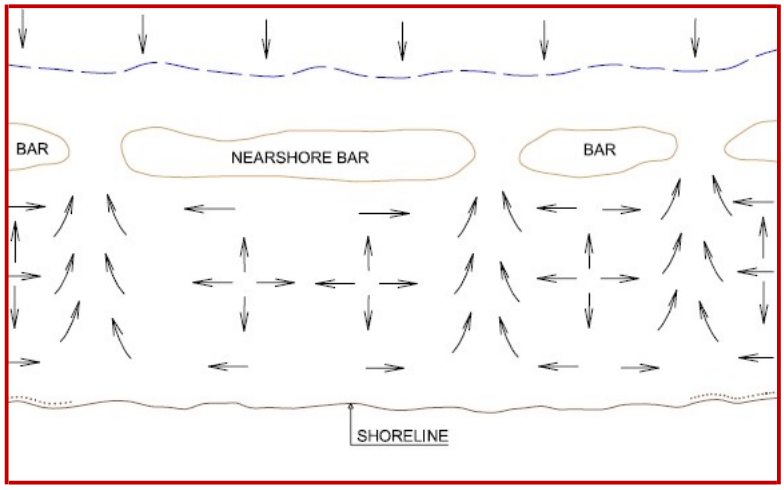


Fig. 2. Schematic diagram of nearshore bar and nearshore current

Due to the increasing demand for safe swimming conditions with minimum impact on the shoreline and keeping acceptable water quality, new studies have been conducted to meet these requirements using appropriate coastal structures. [4] conducted a study in 2002 for the development of the North-West coast of Egypt and recommended the use of a perched beach as a possible alternative for safe swimming conditions along the Al-Arab bay zone, located from Al-Agamy at Km 21 to Al-Alamin city at Km 120 (along the Alexandria-Matrouh road). However, none of the perched beach designs have been constructed to date. Thus, the actual performance of perched beach is not well-known yet. Recently in 2011, one design was approved by the Egyptian Environmental Affairs Agency (EEAA) at Km 38 along the Alexandria-Matrouh road. The construction of this perched beach started in 2012 and was completed by 2013. Thus, the actual field effect

of the perched beach can be monitored and compared with the results predicted by numerical models.

2. STUDY AREA

The pilot area is the coast of a new tourist resort located at Sidi Krir, kilometers 39.774/40.078 west of Alexandria along the Egyptian Northwestern Mediterranean coast, as illustrated in (Fig. 3). In this study, a location has been selected where the shoreline makes an angle of 40° with the North direction. Thus, the predominant waves are almost perpendicular to the shoreline and consequently the slope of the beach is steep, making it a dangerous location for swimmers. Due to the steep slope in the upper part of the beach profile in the study area (water depth <8.0 m below Mean Sea Level (MSL)), waves break close to the shoreline where people tend to swim. The breaking waves make it difficult for swimmers to move freely and may even cause them to remain in place due to seaward drifts caused by the undertow and the rip currents. As a result of the adverse effect of the steep beach profile, swimmers reach relatively large water depths within a short distance from the shoreline. If they reach 30-50 m from the shore line, it is too deep to stand on the sea bed. This, in combination with the breaking waves, allows for a very narrow usable strip for most swimmers along the beach.

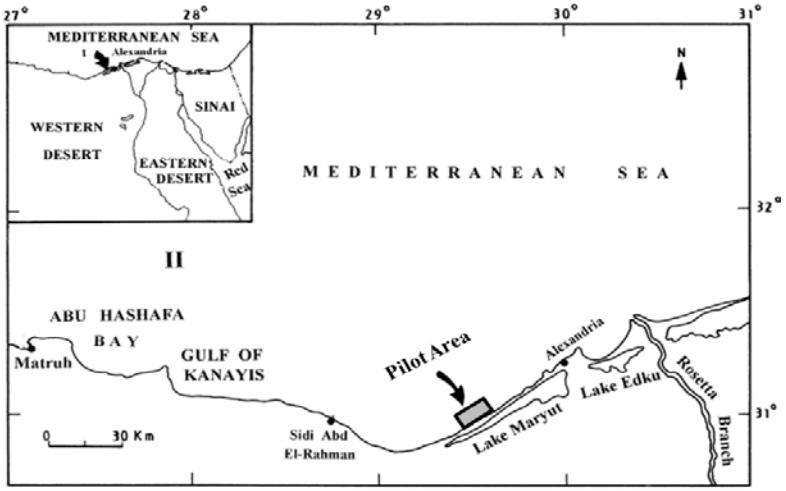


Fig. 3. Location map of the pilot area

The layout and dimensions of the proposed perched beach is shown in (Fig. 4). The resort beach is 300 m long, but the protected length is 200 m, leaving 50 m on both sides of the groins open to the sea. However, simulations using the SMS model have been made for 3000 m along the shore line, extending for about 1500 m normal to the shoreline to limit the boundary effects on the study area. The perched beach generally has two bounding groins and shore parallel breakwater at water depth equal to 3.5 m. The groins extend for 120 m normal to the shoreline and have some opening in its body, such as either a pipe or a gap.

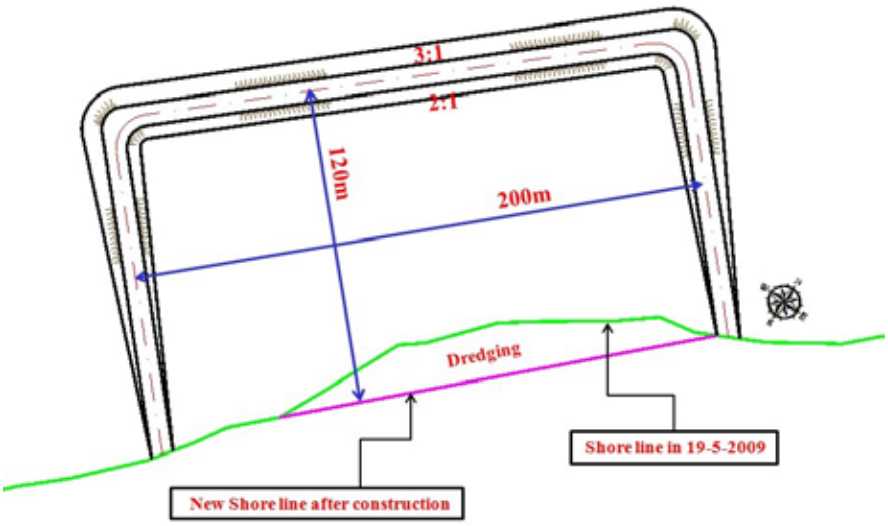


Fig. 4. The layout of the proposed perched beach

Simulations have been made for the case of the perched beach before construction in order to evaluate the problems encountered in the beach. This case was called the baseline condition and shall be used as a reference condition. Based on the results of the wave rose in the El-Dekhiela port (Fig. 5), it has been found that three wave conditions are of major importance, i.e., two during the summer season and one in winter, as shown in (Table 1). The dominant wave height all over the year in deep water is 1.77m and it occurs for (20-30) days during the summer season. However, in the summer period the most relevant for beach recreation and swimming condition, wave heights reach a significant wave height (Hs) of 2.5 m for (4-5) days.

Table 1. The dominate wave conditions

Wave condition	Hs (m)	T (s)	Duration (days)	Notes
1	1.77	5.0	20-30	In summer
2	2.50	7.5	4-5	In summer
3	4.50	10.0	0.86	In winter

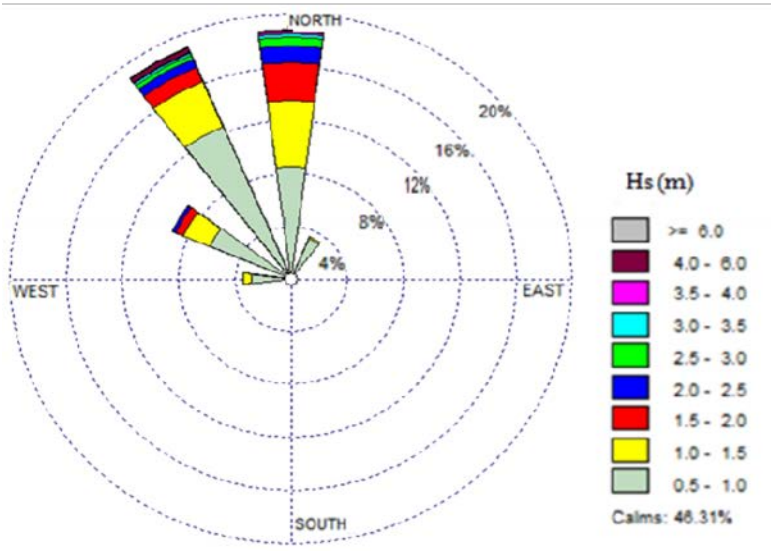


Fig. 5. The wave rose at a water depth of 13m in El-Dekhiela Port (2001-2005)

Various configurations of the perched beach have been described and simulated and the results analyzed to provide general guidelines for the design of a perched beach within the Al-Arab Bay zone denoted as Cell 5 of the North West coast of Egypt. The proposed alternatives have various configurations, including: submergence ratio of the breakwater, groin with/without gap and emerged/submerged groin. The alternatives have been compared from the point of view of wave height, currents velocities, and flushing and shoreline changes. It should be noted that the constructed perched beach is denoted as Alternative (04) in the current study.

2.1 The Proposed Alternatives

The proposed alternatives have various configurations, as follows:

Alternative (01): Submerged groins and breakwaters:

This alternative proposes a shore parallel breakwater and two groins having their crest at -0.50 m MSL. (Fig. 6) shows the layout of the structures and the bed levels as

presented by the SMS model. This alternative has all the merits of submerged structures, e.g., an aesthetic view, moderate waves, good flushing, etc.

Alternative (02): Submerged breakwater and surface piercing groins:

This alternative is similar to Alternative (01) except that the groins are constructed higher than the water surface at +2.0m MSL (Fig. 7). This alternative enables the possible economic use of the groins for recreational activities, but it affects the sight distance of beach visitors to some extent due to interruption of the sight line at the boundaries.

Alternative (03): Submerged breakwater and surface piercing groins with a gap:

This alternative is similar to Alternative (02), but the west groin has a gap located at 1/4 of the groin length measured from the offshore head and the east groin has another gap at 1/4 of the groin length measured from the shoreline (Fig. 8). The proposed gaps are sought to help flush the protected area and allow less trapping of long shore sediments.

Alternative (04): Submerged breakwater and groins with a gap:

This alternative is similar to Alternative (03), but the crest level of the two groins is at -0.50m MSL. (Fig. 9) shows the layout of this alternative and the topography of the sea bed generated by the SMS model.

Alternative (05): Very low crested breakwater and groins:

This alternative is similar to Alternative (01), but the crest level of the two groins and the submerged breakwater is at -1.25 m MSL (Fig. 10).

Alternative (06): Medium low crested breakwater and groins:

This alternative is similar to Alternative (01), but the crest level of the two groins and the submerged breakwater is at -0.9 m MSL (Fig. 11).

The baseline and each alternative have been tested with three wave conditions: 1.77 m, 2.5 m and 4.5 m approaching from the North West direction and represent moderate to severe wave conditions. The presented results are mainly focused on the flow field inside the perched beach and the adjacent area along the shoreline. Moreover, the shoreline changes (erosion/accretion) have been investigated.

2.2 Field Measurements

The survey is performed from onshore the high water line to 10 meters and more offshore relative to Admiralty Chart Datum (A.C.D.) The survey was performed using echo-sounder and differential GPS. Total station stands with reflectors are used for the beach face and backshore. The water depths are corrected to account for sea water level fluctuations to be relative to A.C.D.

Sediment samples at the study area region were collected at different depths/locations along the coast. Sea bed soil samples are collected from the backshore and the beach face up to 6 meters water depth. Laboratory grain sizes distribution tests performed for the samples illustrate that the backshore and the onshore part of the beach face consist of well graded medium sand. Samples collected in water depths close to 2 meters are medium to coarse sand which could be attributed to the washing of fine sand during collection of samples by divers. From analysis of the sediment sample in the study area, it is cleared that the sand on the beach and in the upper part of the coastal profile is coarse, in the order of 050= (0.3-0.7) mm, while in the deeper part (below MSL-2 m) the median grain size somewhat smaller, in order of 050=(0.2-0.3)mm.

The net long shore sediment transport in pilot area is very small to negligible. On the basis of computations and observations near the south-western boundary of the pilot area, the net long shore transport is estimated to be slightly north-east directed with a magnitude of 15000 m^3/year approximately. Near the north-eastern boundary of the pilot area the net long shore transport is estimated to be negligible.

Another set of data regarding the waves were collected from the available sources such as the Coastal Research Institute (CoRI) and the Hydraulics Research Institute (HRI).

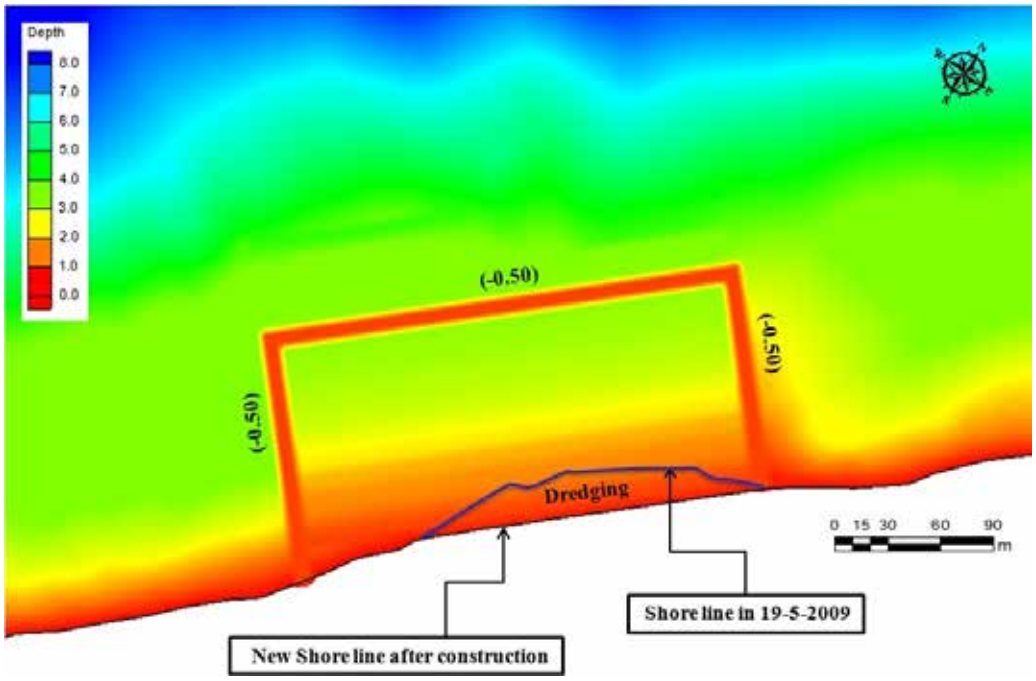


Fig. 6. Layout of perched beach and sea bed levels for alternative (01)

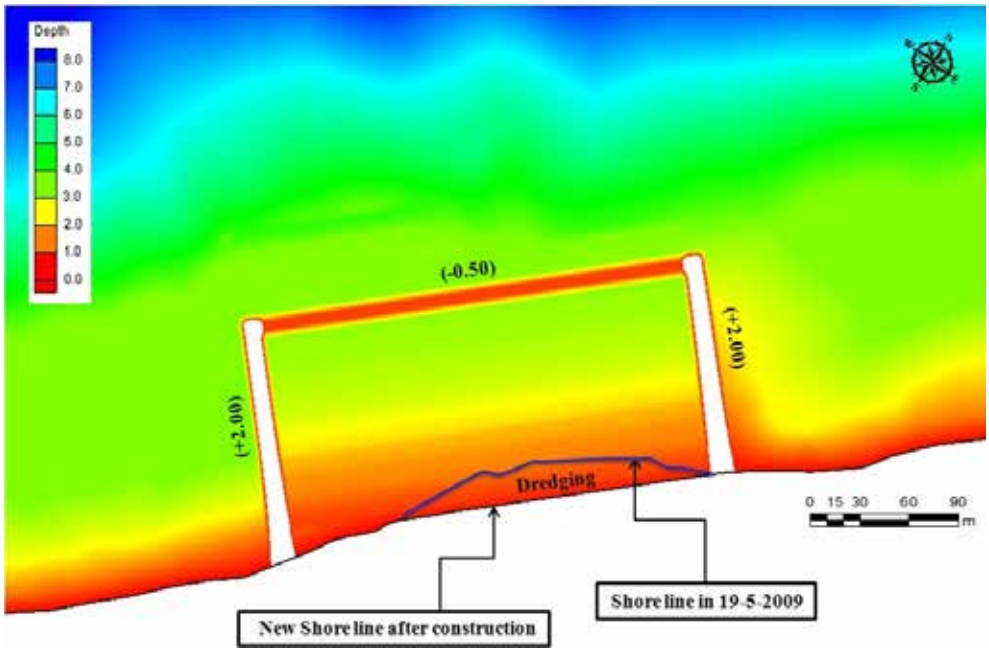


Fig. 7. Layout of structures and sea bed levels for Iternative (02)

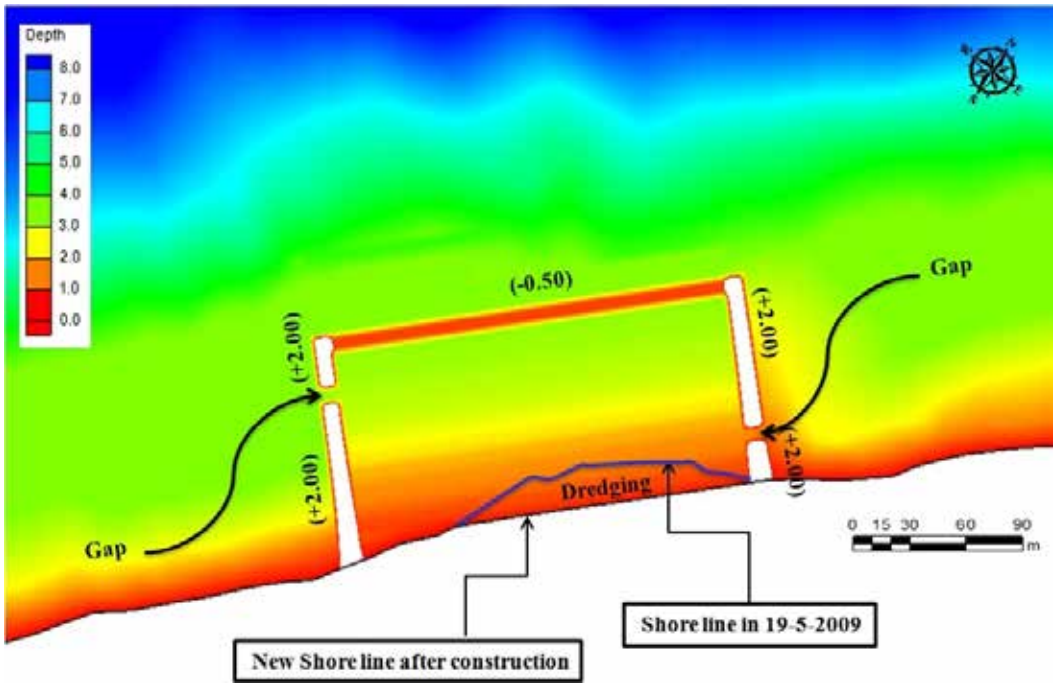


Fig. 8. Layout of structures and sea bed levels for alternative (03)

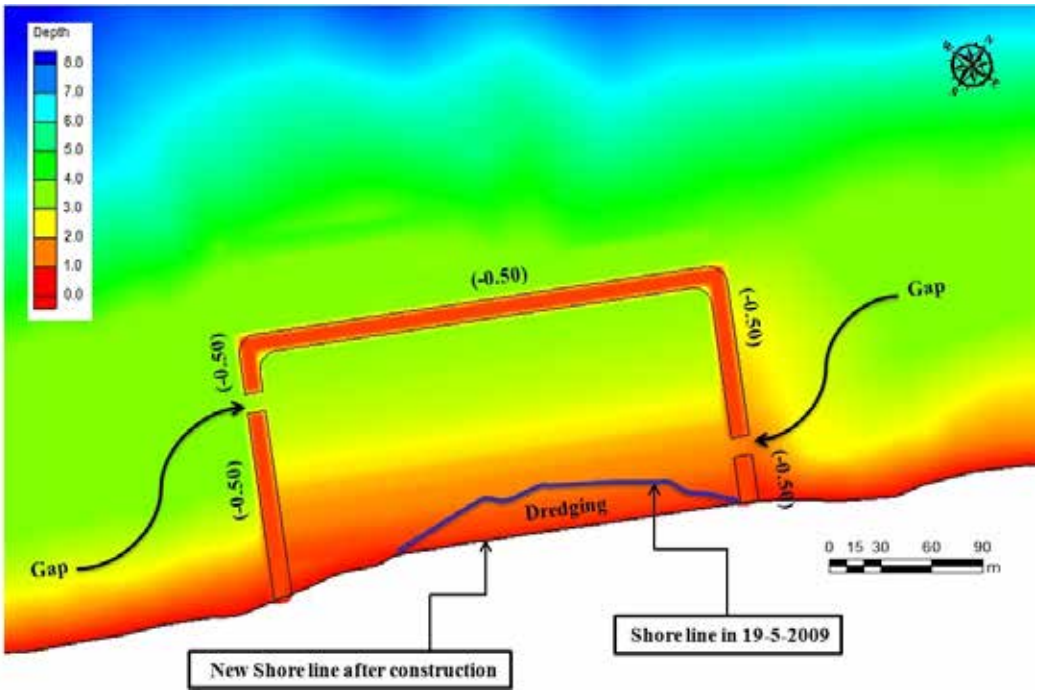


Fig. 9. Layout of structures and sea bed levels for alternative (04)

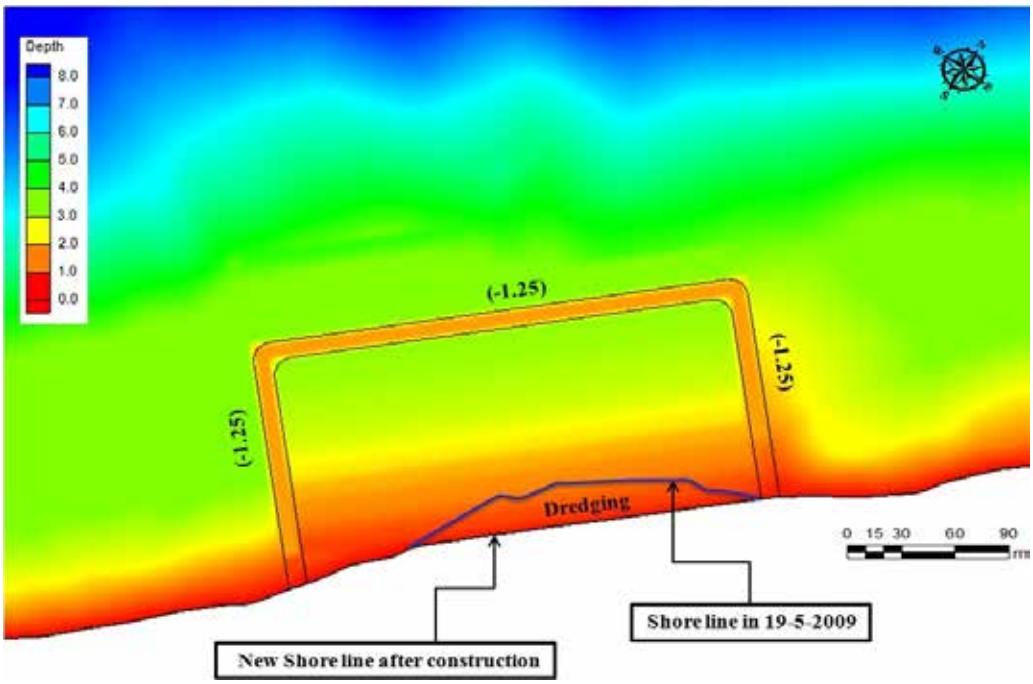


Fig. 10. Layout of structures and sea bed levels for alternative (05)

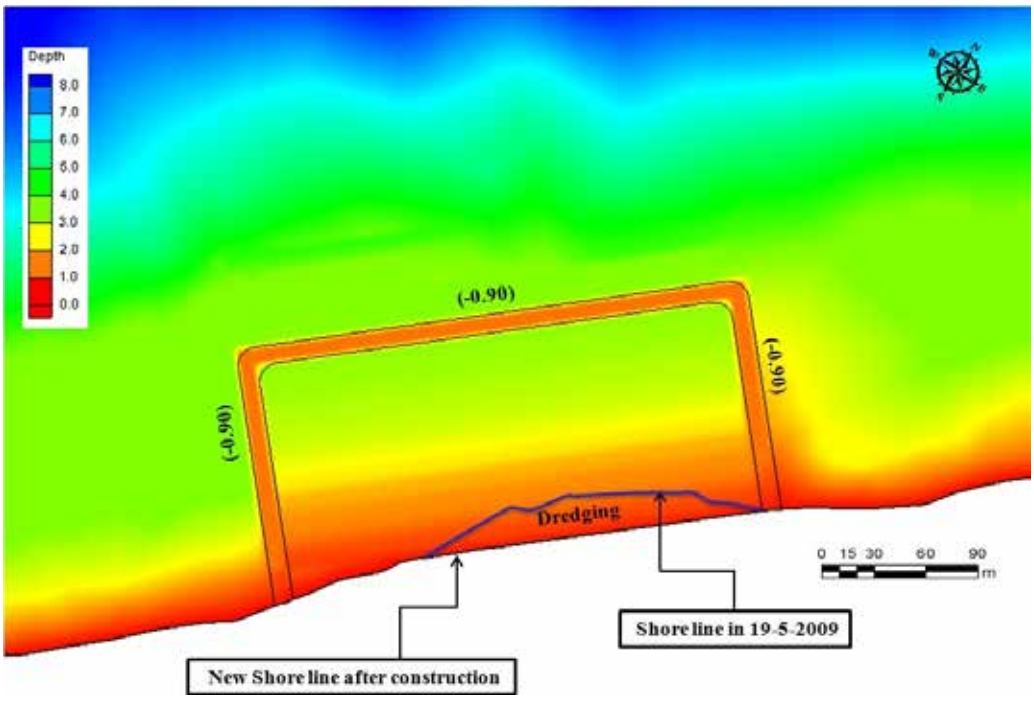


Fig. 11. Layout of structures and sea bed levels for alternative (06)

2.3 SMS Model

SMS is a finite difference model originally developed by Brigham Young University 1985 in cooperation with the U.S. Army Corps of Engineers, Engineer Research and 0evelopment Center (ER0C), and the U.S. Federal Highway Administration (FHWA). Wave models in SMS include CMS-Wave, and BOUSS-20 and include both spectral and wave transformational models. The SMS model adopts GENESIS based on the one-line theory for sediment transport calculations [5]. Numerical wave models BOUSS-20 and CMS-Wave may be used together (coupled) to evaluate potential alternatives of coastal planning for various coastal conditions.

CMS-Wave [6,7],8] is part of the Coastal Modeling System (CMS) for simulating combined waves, currents, sediment transport, and morphology change at coastal inlets, estuaries, and river mouths [9]. The CMS-Wave is a spectral wave model belonging to the phase- averaged class. It is commonly based on Energy Balance equation. It performs steady-state spectral transformation of directional random waves co-existing with ambient currents in the coastal zone. The model simulates half-plane and full-plane wave propagation, so that wave generation, wave reflection and bottom frictional dissipation of multi-directional waves can be considered. BOUSS-20 is a two dimen-sional (2-0) phase-resolving wave model that employs a time-domain solution of fully nonlinear Boussinesq-type equations for waves propagating in water of variable depth. The theoretical background and user manuals for BOUSS-20 are available in CMS technical reports and CHETNs [10,11].

Based on the bathymetric survey, rectilinear grids have been generated and the associated depth files have been prepared for the wave models (CMS-WAVE & BOUSS-20). The model extends 3000 m along the shoreline and 1500 m offshore. A high grid resolution has been applied in the area of the proposed structure (perched beach) in front of the tourist resort, and a low resolution has been implemented far away of the area of their influence. The grid cell size (5x5 m) is fine inside the structure area and the adjacent regions while it is course (20x20 m) in the far field till the open boundary (240 cells along the shoreline and 150 cells offshore). The model grid meets criteria for smoothness (adjacent cells do not differ much in size) and orthogonally (the angles of the comers of the cells are close to 90°), in order to avoid that small disturbances due to irregularities in the grid grow to governing features during the computation. The average

effective grain size of the soil on-site is found to be 0.3 mm, the average berm height is computed and found to be 2m and the closure depth is considered to be 8m. Based on the measured shorelines of 2007, 2009 and 2012 the model was calibrated. A comparison was prepared between the computed and measured shoreline changes for different cases of different calibration coefficients (K1, K2) in the longshore sediment transport formula. It has been found that the best values of the calibration coefficients for the study site are K1=0.45 and K2=0.10.

2.4 Base Line Condition

(Fig. 12) shows the wave direction and height as waves approach the shoreline for moderate and severe wave conditions. It can be observed that waves approach the shore normal to it due to refraction. The variation of wave heights along the centerline of the project area for the case before constructing the perched beach (Shoreline is located at distance=0) is presented in (Fig. 13). It can be observed that the waves break at distances of 160 m, 120 m and 40 m measured from the shoreline for deep water wave heights of 4.5 m, 2.5 m and 1.77 m, respectively. Also, it can be observed that only a narrow strip of less than 30 m, having a wave height of less than 0.60 m for H=1.77 m, exists. Thus, the beach is unsuitable for swimming even during the occurrence of moderate wave heights. Also, it can be observed that for a wave height of 4.50 m, the wave height decreases rapidly when compared with incident waves of 1.77 m and 2.50 m.

The location of the breaker line for the dominant high waves during the summer season, i.e., H=1.77 m, is very close to the shoreline hence limiting the surf zone against the convenience of swimmers. It can be observed that there are two breaker lines, i.e., in deep and shallow water. Moreover, a strong rip current can be noticed on a rip head, which is formed offshore. Although the breaker line is shifted offshore and the surf zone becomes wider than the case of H=1.77 m, considerably large waves exist near the shoreline and a secondary breaker line is formed. It can be concluded that swimmers should abandon the sea for a long period during the summer season due to the occurrence of H=1.77 and 2.5 m waves.

(Fig. 14) shows the flow field in the pilot area. Five transects along the shoreline of the resort are shown, namely as C.S.1-C.S.5, and C.S.3 is at the resort centerline. Furthermore, the cross shore and the long shore currents are also computed as shown in (Figs. 15-a and 15- b). It is clear that the transect C.S.3 shows the largest long shore

velocity and has a maximum of 0.68 m/s for H=2.5 m. The rip current reaches a maximum value of about 0.75 m/s occurs at C.S.4 for H=2.5 m during the summer season. It can be confirmed that the rip currents are generally large and dangerous for more than a month every year during the summer season (see Table 1). It can be concluded that the presence of the hazardous rip currents, circulation zones and the adverse effect of the steep profile along the coast of the pilot area, in combination with the breaking waves, makes that only a very narrow strip (20 m approx.) of coastline usable by most swimmers. So, there is an essential need to construct a suitable coastal structure in the pilot area in order to create safe conditions for swimmers with minimum shoreline change.

3. IMPACTS OF THE PERCHED BEACH

Numerical simulations have been made for the case of the actual dimensions of the structures and site specific conditions [Alternative (04), (Fig. 9)]. It can be observed that two openings exist in the west and east groins, and dredging works have been applied to provide better shape of the beach and nearly uniform bed slope within the perched beach.

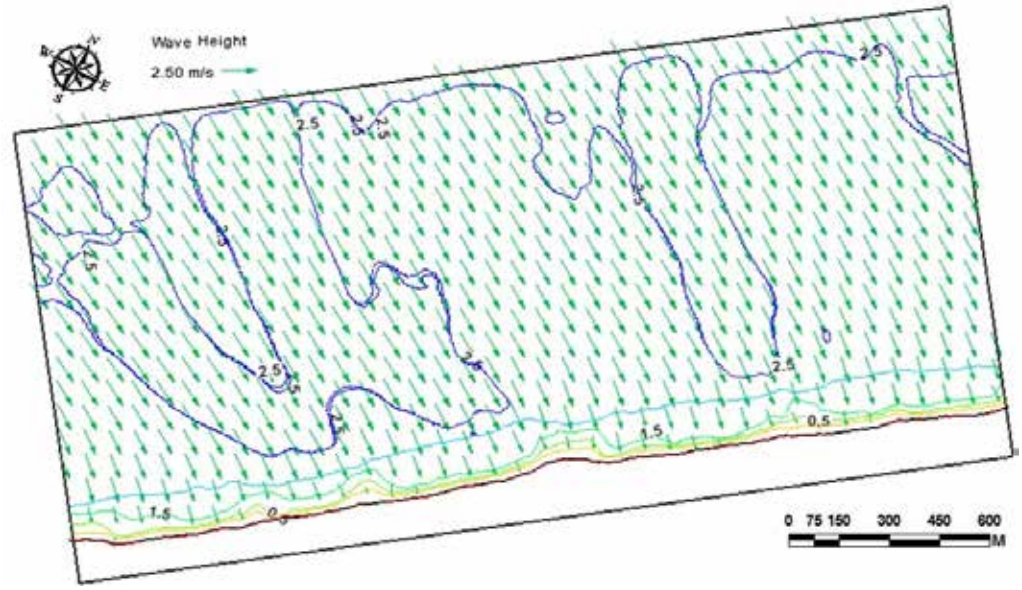


Fig. 12. Computed wave height and direction in the study area (H=2.5 m, T=7.5 sec and direction is NW) for the baseline case

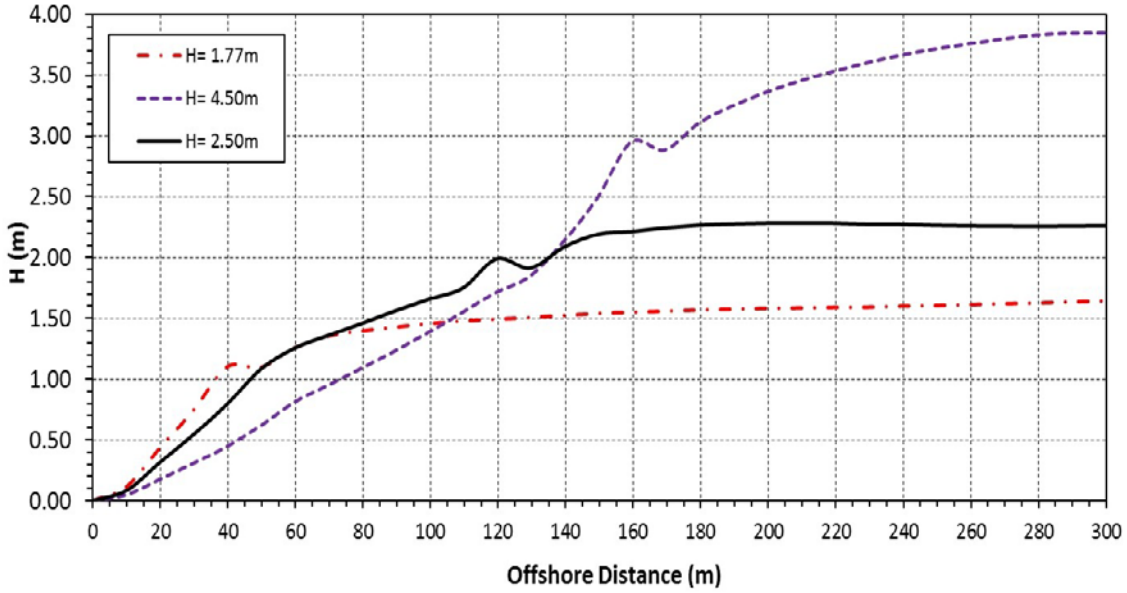


Fig. 13. Computed wave height along the centerline of the beach

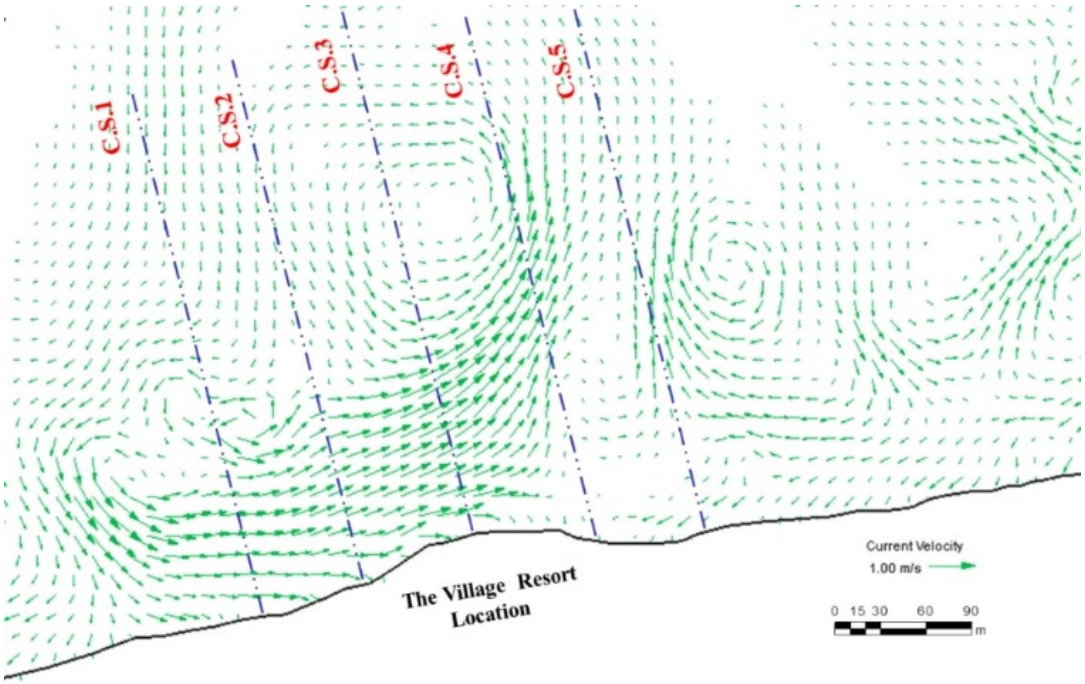


Fig. 14. Current velocity in the beach for H=2.5m, T=7.5s and direction is NW

(Figs. 16a and 16b) show the wave direction and height as the waves approach the perched beach from the prevailing wind direction for H=1.77 m and 2.5 m. It can be observed that the incident wave is partially reflected at the submerged breakwater and small waves are transmitted to the protected area over and through the permeable submerged structures. Over the submerged breakwater, the combined effects of wave shoaling and damping occur due to the change in the water depth and the dynamic interaction with the flow inside the submerged breakwater. The gap allows some wave energy into the perched beach and high waves are formed at its offshore face. Thus, it is recommended to prohibit swimmers from accessing the opening, and a strong plastic wire mesh should be installed in the openings to save swimmers from any possible movement through them.

It is also evident that wave breaking takes place over the submerged breakwater, and small waves are transmitted to the protected area (Fig. 17). It can be remarked that the transmitted wave height is always less than 0.75 m even for the extreme wave height of 4.5 m, but it is less than 0.5 m for all other incident wave height conditions. Comparisons between the wave heights for the cases before and after construction of the perched beach are evident in (Fig. 17). It is worthwhile that before the construction of the perched beach, large waves could approach the shoreline at a height of more than 1.0 m for the prevailing deep water summer waves of 1.77 m in height. The latter waves break at about 40 m from the existing shoreline and the broken wave height is less than 0.5 m within the last 20 m from the shoreline. This causes inconvenience to swimmers due to the limited width of the surf zone and possibly large induced rip currents.

The virtue of the perched beach is well pronounced as shown in (Fig. 18) as the current velocities in the protected area become very small due to the construction of the perched beach. The velocity inside the perched beach is less than 0.5 m/sec which is very convenient for swimmers even during the extreme incident wave conditions. It can be observed that no rip current or circulation occur inside the perched beach, which is safe for swimmers. On the other hand, rip currents and circulation zones are evident outside the perched beach.

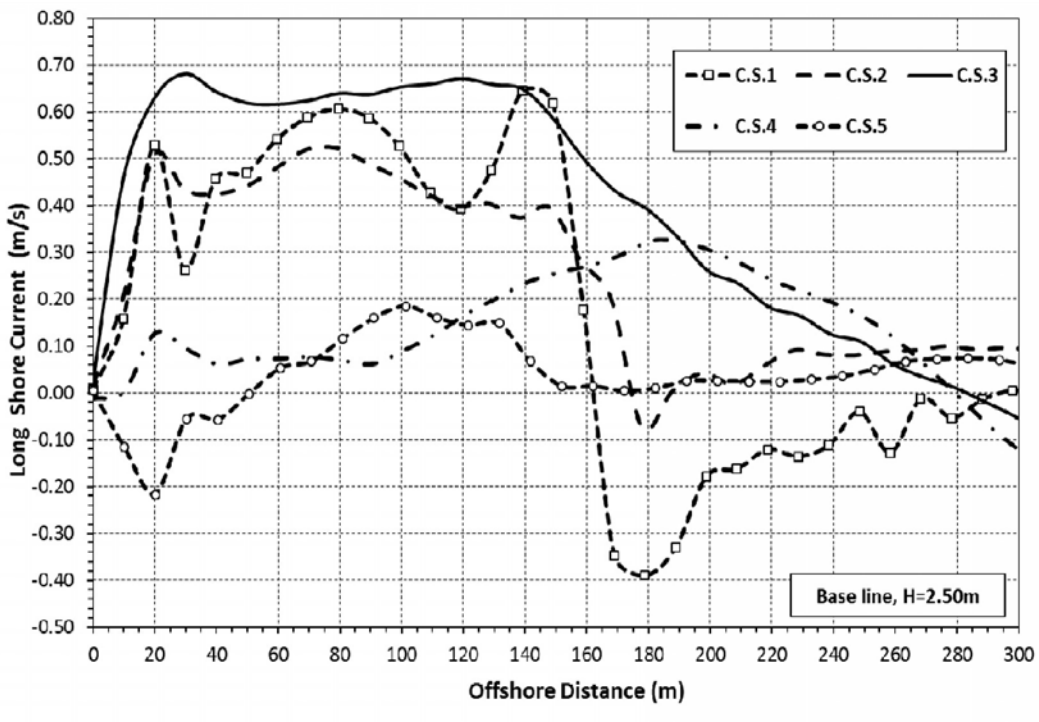


Fig. 15a. Long shore current at the profiles for H=2.50 m

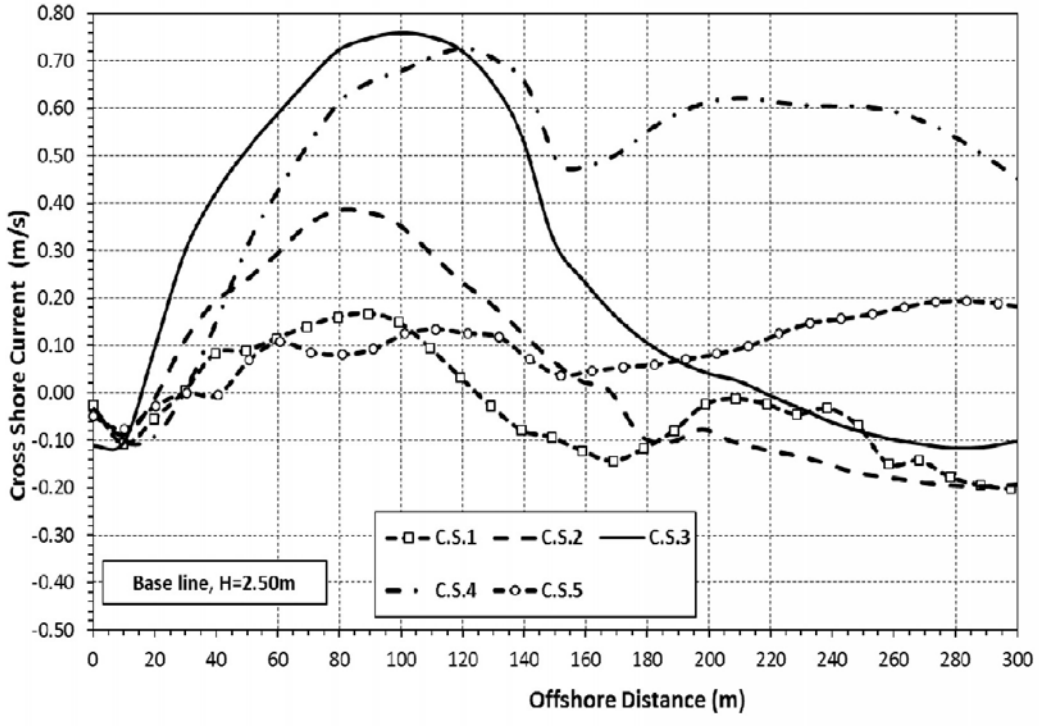


Fig. 15b. Cross shore current at the profiles for H=2.50 m

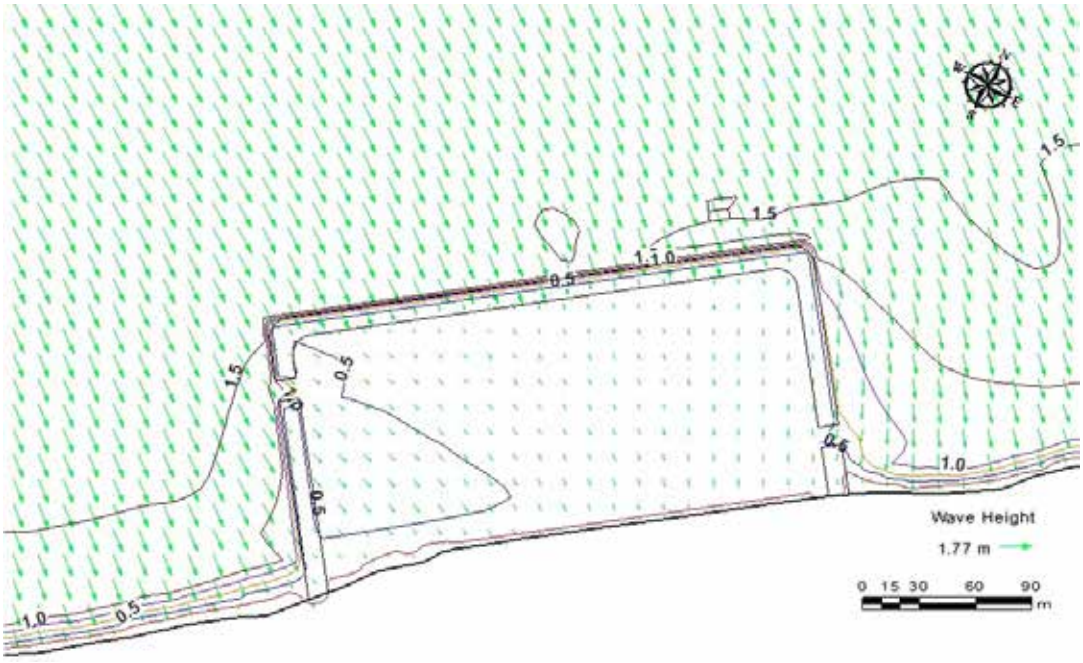


Fig. 16a. Computed wave height and direction in the vicinity of the structure for H=1.77 m



Fig. 16b. Computed wave height and direction in the vicinity of the structure for H=2.50 m

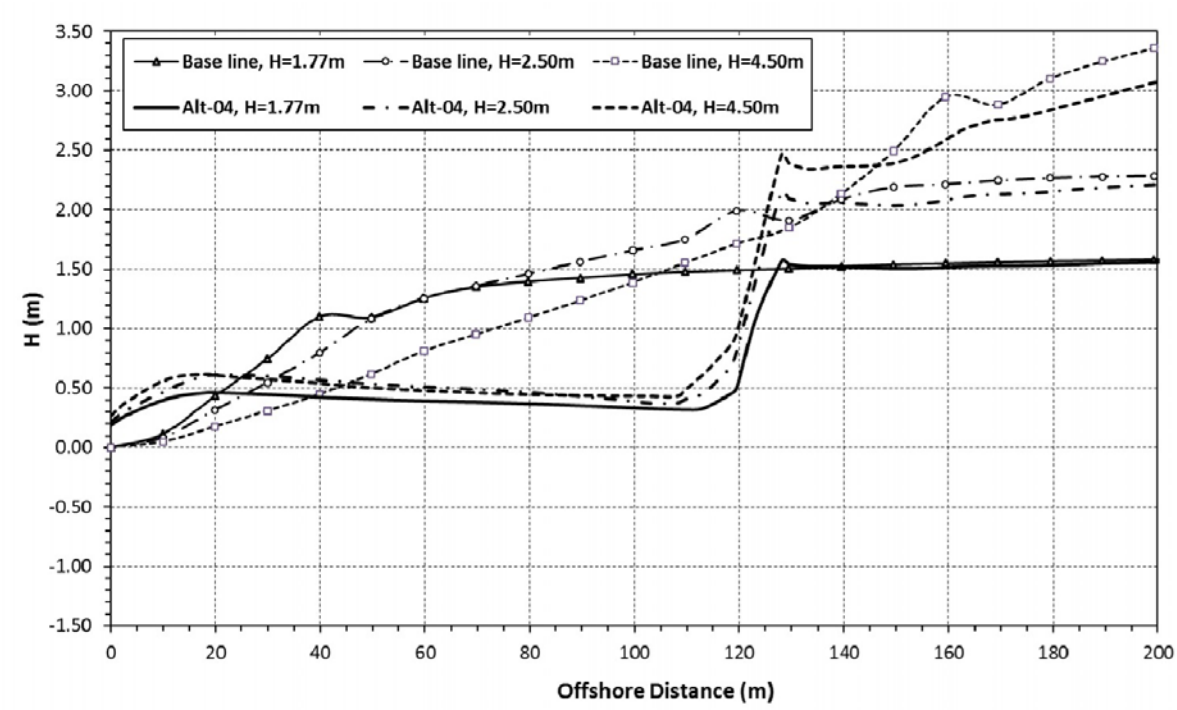


Fig. 17. Computed wave height at the centerline of the perched beach (at the profile C.S.3)

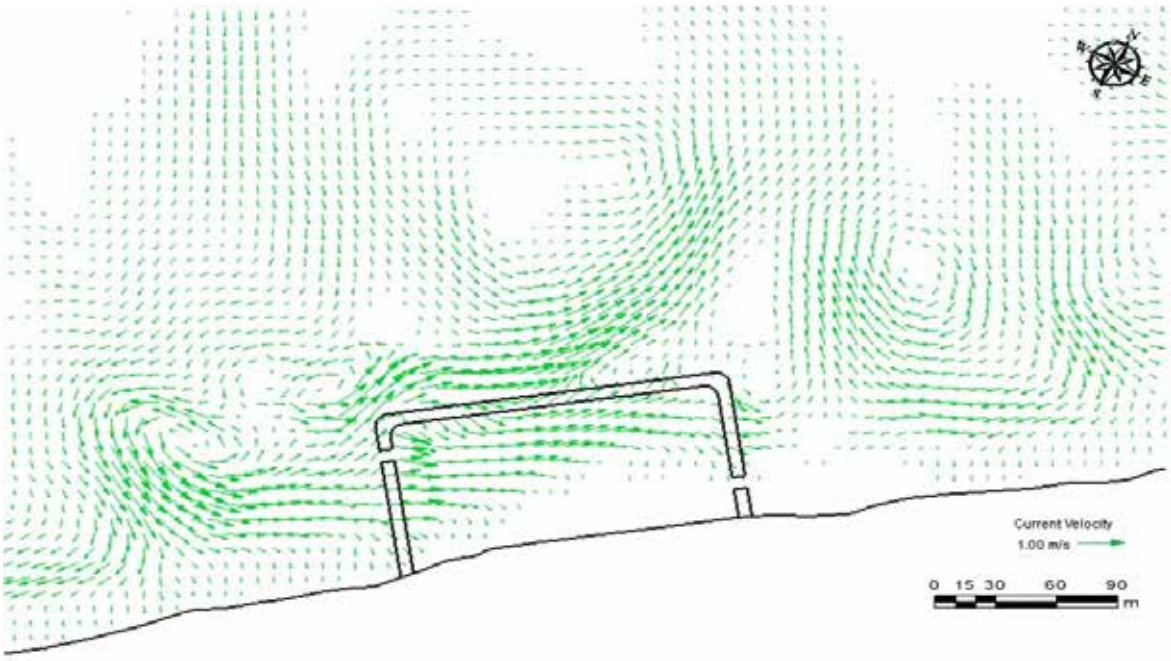


Fig. 18. The current velocity in the vicinity of the structure for H=2.50 m

The cross and long shore currents along the centerline of the perched beach for various incident wave conditions are presented in (Figs. 19 and 20). It can be noticed that the rip currents are almost null during moderate summer waves, i.e., H=1.77 m, and are less 0.2 m/s during high summer waves, i.e., H=2.50 m. On the other hand, the long shore current inside the perched beach is less than 0.5 m/sec during the summer waves. The maximum long shore current velocity reaches 0.70 m/s and 0.60 m/s during summer for H=2.50 m and H=4.50 m, respectively, and occur at the offshore toe of the submerged breakwater outside the perched beach. It is also evident that eddies are sometimes generated at the west corner of the submerged breakwater and large current velocities are induced at the offshore toe of the submerged breakwater (Fig. 19) for the highest summer and winter waves, i.e., H=2.5 and 4.5 m. Thus, additional toe protection has been made during construction at the latter locations to save the breakwater from toe scour and possible failure. The currents also cross the opening in the west groin to the perched beach at relatively slow velocity before they reach/pass the openings in the east groin. (Fig. 18) shows that two large eddies are generated during the highest summer wave, i.e., H=2.5 m, and are located at the west and east sides of the perched beach. Observations have been made after the complete construction of the perched beach and confirmed the aforementioned results of the numerical model to a great extent.

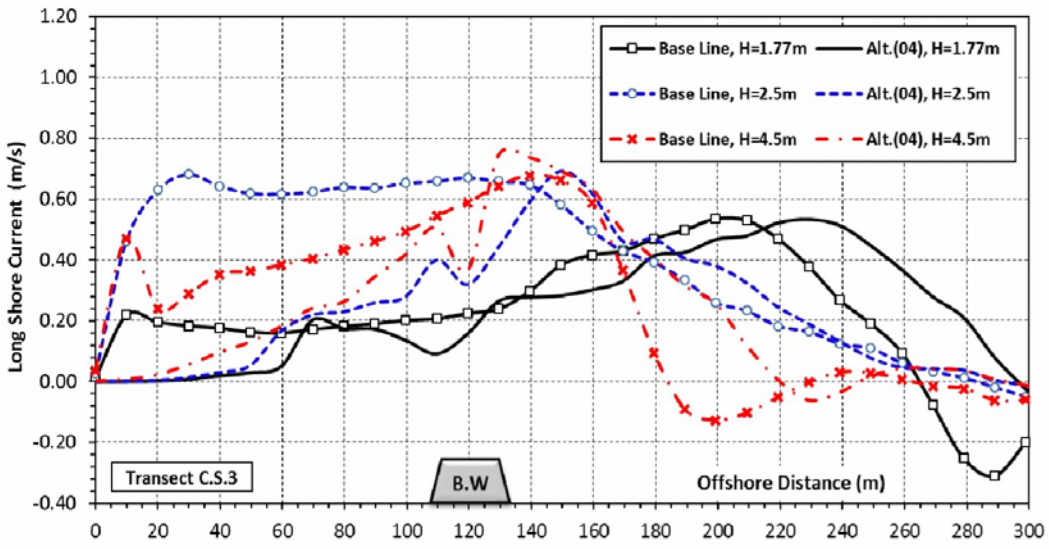


Fig. 19. Long shore current velocity along C.S.3 before/after construction of the perched beach

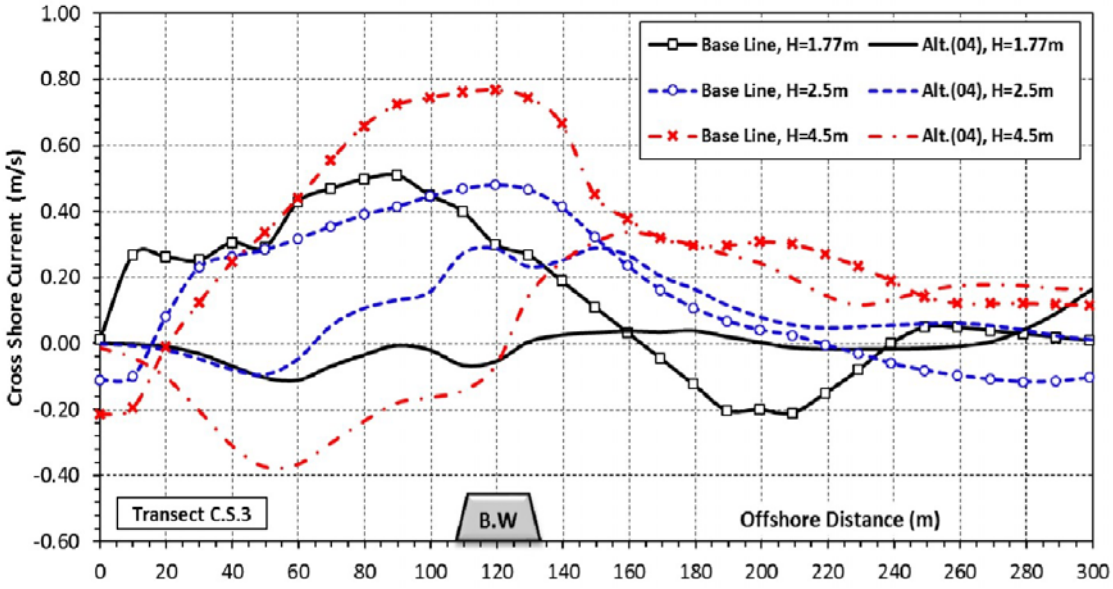


Fig. 20. Rip current velocity along C.S.3 before/after construction of the perched beach

4. ALTERNATIVES DISCUSSION

The proposed alternatives have various configurations including: submergence ratio of the breakwater, groin with/without gap and emerged/submerged groin. The alternatives have been compared from the point of view of wave height, currents velocities, flushing and shoreline changes. In the current discussions, it has been focused on the case of maximum deep water wave in summer, i.e., H=2.5 m.

4.1 Wave Height

Comparisons between the wave heights for the cases before and after construction of the perched beach are evident in (Fig. 21). The computations have been made for the different alternatives, as well, for various values of d/h (crest height/water depth), as shown in (Fig. 22). It is observed that wave breaking takes place over the submerged breakwater and small waves are transmitted to the protected area. These figures confirm that a partial standing wave is formed in front of the breakwater and nonlinear wave damping takes place over it with a smaller wave being transmitted to the onshore side.

The results also suggest that wave energy dissipation depends greatly on breakwater height. It is shown that the higher the breakwater is, the lower the transmitted, but the slightly higher the reflected wave energies are. It has been found that the transmitted wave height is less than 0.60 m for the alternatives: Alt. (01), Alt. (02), Alt. (03), and Alt. (04) which have the same submergence ratio (d/h=0.84), which means that the site can be used for recreational purposes for most of the summer season. On the other hand, the transmitted wave height is more than 0.6 m for the alternatives: Alt. (05), and Alt. (06). (Fig. 23) shows that there is no significant effect on the wave height at the centerline of the perched beach due to the gaps in groin and the emerged/submerged groins. So, these wave conditions are considered as non-comfortable swimming conditions, as stated by [2] and hence these alternatives do not provide safe swimming conditions.

Computations have also been made for the transmission coefficient (Kt) using various well-known formulae available in literature. The values of the coefficient of transmission either computed by the empirical formulae or the results of the SMS model have been presented in (Fig. 24). It has been found that the value of Kt for the actual dimensions of the perched beach (Alt.04) is 24% as per the SMS model, but it is 22%, 38%, 45%, 52% and 68% as computed by [12, 13, 14, 15, 16], respectively. It can be concluded that the SMS model results agree reasonably with those computed by [12, 13], but [15, 14, 16] show much higher values. Thus, only the results of [12, 13] are considered applicable to the current perched beach. Generally, it can be stated that the maximum transmitted wave height in summer varies from 0.55 m to 0.95 m as computed by the SMS model, [12,13] formulae.

4.2 Current Velocity

The cross and long shore currents along the centerline of the perched beach for the different alternatives are presented in (Figs. 25-28) during high summer waves, i.e., H=2.50 m. It can be noticed that the rip currents before construction of the perched beach are more than 0.7 m/s, while they decrease after construction to 0.2 m/s inside the perched beach. Also, it can be noticed that the long shore currents are less than 0.2 m/s for a distance 60 m offshore, but after this distance they increase rapidly to reach 0.46 ms/, 0.68 m/s and 0.77 m/s in case of d/h=0.84, d/h=0.72 and d/h=0.62, respectively, and occur at the offshore toe of the submerged breakwater outside the

perched beach. So, it can be confirmed that the higher the breakwater is, the lower offshore currents are. Also, attention should be given to design of the breakwater toe. Furthermore, swimming close to the offshore side of the breakwater is forbidden.

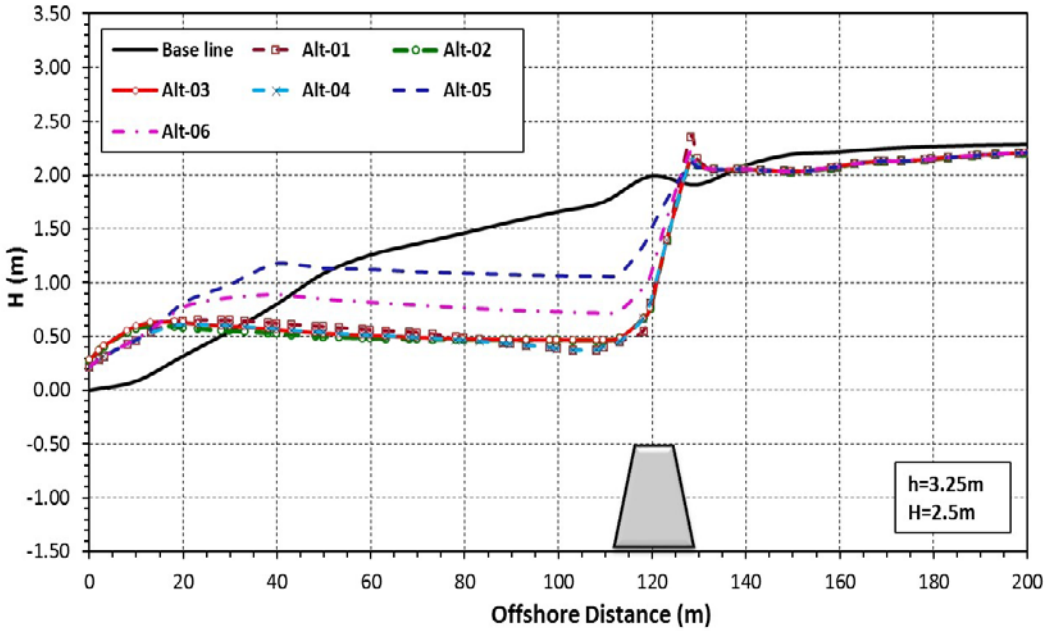


Fig. 21. Computed wave height along the centerline of the perched beach (H=2.50 m)

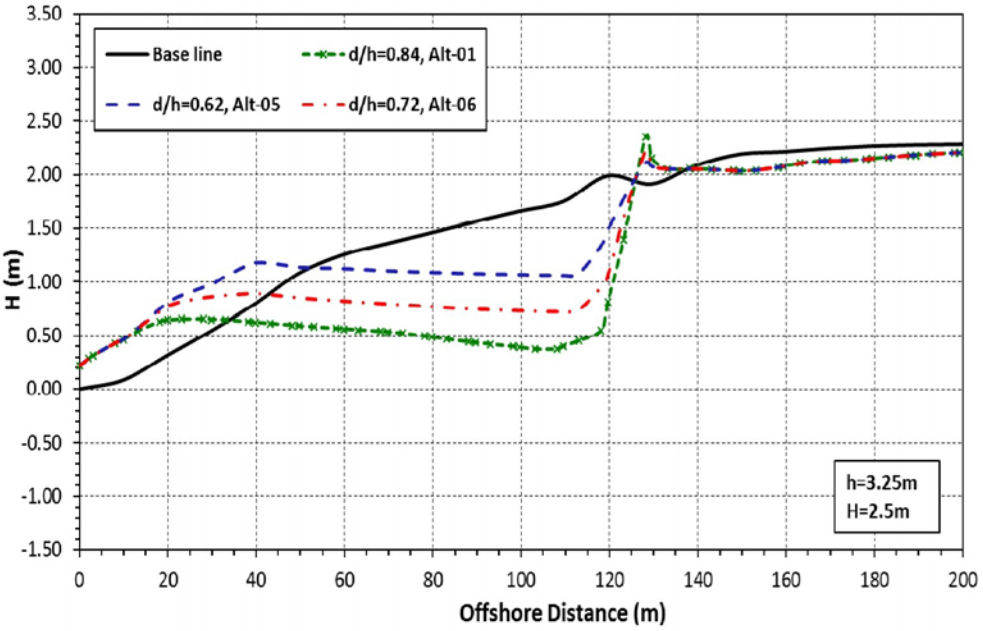


Fig. 22. Effect of d/h on the wave height at the centerline of the perched beach (H=2.50 m)

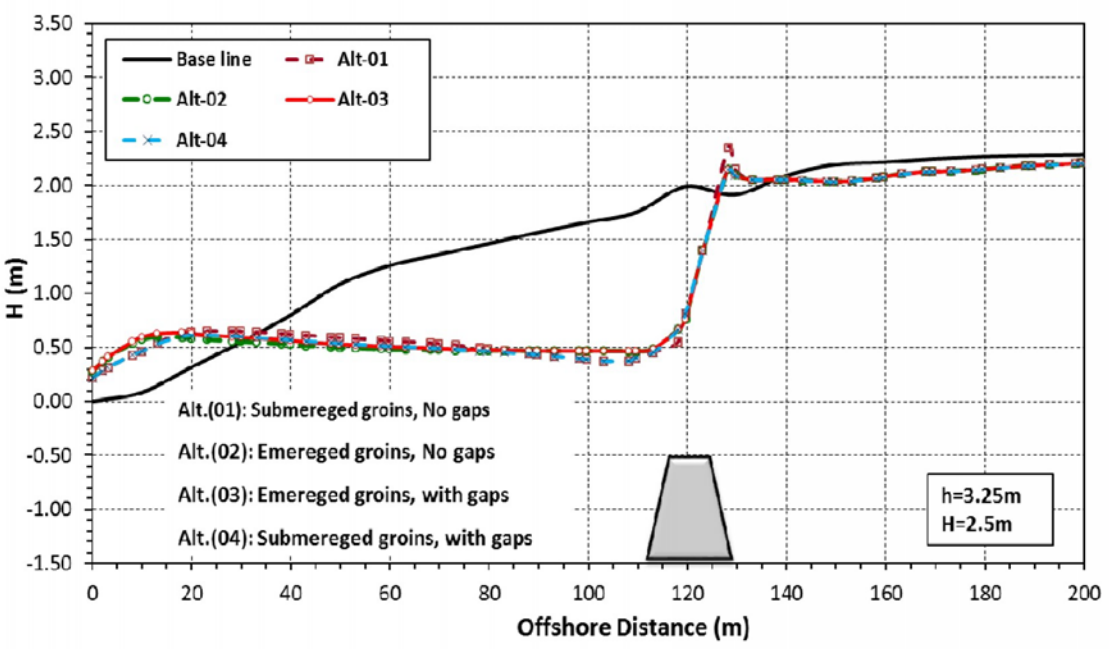


Fig. 23. Effect of the gaps in groin and the emerged/submerged groins on the wave height (H=2.50 m)

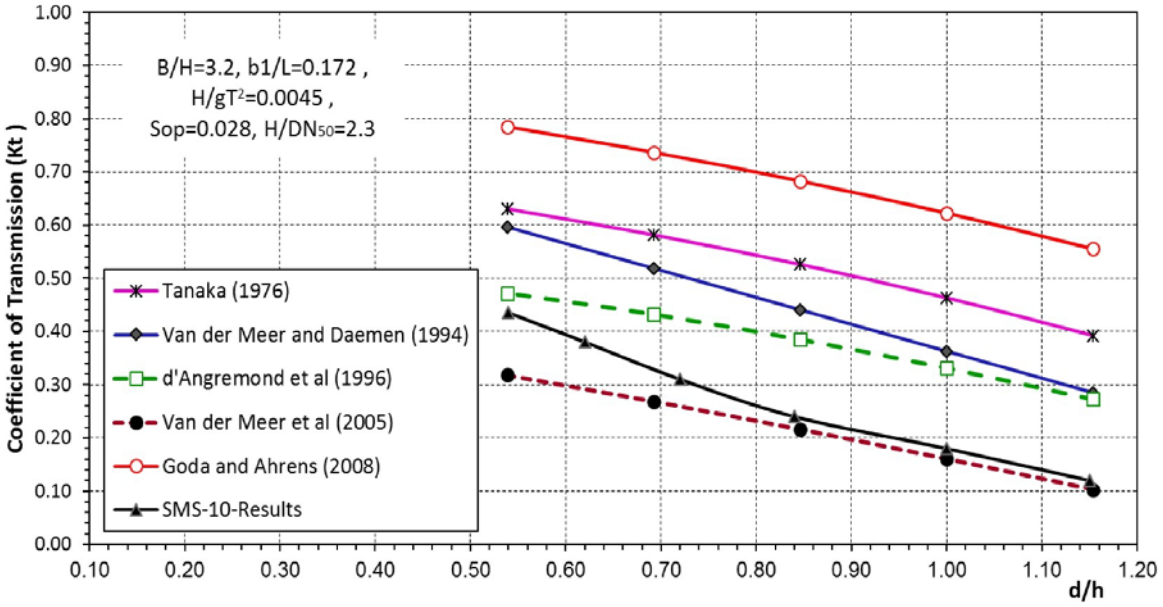


Fig. 24. Computed values of the transmitted wave height using various empirical formulae and SMS

Moreover, it can be observed that the effect of the submergence ratio (d/h) on the rip current is small compared to its effect on the long shore currents. The emerged/submerged groins have significant effect on the cross and long shore currents

inside the perched beach. On the other hand, the gaps in the groin have no effect on the cross and long shore currents inside the perched beach, as shown in (Figs. 27-28).

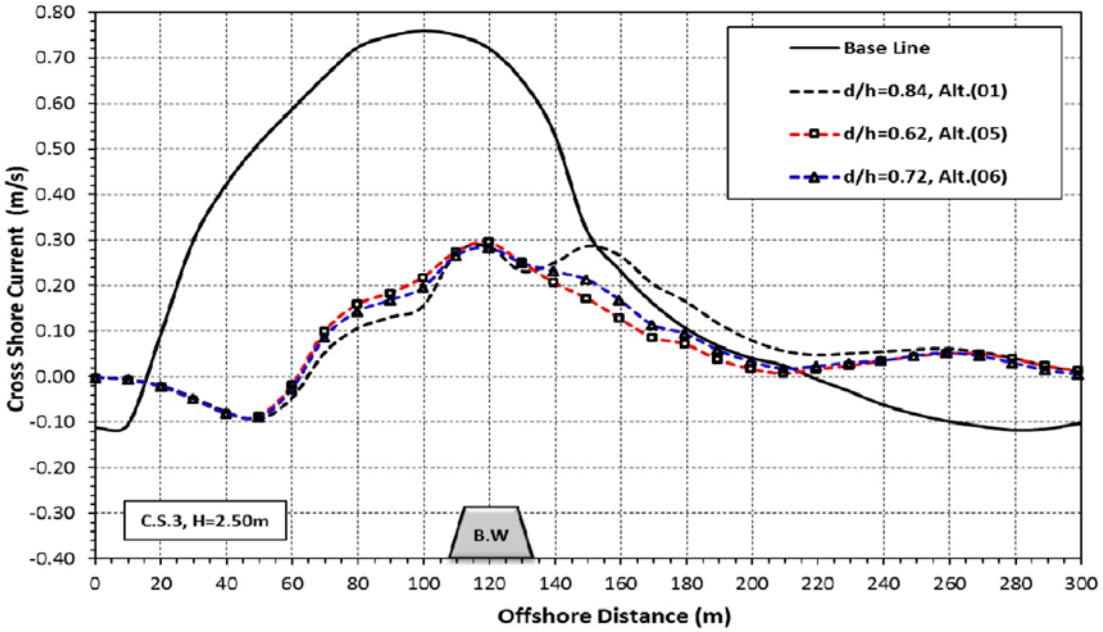


Fig. 25. Rip current velocity along the perched beach for various values of d/h

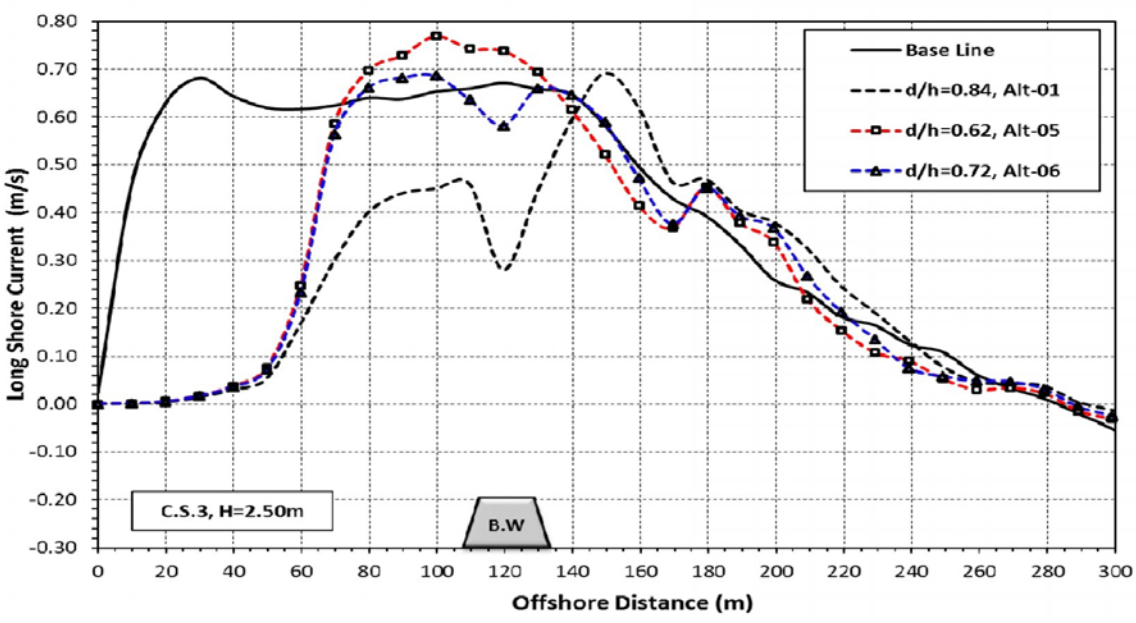


Fig. 26. Long shore current velocity along the perched beach for various values of d/h

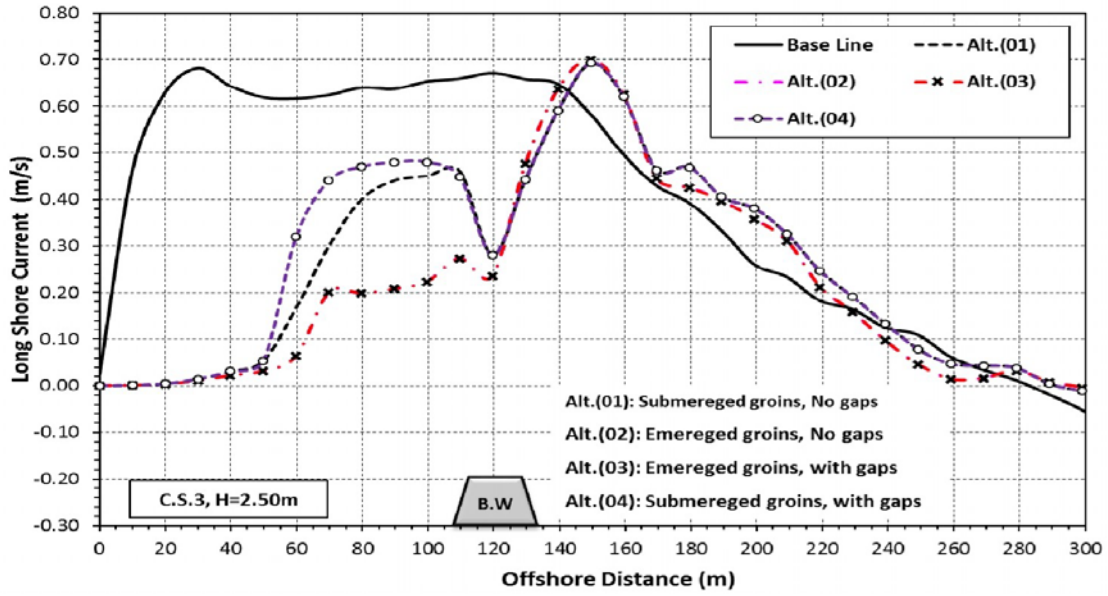


Fig. 27. Effect of the gaps in groin and the emerged/submerged groins on the long shore current velocity along the perched beach (H=2.50 m)

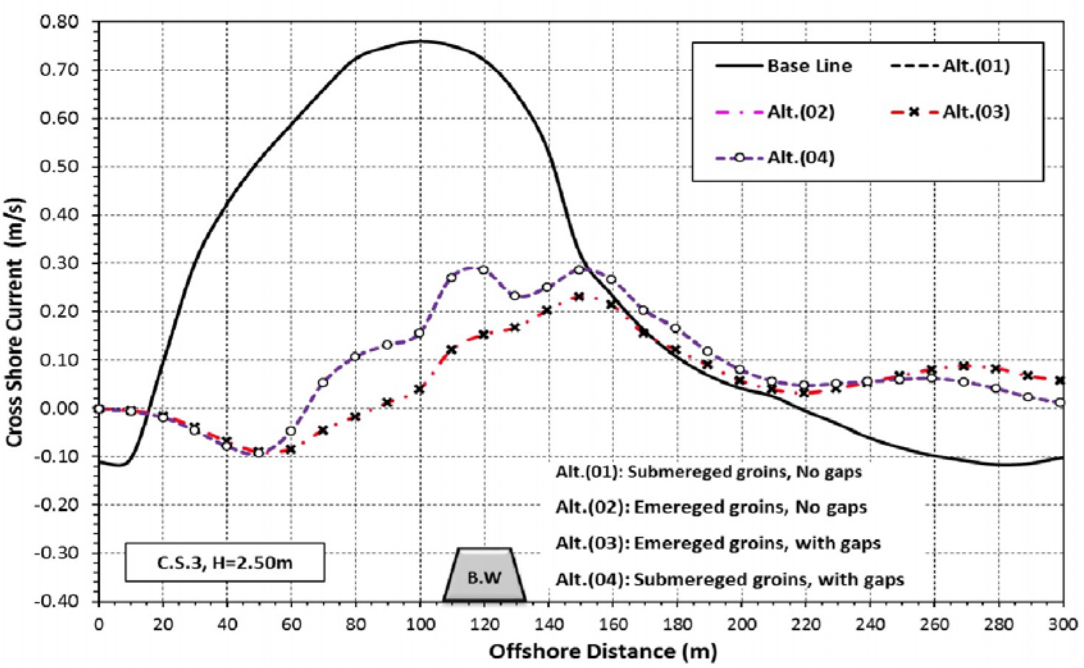


Fig. 28. Effect of the gaps in groin and the emerged/submerged groins on the rip current velocity along the perched beach (H=2.50 m)

4.3 Shoreline Changes and Flushing

Computations have been made using the GENESIS [5] program within the package of the SMS model for shoreline locations. Calibration has been made for the sediment transport model (GENESIS) using the bathymetric survey data conducted in 2009 and 2012, before commencement of construction of the perched beach, and the measured in 2013. (Fig. 29) shows the computed and measured shoreline changes after one year from the perched beach construction. A comparison was made between the computed and measured shoreline changes for different cases of different calibration coefficients (K1, K2) in the longshore sediment transport formula. The correlation shown in (Fig. 30) illustrate that the best values of the calibration coefficients for the study site are K1=0.40 and K2=0.08. According to the proposed, the long shore sand transport calibration coefficients, it can be observed that there are small differences between the computed and measured shoreline changes along the up drift and down drift of the structure.

Moreover, computations have also been made for predicting the shoreline changes after complete construction of the perched beach being in January 2013 with the results being presented in (Fig. 31) after 3 years later, i.e., 2016. The longshore sediment transport has been calculated based on the Ozasa and Brampton formula in the SMS model. The net transport has been computed over three years of simulation, including seabed update. The computed net sediment transport rate that corresponds to the period 2009–2012, i.e., before construction of the perched beach, has been found to be 15000 m^3/year and its direction is eastward. (Fig. 31) shows the shoreline at the west side of the perched beach progresses along the groin during the period 2013-2016.

The shoreline at the up drift side has been anticipated to progress for 13.3m/year seaward in case of no gap (Alt. 01) and for 11.? m/year if the gap is kept clear (Alt.04) during the period 2013-2016 (Figs. 32-33). Thus accretion is slightly slower in case of the gap than in case of no gap. It can be stated that the gap allows some sediment to cross the groin into the perched beach and hence less accretion occurs at the up drift side. On the other hand, the down drift side has been found to erode at a slow rate. The shoreline at the down drift side has been found to retreat for 4.5 m/year in case of no gap (Alt. 01) and for 2.8 m/year if the gap is kept clear (Alt.04). As well, erosion is slightly slower in

case of the gap than in case of no gap. The accretion rate has been estimated by the numerical model and found to be 9600 to ?200 m^3 /year at the up drift side. The corresponding erosion rate has been found to be 6850 and 5100 m^3/year for the cases of no gap and gap, respectively. Although the erosion is generally within acceptable limits, the gap seems to considerably reduce the erosion rate and shoreline retreat.

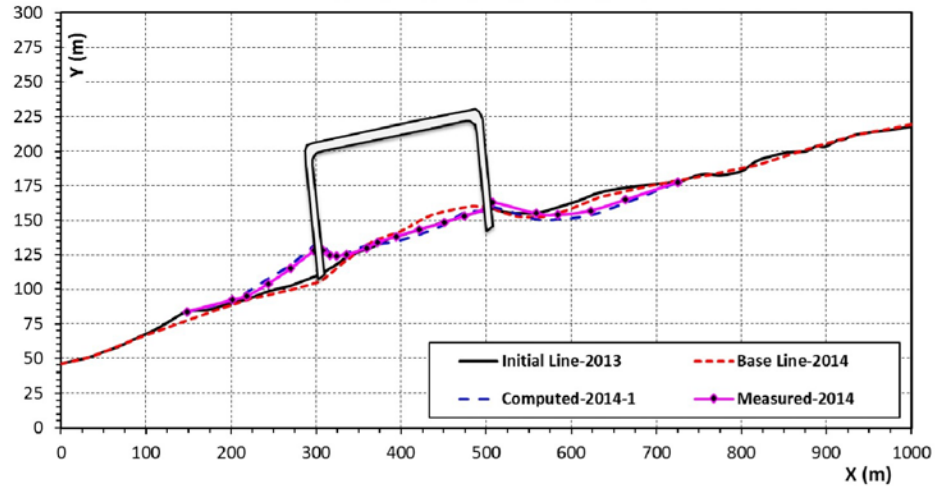


Fig. 29. Computed and measured shoreline changes around the perched beach

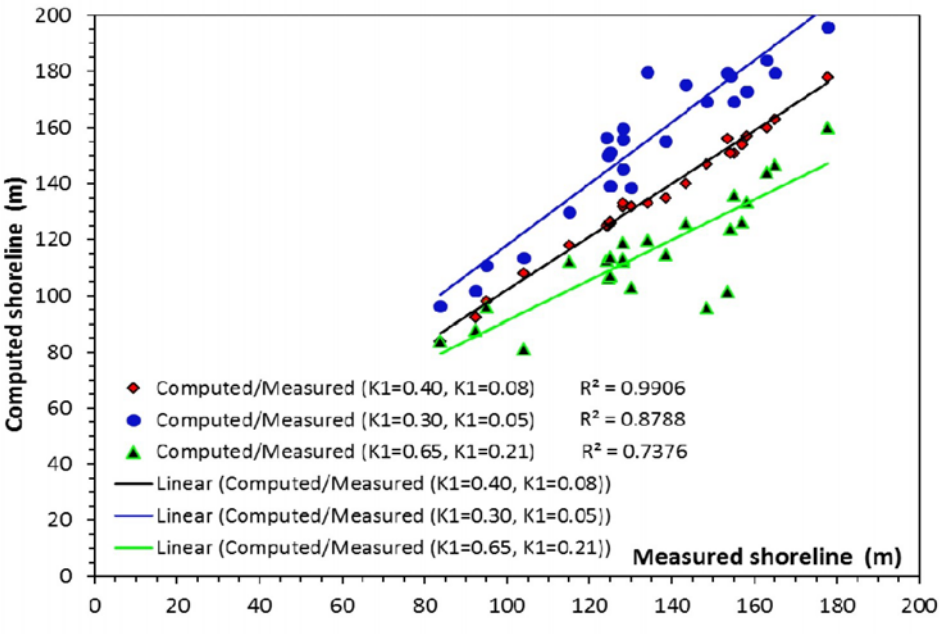


Fig. 30. Correlation of the computed and measured shoreline changes

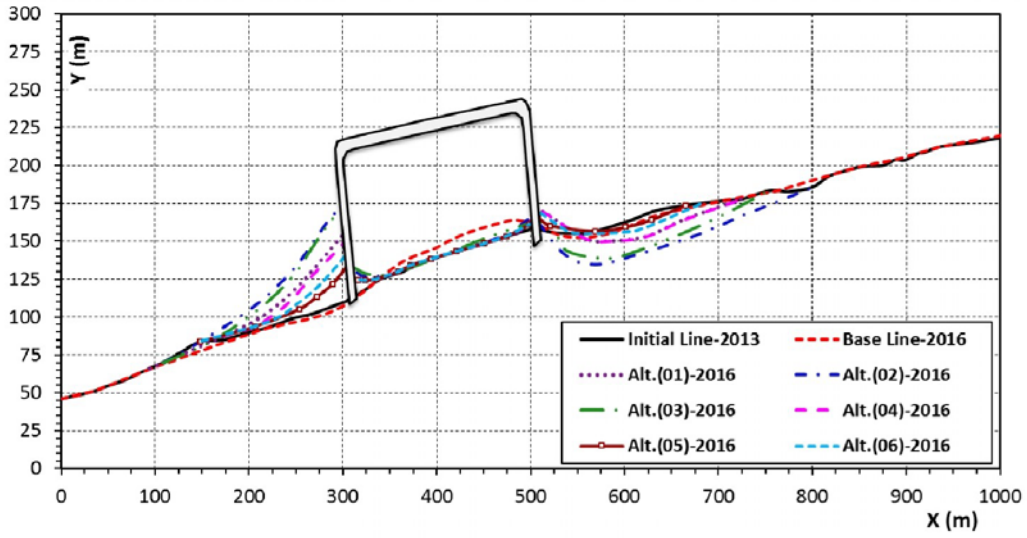


Fig. 31. Shoreline changes around the perched beach for various alternatives after 3 years of construction as compared with the case without a perched beach

Moreover, the submergence ratio has significant effect on the shoreline changes. The shoreline at the up drift side has been found to progress for 13.3 m/year, 9.3 m/year and 6.7 m/year toward the sea in case of d/h=0.84, d/h=0.72 and d/h=0.62, respectively. While, the shoreline at the down drift side has been predicted to retreat for 4.5 m/year, 2.5 m/year and 1.3 m/year toward the shore in case of d/h=0.84, d/h=0.72 and d/h=0.62, respectively. The accretion rate has been found to be 9600 m^3/year, 4800 m^3/year and 3600 m^3/year at the up drift side. The corresponding erosion rate has been found to be 6850m^3/year, 2400 m^3/year and 2050 m^3/year for the cases of d/h=0.84, d/h=0.72 and d/h=0.62, respectively (Figs. 32-33).

It can be observed that the emerged/submerged groins have significant effect on the shoreline changes along the up drift and down drift of the perched beach, as well. In case of emerged groins (Alt. 02) the shoreline at the up drift side progresses 20.0 m/year and the shoreline at the down drift side retreats 7.2 m/year. In case of submerged groins (Alt. 01), the shoreline at the up drift side progresses 13.3 m/year toward the sea and the shoreline at the down drift side retreats 4.5 m/year toward the shore. The accretion rate has been found to be 20160 m^3/year and 9600 m^3/year at the up drift side for Alt. 02 and Alt. 01, respectively. The corresponding erosion rate has been found to be 15900 m^3/year and 6850 m^3/year for the cases of emerged groins and submerged groins, respectively. Although the erosion is generally within acceptable

limits, the submerged groins/breakwater seems to considerably reduce the erosion rate and shoreline retreat.

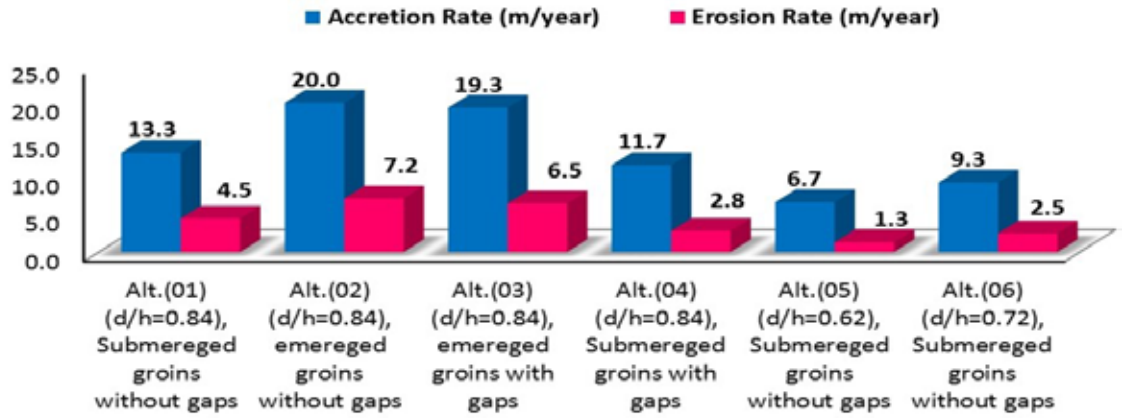


Fig. 32. Accretion and erosion rates around the perched beach for various alternatives

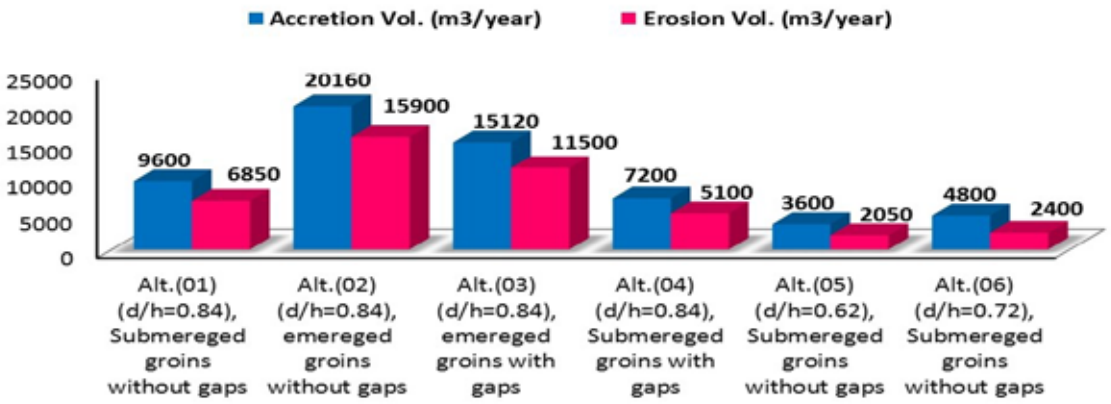


Fig. 33. Accretion and erosion volume rates around the perched beach for various alternatives

To minimize and mitigate erosion at the down drift, sand nourishment is considered to be the most straightforward soft approach. Thus, it is possible to move the sand from the accretion zone in the up drift to nourish the erosion area in the down drift. This will allow coarse sand particles deposited at the up-drift to nourish the erosion zone in the down drift instead of the finer particles, and hence erosion rates would decrease over time.

For the constructed alternative in the pilot area (Alt.04), it is recommended to perform the sand transport once every 3 years to limit the maximum shoreline retreat to a maximum of 10 m while keeping the gap in good working condition. It is also evident that the shoreline at the up-drift side is almost unaffected by the perched beach after 100 m away from the west groin within the period of 2013-2016, which is less than the groin length. On the other hand, the extent of erosion at the down drift side is limited to about 200 m away from the east groin during the period 2013-2016, which is less than twice the groin length. The shoreline in the protected area has been found to be almost unaffected during the period 2013-2016 due to the low currents. It is noteworthy that the spacing between the groins in the protected area in 2013 and 2016 has been artificially made by dredging early in 2013 to adjust the beach profile in the protected area. The annual nourishment to mitigate the erosion at the down drift, is estimated to be 6300 m^3. The grain size and schedules for the nourishment should be carefully prepared taking into account the social impact.

Further computations have been made for the flushing rate based on the relation between the tidal range and the structure height. It has been found that the flushing rate inside the perched beach ranges from 2 to 3 days, during the frequent occurrence of summer storms (H=2.5 and 1.77 m) and is always less than 6 days most of the time. These values are in a good agreement with the required flushing time in hot climate, which is between 4 and 6 days. It is known that the long flushing time will lead to deterioration in the water quality.

4.4 Assessment of Alternatives

[2] Conclude that the comfortable swimming conditions exist when breaker heights are smaller than 0.6 m and current velocities smaller than 0.2 m/s. Furthermore, the required flushing time in hot climate is between 4 and 6 days. Based on the stated comfortable swimming conditions and the results data, it can be stated that the proposed alternatives are acceptable from a flushing point of view. It can be observed that the transmitted wave height and the current velocities are acceptable for the alternatives: Alt. (01), Alt. (02), Alt. (03), and Alt. (04) but are unacceptable for the alternatives: Alt. (05) and Alt. (06).

Although, the shoreline changes are minimal in case of alternatives: Alt. (05) and Alt. (06), nonetheless, these alternatives are unacceptable for the transmitted wave height and current velocities. Also, the flushing rate inside the perched beach is always less than 6 days in all alternatives. Moreover, the shoreline changes in case of alternatives: Alt. (05) and Alt. (06) are larger than the other alternatives.

It can be judged that the configurations of alternatives: Alt. (01) and Alt. (04) are the most suitable, but still Alt. (04) is the better due to the groin gaps effectiveness. Thus, it can be considered that the configurations of alternative (04) provide guidelines for the design of a perched beach within the Al-Arab Bay zone in Cell 5 of the North West coast of Egypt.

5. CONCLUSION

This study has been conducted to investigate the actual case of a perched beach as a pilot project along the North-West coast of Egypt. The main purpose of the perched beach is to provide safe swimming during the summer seasons for visitors of a coastal resort while minimizing the possible negative impacts on the environment. Investigations have been made for the case before and after construction of the perched beach to clarify the impacts of the pilot project using the SMS numerical model. The results of the study can be used for the application of new coastal protection systems. The following points have been concluded:

D Large current velocities and eddies are generated offshore the submerged breakwater and offshore the west groin. The need for extra toe protection at these locations is far more evident than other locations. Attention should be given to bed scour and toe design.

D The wave energy dissipation depends greatly on breakwater height. It is shown that the higher the breakwater is, the lower the transmitted but the slightly higher the reflected wave energies are.

D The combined use of empirical formulae and the results of the numerical models to estimate the transmitted wave height and design of a submerged breakwater are useful tools in coastal studies especially along the North-West coast of Egypt. It has been found that the value of Kt for the actual dimensions of the perched beach is 24% as per the SMS model.

D The higher the breakwater is, the lower offshore currents are. It should be taken into consideration to pay close attention to the breakwater toe and to swim close to the breakwater due to large currents occurring around it.

D The effect of the submergence ratio (d/h) on the rip current is small compared to their effect on the long shore currents.

D The emerged/submerged groins have significant effect on the cross and long shore currents inside the perched beach. On the other hand, the gap in groin has no effect on the cross and long shore currents inside the perched beach.

D The accretion is slightly slower in case of the gap than in case of no gap. It can be stated that the gap allows some sediment to cross the groin into the perched beach and hence less accretion occurs at the up drift side. On the other hand, the down drift side has been found to erode at a slow rate.

D The submergence ratio has significant effect on the shoreline changes. Also, the emerged/submerged groins have significant effect on the shoreline changes along the up drift and down drift of the perched beach, as well.

D To minimize and mitigate the erosion at the down drift, sand nourishment is considered to be the most straightforward soft approach to beach erosion. This will allow coarse sand particles deposited at the up-drift to nourish the erosion zone in the down drift instead of the finer particles and hence erosion rate would become less over the time.

D The configurations of alternatives: Alt. (01) and Alt. (04) are the most suitable, but still Alt. (04) is preferred due to the groin gaps effectiveness. So, it can be considered that the configurations of Alternative (04) provide guidelines for the design of a perched beach within the Al-Arab Bay zone in Cell 5 of the North West coast of Egypt.

D For the constructed perched peach (Alt.04), it has been found that:

– The maximum length of erosion in the down drift (east of the jetties) is less than twice the jetty length and the shoreline retreats at less than 3 m/year, but the maximum accretion length is less than the jetty length and the shoreline progresses is less than 12 m/year. The rates of sediment transport up drift and down drift the perched beach are 7200 and 5100 m^3/year, respectively, and sand nourishment is recommended once every three years. The residual adverse impacts could be generally alleviated through a routine sand nourishment program of the shoreline.

– The flushing rate inside the perched beach has been found to range from 2 to 3 days, during the frequent occurrence of summer storms (H=2.5 and 1.77m) and is always less than 6 days most of the time. These values are in a good agreement with the required flushing time in hot climate, which ranges from 4 and 6 days.

COMPETING INTERESTS

Authors declare that there are no competing interests.

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Neural Networks Approach for Hyperelastic Behaviour Characterization of ABS under Uniaxial Solicitatio

1. INTRODUCTION

Polymers still occupy a noticeable place in the materials industry, their characterization during working process, as well as during their use in diverse industrial fields, impose an advanced knowledge of their mechanical and thermal behavior.

In the working level, forming a polymeric sheet into a desired shape is done by means of the blow molding or the thermoforming process for example. Generally, the deformation is very fast, non-uniform, multiaxial and occurs at a forming temperature above the glass transition temperature [1]. The modeling of this phenomenon remains delicate and creates several difficulties in the experimental level [2] as much as in the modeling level in terms of important computational time, as well the implementation of nonlinear constitutive laws [3].

On the other hand, designing the polymeric parts of different shape and geometries requires a rigorous control of external constraints, and mechanical limits (such as yield point, failure stress _). Modeling the mechanical behavior of polymers during this state proves to be useful, even crucial in order to improve the working process.

Generally, material constants embedded within the behavior models can be determined by using a modified Levenberg–Marquardt algorithm [4,5], or a

Powell's iterative algorithm which is a conjugate direction method without gradient calculation [6], to minimize the difference between the experimental curves and the theoretical response [7,8]. However, as it is underlined in several references [9], the convergence of the solution of the equilibrium equation, which governs the movement of the thermoplastic flat plate, depends on the initial choice of the material parameters embedded in the model.

To remedy this problem, in this work, an approach combining experimental and numerical tools, based on an artificial neural networks model [10,11], is used to model the behavior of thermoplastic flat plats under uniaxial tensile solicitation. The algorithms associated with the artificial neural networks can prove to be an interesting alternative for the determination of the mechanical parameters.

Recently, neural networks are used in many areas include the classification, pattern recognition, speech synthesis, diagnosis, identification and control of dynamic systems, or even to improve the quality of produced parts in various industrial processes such as injection molding or blow molding [12,13].

The use of neural networks in the identification processes is justified by the fact that they can approximate the nonlinear functions through their capacity, to reproduce rather complex behavior. Their performance is improving continuously while relying on a dynamic learning [14], which provides a robust neuronal identification vis-a-vis the parametric variations and disturbances that can affect the operation of the studied system.

Modeling using neural networks requires a model selection which is a crucial step in designing a neural network, as with any non-linear model. Indeed, this phase should lead to choose the model that has a complexity that is both sufficient to fit the data and not excessive.

Their use in the identification problem in the mechanical field remains a matter of actuality, the pioneer works are those proposed by Erchiqui [11] and [15] for identifying the hyperelastic behavior of a polymeric sheet in bubble inflation technique. The same approach was used in the aim to characterize the viscoelastic behavior of an ABS polymeric sheet in bubble inflation technique [16].

In this work, the power of neural networks is exploited to identify the nonlinear behavior of an ABS flat plate under uniaxial tension. Our neural algorithm is coupled with a finite element code [17] in order to reproduce the behavior of material, hyperelastic Mooney-Rivlin [18] and Ogden [19] models are considered, a multilayer perceptron is used for this application.

In the first approximation, models with first order of the strain energy function are considered. However, the obtained results show a need to increase the strain energy function order. The strength of the neuronal approach is explored to control the additional materials constants.

2. BEHAVIOUR MODEL

In static tensile test, a volume element undergoing a tensile stress in a single direction is subject to the Poisson's effect as showing in Fig 1 below:

This implies that the extensions or stretches in both y and z directions are equivalent:

$$= \qquad (1)$$

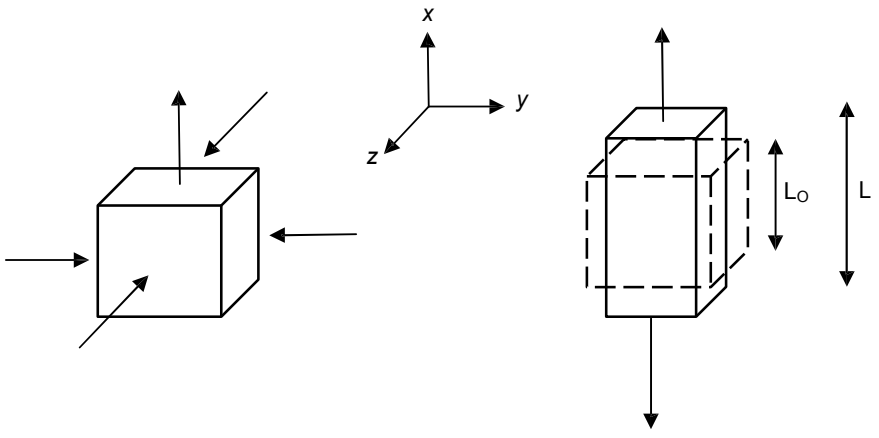


Fig. 1. Volume element of the tensile specimen in the non-deformed and deformed state

We can define the principal stretch with respect to the x axis as:

$$_1 = \quad = 1 + \frac{dL}{L_0} \tag{2}$$

Assumptions of plane stress and the incompressibility of thermoplastic material are taken into account. It follows that the main stretches in the directions of y and z can be written as follows:

$$_2 = \ _3 = \frac{1}{\sqrt{=}} \tag{3}$$

The Cauchy stress tensor's components are:

$$a_{22} = a_{33} = a_{13} = a_{23} = a_{31} = a_{32} \tag{4}$$

In this work, we consider the hyperelastic materials. They are defined by the existence of scalar function, W, called the strain energy function, from which stresses can be derived at each point. In order to satisfy the objectivity requirements, the strain energy function must be invariant under changes of the observer frame of reference. It is well-known that the Cauchy–Green deformation tensor C is invariant under changes of the observer frame of reference. Thus, if the strain energy function can be written as a function of C, it automatically satisfies the objective principle. The general stress–strain relationship is given by the formula:

$$s = 2\frac{aw}{a} \tag{5}$$

Where s is the Piola–Kirchhoff stress tensor. The different models that exist in the literature define the strain energy as a function of the strain field. The Rivlin theory [18] for isotropic materials describes the energy as a function of the three Cauchy strain invariant 1_1 , 1_2 and 1_3. Based on the assumption of the incompressibility of the material, the stress can be obtained from the following Mooney–Rivlin [18]:

$$w = L_{i+j}^{n} C_{ij} (/_1 - 3)^i (/_2 - 3)^j \tag{6}$$

Cij are the material constants. The use of two terms in the series is sufficient to describe the elastic modulus in both uniaxial and biaxial deformation modes, but we will see the opposite; to describe with more accuracy the behaviour of our material, we have to go beyond the first order.

From other side, Ogden [19] proposed to link the strain energy directly with principal stretches.

$$w = L^{N}_{n=1} \frac{\mu_n}{a_n} \left(-^{a_n}_{1} + -^{a_n}_{2} + -^{a_n}_{3} - 3 \right) \tag{7}$$

The real doublets $(\mu_n, a_n)_{n=1,N}$ are material constants.

The use of a series of three terms can get very good results to represent the overall behaviour of materials. In addition, the simplicity of the mathematical formulation and the direct use of extensions make the model widely used in numerical problems of large hyperelastic deformations.

Stress difference for incompressible hyperelastic material is given by:

$$\begin{aligned} a_{11} - a_{33} &= \lambda_1 \frac{\partial w}{\partial \lambda_1} - \lambda_3 \frac{\partial w}{\partial \lambda_3} \\ a_{22} - a_{33} &= \lambda_1 \frac{\partial w}{\partial \lambda_1} - \lambda_3 \frac{\partial w}{\partial \lambda_3} \end{aligned} \tag{8}$$

We can write generally for Mooney type material, for the first order development:

$$\begin{aligned} \lambda_1 \frac{\partial w}{\partial \lambda_1} &= 2C_1 \lambda_1^2 + 2C_2 \left(\frac{1}{\lambda_2^2} + \frac{1}{\lambda_3^2} \right) \\ \lambda_2 \frac{\partial w}{\partial \lambda_2} &= 2C_1 \lambda_2^2 + 2C_2 \left(\frac{1}{\lambda_1^2} + \frac{1}{\lambda_3^2} \right) \\ \lambda_3 \frac{\partial w}{\partial \lambda_3} &= 2C_1 \lambda_3^2 + 2C_2 \left(\frac{1}{\lambda_2^2} + \frac{1}{\lambda_1^2} \right) \end{aligned} \tag{9}$$

And for Ogden type material, we can write for the first order approximation:

$$\begin{aligned} \lambda_1 \frac{\partial w}{\partial \lambda_1} &= \mu \lambda_1^{\alpha} \\ \lambda_2 \frac{\partial w}{\partial \lambda_2} &= \mu \lambda_2^{\alpha} \\ \lambda_3 \frac{\partial w}{\partial \lambda_3} &= \mu \lambda_3^{\alpha} \end{aligned} \tag{10}$$

The equation (8) can be rewritten as follows, for Mooney material:

$$\begin{aligned} a_{11} - a_{33} &= 2C_1 (\lambda_1^2 - \lambda_3^2) - 2C_2 \left(\frac{1}{\lambda_1^2} - \frac{1}{\lambda_3^2} \right) \\ a_{22} - a_{33} &= 2C_1 (\lambda_2^2 - \lambda_3^2) - 2C_2 \left(\frac{1}{\lambda_2^2} - \frac{1}{\lambda_3^2} \right) \end{aligned} \tag{11}$$

And then for Ogden material:

$$\begin{aligned} a_{11} - a_{33} &= \mu (\lambda_1^{\alpha} - \lambda_3^{\alpha}) \\ a_{22} - a_{33} &= \mu (\lambda_2^{\alpha} - \lambda_3^{\alpha}) \end{aligned} \tag{12}$$

By considering equations (1), (2) and (3), both expressions (11) and (12) can be written respectively as:

$$a_{11} - a_{33} = 2C_1 (\lambda^2 - \frac{1}{\lambda}) - 2C_2 (\frac{1}{\lambda^2} - \lambda) \quad (13)$$
$$a_{22} - a_{33} = 0$$

And

$$a_{11} - a_{33} = \mu (\lambda^a - \lambda^{-\frac{a}{2}})$$
$$a_{22} - a_{33} = 0 \quad (14)$$

By substituting in our case, which is a simple uniaxial tension, it follows that:

$$a_{22} = a_{33} = 0 \quad (15)$$

Then the Cauchy principal stress in the x direction takes the following form, for Mooney and Ogden material respectively:

$$a_{11} = (2C_1 + \frac{2C_2}{\lambda}) (\lambda^2 - \frac{1}{\lambda}) \quad (16)$$

$$a_{11} = \mu (\lambda^a - \lambda^{-\frac{a}{2}}) \quad (17)$$

3. EXPERIMENTAL

The gripping faces were covered with an elastomeric film to prevent slippage during loading, were mounted on a Zwick-Roell Z005 displacement controlled tensile testing machine. Dog- bone ABS (Acrylonitrile-Butadiene-Styrene) specimens were tested, according to the guidelines prescribed by the ASTM D 638-03 norm [20], Fig. 2 shows the specimen dimension according to this norm.

Preconditioning of the samples was carried out with a preload of 0.5 MPa with a load speed of 1 mm/min. The stress was determined by dividing the instantaneous load by the original cross-sectional area. The stretch was obtained by dividing the instantaneous gauge length by the original length. The original length of each specimen was taken as the gauge length after test specimen preconditioning and at a load of 0.5 MPa. The gauge length was the vertical distance between the clamps gripping the test specimen.

The experiment of tension was fulfilled until the specimen's failure, the stress versus strain's evolution are recorded simultaneously, using a data

acquisition system. Note that all tests were carried out at controlled ambient temperature, which is 25°C.

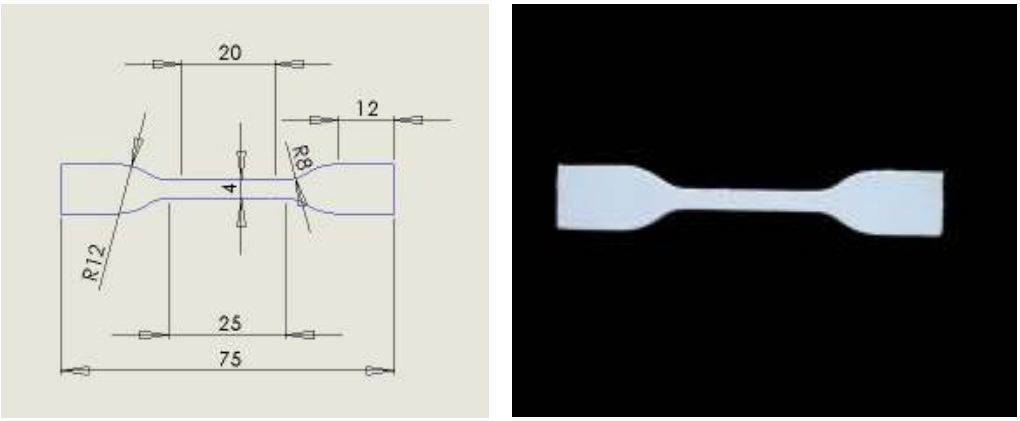


Fig. 2. Dimensions of the dog-bone test specimen in mm

4. IDENTIFICATION ALGORITHM

Neural networks have been studied since the 40's with the notion of formal neuron of McCulloch and Pitts [21] who first developed a mathematical model of biological neuron. Hence a neural network is a mathematical model of treatment consists of several basic interconnected neurons via weights that play the role of synapses.

These weights assume values that define the behavior of the whole structure. The adaptation of the latter through a suitable learning algorithm, allows the network to learn, memorize and generalize information.

4.1 Architecture

In general, a multilayer network is composed of an input layer, an output layer and a number of hidden layers [22]. Each neuron is connected to all neurons of the next layer via connections whose weights are real. Usually, the neuron used in the hidden layers or in the output layer, performs a weighted summation of its inputs and a nonlinear transformation which is often the sigmoid

function. While the neuron used in the input layer, simply passes its input to output.

4.2 Learning Process

During a learning process, neural network changes its behavior to allow it to move towards a clearly defined purpose. In other words, learning is adjusting the connection weights so that the outputs of the network are as close as possible to the desired outputs for all the used examples.

Initially, the learning process of a multilayer network was determined by the gradient method. Then, all optimization methods have been applied to this problem as the conjugate gradient method, the Levenberg-Marquardt [4] or Kalman filters [23].

Thus, the literature of learning of a multilayer neural network is very rich. However, we limit our study on the back-propagation algorithm combined with a Levenberg-Marquardt [24] optimization algorithm, which is a modified version of the gradient method and remains the most used and most responded. It is an optimization algorithm that seeks to minimize a cost function which covers the gap between the desired output and that delivered by the network [25].

The back-propagation algorithm can be described using two phases, first, a propagation phase or relaxation: initially, the input values are provided to the network's input layer, and then the network propagates the information from one layer to another to the output layer, and which gives the response of the network. Second, the back-propagation phase: that is to calculate the difference between the outputs of the network and the desired resulting changes in weight of the output neurons. Then, retro propagating the error to the input layer which allows the adaptation of the hidden layers weights.

In our network, we used a learning algorithm by back-propagation associated with a Levenberg-Marquardt optimization algorithm [26], with a

transfer function of sigmoid type. In our architecture, the error in the presentation of an example, denoted by *E*, can be given by the following expression:

$$E = \frac{1}{2} L^{h}_{k=1} (Y_k - Y^d_k)^2 \quad (18)$$

d_{Y_k} represents the Kth component of the desired output vector. The overall error to minimize is the sum of all errors on the database. The inputs and outputs of the neurons j and k explicit from the following expressions:

$$E_j = L^{n+1}_{i=1} x_i w_{ij} \quad ; \quad s_j = f(E_j) \quad (19)$$

$$E_k = L^{m+1}_{j=1} s_j w_{jk} \quad ; \quad Y_k = f(E_k) \quad (20)$$

$$E_j = L^{n+1}_{i=1} x_i w_{ij} \quad ; \quad s_j = f(E_j) \quad (19)$$

$$E_k = L^{m+1}_{j=1} s_j w_{jk} \quad ; \quad Y_k = f(E_k) \quad (20)$$

Where f is the sigmoid activation function defined by: (21)

$$f(x) = \frac{1}{1+e^{-x}}$$

The adjustment of the network weights by the back-propagation algorithm is ensured through the following iterative equation:

$$w_{uv}(i) = w_{uv}(i-1) - e\frac{aK}{aw_{UV}} \quad (22)$$

With e and i denote the step and the iteration number.

The derivative of E with the weight depends on its position, in fact if the weight connects the hidden layer to the output layer, so:

$$\frac{es}{ew_{0P}} = f^{1}(E_k)(Y_k - Y^d_k)s_j \quad (23)$$

If the weight connects the input layer to the hidden layer, then:

$$\frac{es}{ew_{0P}} = f^{1}(E_j)\Re L^{h}_{k)1} f^{1}(E_k)(Y_k - Y^d_k)]x_i \quad (24)$$

It should be emphasized that the convergence of the back-propagation algorithm depends on a variety of parameters, namely:

The complexity of the database and the order of the presentation of examples. Indeed, various studies have shown that a random sample presentation allows faster learning [25].

The structure of the considered neural network and especially the number of neurons in the hidden layers, which must be not very important to ensure the generalization ability of the network, nor very small for the learning network capability.

The initial setting of the algorithm parameters, essentially the initial values of weight and iteration step must be chosen in a manner allowing having a fast convergence.

The multilayer neural network that we propose has the following architecture as showing in the Fig 3 below:

Where X_1 and X_2 denoted C_1 and C_2 for the Mooney material, and μ and a for Ogden type material.

The used network consists of an input layer, hidden layers and an output layer. The number of neurons in the output layer depends on the response contemplated by the network. For the first approximation identification program, two neurons are required in the output layer to give the response of the excitation. The two neurons outputs represent the materials parameters embedded in the Mooney-Rivlin and Ogden models, while the input of the network is the variance of the corresponding stresses. Whereas for the second or third approximation model, the output layer takes more than two neurons depending on the behavior model presentation.

The simulation data are used for network learning, also, the error back-propagation algorithm is used for the perceptron learning. Thus, the optimization algorithm of Levenberg-Marquardt is used also in view of minimizing the error during the operation of back propagation. Generally, the use of a

maximum of three hidden layers gives satisfying results, this optimization technique is more powerful than other optimization algorithms, but it requires more CPU memory.

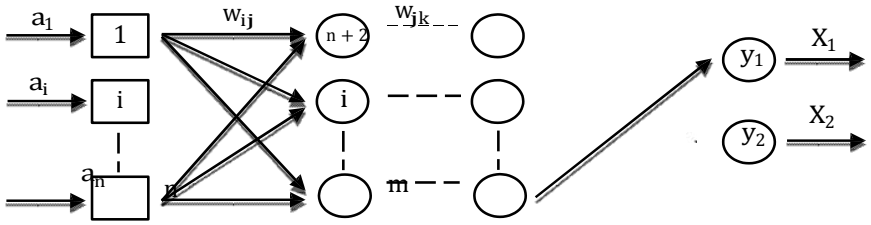


Fig. 3. Structure of the used multilayer neural network

5. VALIDATION

Both Mooney-Rivlin and Ogden behavior models are implemented in a finite element method code. First the two symmetry plans are exploited in order to reduce the calculations complexities during modeling. One-fourth of the dog-bone specimen was modeled as presented in Figs. 4 and 5. Then, the use of a 20 model proves to be satisfying given the specimen thickness which remains negligible as compared with other dimensions.

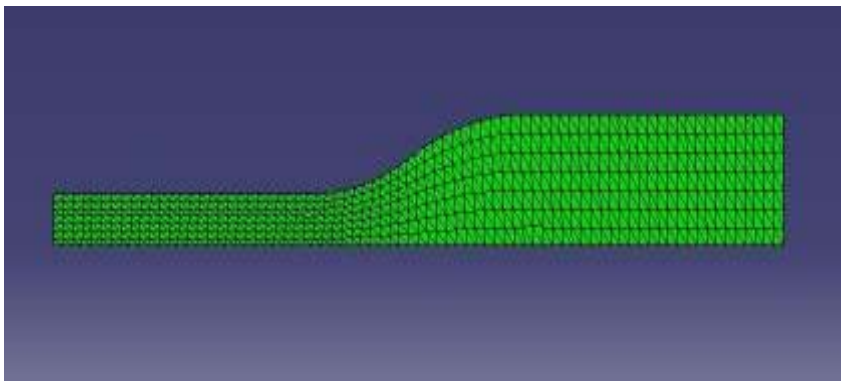


Fig. 4. Meshed geometry used for the finite element modeling

Generally, the specimen reaches the failure point at a strain around 4%, which justifies the choice of this value for the hyperelastic models. Both Mooney-Rivlin and Ogden models present the mechanical behavior of the material. The relative error remains important and its maximum value reaches up to 30% in some measurement points Fig. 6. This error is more or less acceptable and justifies our choice to proceed with the second order for both models, in order to achieve more accuracy in the mechanical behavior of the ABS flat plate.

Theoretical material constants for Mooney–Rivlin and Ogden models are obtained byusing the neural networks approach for ABS. The material constants are given in Table 1 for Mooney–Rivlin and Ogden models respectively.

Going beyond the first order for both hyperelastic Mooney-Rivlin and Ogden models seems to be delicate, in terms of non-stability of materials constants and the identification neural network algorithm becomes heavy and time consuming. However, the obtained results show the reliability of the used approach.

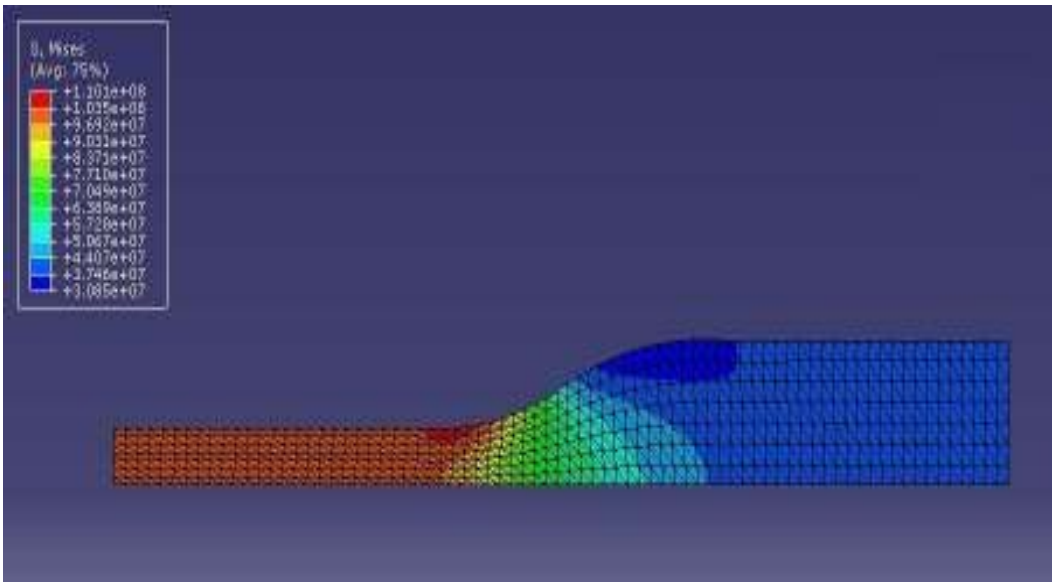


Fig. 5. Deformed geometry and von mises stresses distribution in the last step

Table 2 presents the hyperelastic material constants for the second order Mooney-Rivlin and Ogden models, while Fig. 7 shows the concordance between both Mooney-Rivlin an Ogden Models. It is observed that the relative error barely exceeds 9%and the behavior can be reproduced more accurately.

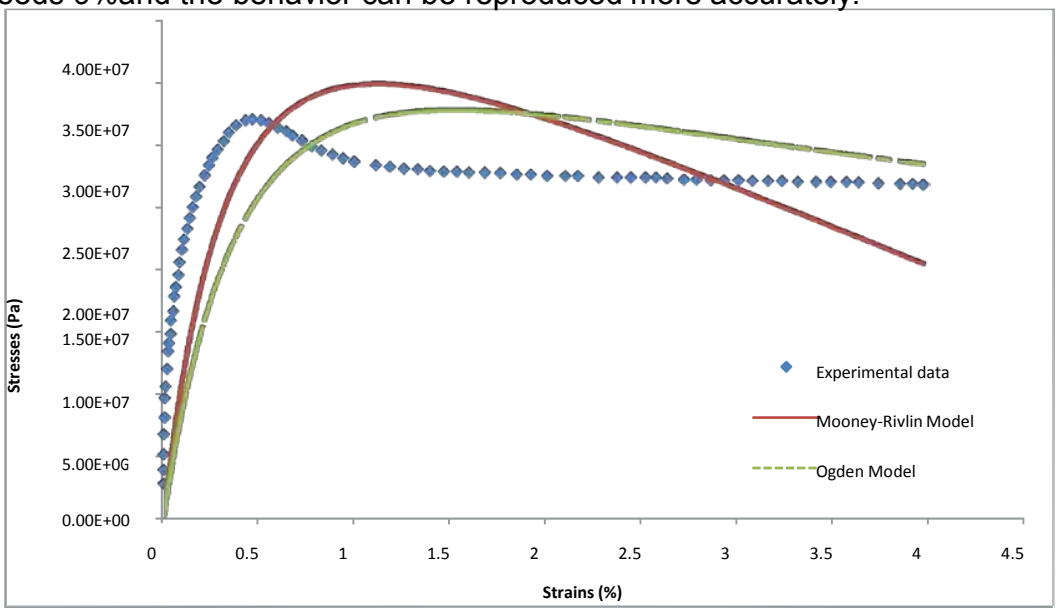


Fig. 6. Stress-strain curve of experimental data versus mooney-rivlin and ogden hyperelastic model

Table 1. Material constants for the ABS material for first order mooney–rivlin and ogden models

Mooney-rivlin		Ogden	
C_{10}	C_{01}	μ	a
3224883.72	26436887.2	35005279	1.04

Table 2. Material constants for the ABS material for second order mooney–rivlinand ogden models

Mooney-rivlin			Ogden	
C_{10} 156837906		C_{01} 215808417	μ_1	a_1
C_{20} 730499.919	C_{11} -5833980.30	C_{02} 53638970.1	-116983818	-3.16
			μ_2	a_2
			247944226	6.25

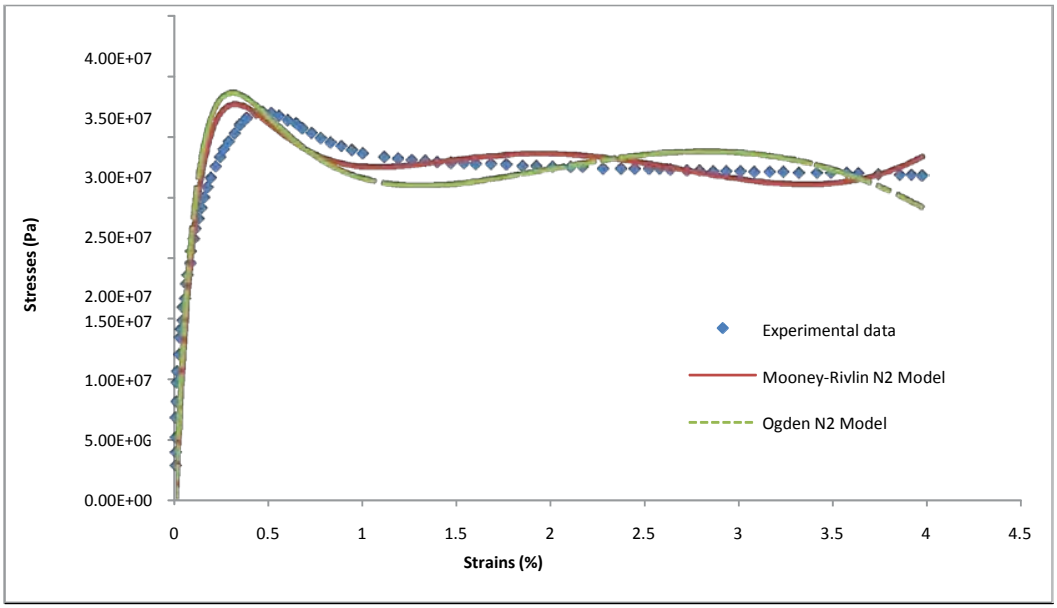


Fig. 7. Stress-Strain curve of experimental data versus second order mooney-rivlin and ogden hyperelastic model

6. CONCLUSION

In this study, uniaxial tensile technique tests have been exploited, in the aim to obtain the required parameters for the characterization of a hyperelastic material. First, stresses and displacements are recorded during experiment. Thereafter, Mooney-Rivlin's and Ogden's theory of hyperelastic are utilized to define the constitutive model of halter thermoplastic membranes (HTPM), nonlinear equilibrium equations governing the stretching are solved employing finite element method using Abaqus software.

The numerical model for ABS, fits much better to the experimental data. In order to minimize the difference between the calculated and measured parameters to determine material constants of Mooney-Rivlin and Ogden models, a neuronal algorithm (ANN model) is applied as a last step. The developed technique is successfully implemented with two constitutive models for ABS material.

The obtained error in the first order development of both Mooney-Rivlin and Ogden's models is around 30%, the passage to the second order of the hyperelastic models seems to be more feasible, and the error between the

calculated stress and the experimental results has reduced to 4%. However, this choice is much expansive in term of CPU calculation time. The material data obtained in this work can be implemented into industrial and academic software for applications and design purposes.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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A Catalyst Method for an Innovative Eco-Design Strategy Using TRIZ Approach

1. INTRODUCTION

Many eco-design tools are available in the literature. Each search is specific and is based on the analysis of the product life cycle where the objective is to consider multiple criteria and assess their impacts on human health and environment. Commonly called LCA (Life Cycle Assessment), this assessment tool takes into account the evolution of the product, from the raw materials that were used in its manufacture, its use and end of life characterized by an important step of destruction and recycling, as well as all the intermediate steps (transport, packaging, storage etc.), which all generate negative impacts on the environment [1].

Some studies on life cycle assessment simply focus on the stage having the most impact, while others accentuate the entire product life cycle characterized by an important step of destruction and recycling. It is now recognized that the latter is tedious, time-consuming, expensive and difficult to carry out on the following grounds [2]:

- Lack of firm-level experts to implement the tool.
- Most companies prefer, when they stick to the principle, to opt for more simplified tools.
- Lack of spatiotemporal data, or when such data exist, they are fluid and difficult to control, which can seriously affect the impact of the assessment results.

Studying a design process for an existing product in an attempt to improve or develop a new one requires that each step will be considered in order to integrate environmental parameters which will allow a focus on the most sensible approach to improve its environmental qualities.

While many methods and approaches exist for eco-design their analysis however reveals that they are not used nearly enough, for three main reasons [3]:

- Some of them are complicated methods that require a high level of environmental expertise.
- Mediocre quality of data for results given with a large margin of error.
- Some are expensive methods that require significant human and financial resources.

The proposed methodology in this study is based on a (global and multi-criteria) simplified environmental but thorough assessment. In this stage we do not directly give the solution to the designers. It will therefore translate the results of evaluation design axes but, in general, the lines proposed are inconsistent or contradictory. Therefore, what we find is a compromise given to the solution.

The challenge we are facing in an industrial reality is that one should not go for a compromise solution. TRIZ (*Teorija Reshenija Izobretateliskih Zadatch*) or the theory of Solving Inventive Problems, in the field, will be reformulated and go through the contradiction matrix and then intervene with the principles of interpretation resolutions to give possible solutions. The applicability of this method is justified by the many contradictions in the choices in a study of the life cycle.

The TRIZ method which has been proven in other areas for finding a solution without compromise will be deployed to transform these eco-design contradictions which have not been discussed before now. For example, increasing the lifespan of a refrigerator has positive effect on the management end of life but also have negative effects due to energy consumption.

From the matrix of engineering parameters we will build a new matrix based on parameters or eco-efficiency indicators in relation to these parameters. We have developed a methodology for formulating and solving problems of eco-innovation based on an approach established on conflict**.** This framework can handle the multi-objective requirements and complex combinatorial nature of the research phase of solution concepts. There will be question of presenting the different stages of our methodological approach and justification of choice. This discussion will lead us to identify the main contributions of this research and the development of an eco-innovation tool focused on the phases of creativity as well as the development of an experimental protocol that will allow us to argue about the performance of this tool for eco-innovation.

Among the strategic tools based on creativity sessions, while taking into account the eco- design are included: the Eco-compass [4], the wheel of Brezet [5], or the BEC diagram [6]. One may also mention some checklists such as the Ten Golden Rules [1]. Among the tools focused on structuring the results of the creative session, Jones [7] studied a tool combining the mind map with eco-design inputs. Other tools from the innovation process, such as those resulting from work on TRIZ or QFD (Quality Function Deployment), can be cited. However, it is now necessary not to seek to use the innovative principles of the matrix, but rather to reinterpret them, or also to modify the technical parameters, and it is possible to work on systems other than products [8]. However, some peripheral TRIZ tools seem more relevant in thinking and should be adapted in order to go from a methodology derived from a purely technological context to a context focused on a variety of applications (product, service, use). Dangelico and Pontrandolfo [9] worked on the eco-design tools that can assist engineers in the ecological conception of products. The work of Cheng [10] described a new model to accelerate the preliminary design of the eco-innovative product by incorporating the benefits based upon reasoning and the TRIZ method. Several examples of eco-design are given to illustrate the capabilities of such a method already starting with the work of Jahau Lewis Chen, Chih-Chen Liu [11].

Hsiang Tang Chang [12] proposed an eco-innovating method based on a design approach using TRIZ. David Russo [13] described a way to use concepts and tools of TRIZ to assess, evaluate and innovate a technical system in such a way that some practical activities to ensure sustainable results can be easily incorporated into the practices of design in everyday life. Vicenti Chulvi [14] compared the trends of evolution in TRIZ with eco-design strategies presented under the name of LiDS Wheel (Life Cycle Design Strategies) to analyze the effects on environmental parameters.

At the base of the Mal IN and Eco-Mal IN methods, Kallel [15] developed a new eco-innovation tool based on the invention matrix. Benjamin Tyl [16] proposed the Eco-asit tool to promote eco-ideation of sustainable systems.

Strasser and Wimmer worked [17] worked on the combination of ecodesign and inventive principles TRIZ tool. Meant for design engineers providing a clear procedure for innovative ideas when developing environmentally conscious products.

Jones and Harrison [18] have shown that it is possible to extract the "principles" to resolve the contradictions encountered in strategic environmental management product. These authors are based on practical cases of eco-innovation: the development of energy- efficient lighting fixtures. By analyzing in detail the evolution of these devices through patents, the authors showed that these innovations are the result of the use of TRIZ in solving several contradictions in relation to the objectives of ecoefficiences parameters previously set.

These last two methodological approaches in the context of research ecoinnovante solution is based on a similarity sought between engineering parameters and parameters of selected eco-efficiency. Exploitation of the contradiction matrix with organizational steps will guide the designer to one or more ecoinnovante solutions.

We considered two new parameters not least for ecoinnovative Design: User settings and ownership of ecodesign by stakeholders, which no proposed approach will be validated in our view.

In addition, we propose a rather simplified upstream prioritization of impacts and downstream phase of ideation for choosing the right ecoinnovative solution.

2. RESEARCH BASIS

The contribution of all this research through the models developed seems to us lacking support tools that are easily accessible to the uninitiated where applications can be accessible to scantily trained participants and the degree of ownership of the designer of the company or service provider ecodesign. This, on the one hand; on the other, these days eco-innovation must support two very important dimensions to say the least: the parameters of use of the product as well as the readiness of companies and designers to eco-design. These two parameters are introduced for the first time in our methodological approach and are considered as factors of eco-efficiency to support any project of eco-innovating design [19].

The importance of introducing the use parameters that need to take care of, in addition to environmental factors, social needs of the user in the context of a eco innovative approach.

The second criterion introduced for the first time, which is a priority in our opinion, is the degree of ownership of the designer of the company or service provider ecodesign.

In order to exploit the matrix of engineering parameters and adapt it to ecoinnovation chosen parameters, it was necessary to combine engineering parameters by category ecoinnovation parameters considered.

3. THE METHODOLOGY

The methodology has been developed through the following characteristics (Fig. 1):

- Simple qualitative, comprehensive and multi-criteria evaluation, followed by a prioritization of impacts;
- TRIZ method for resolution of uncompromising problems;
- Choice of eco-efficiency factors related to engineering parameters;
- Establishment of an eco-innovative matrix;
- Justification of design parameters.

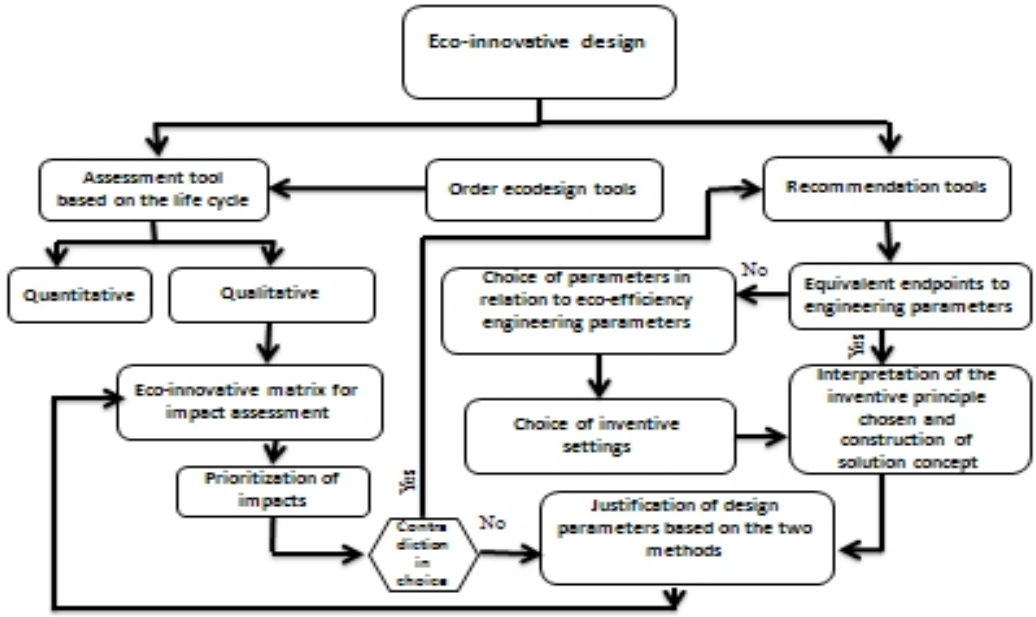


Fig. 1. Initiative of the eco-innovating process

3.1 Choice of the Eco-design Tool

The first phase of our approach is a review of most of the tools developed in eco-design. We felt it was necessary to separate them following two criteria: one of evaluation and the other one being one of prescription or interpretation of the results for the reduction of impacts.

Among the assessment tools we chose to work with are a qualitative matrix with a comprehensive and multi-criteria analysis. This is justified by the ease of ownership since the user does not require data based on a simple-to-use matrix, difficult acquisition and whose quality is often a source of uncertainty about the final outcome when it comes to using a quantitative tool, including no less important parameters related to factors of ease of product and of organizational preparation for the appropriation of the eco-design approach, in addition to the usual eco-efficiency factors. Finally, this tool allows to prioritize impacts. To help the designer to decide the method of solving inventive principles was proposed. This manner of procedure can help the designer to choose an approach and achieve a level of eco-design in proportion to the resources available to him and guide him, in the ideation phase, towards an eco-innovative solution.

3.2 Selection of Eco-efficiency Parameters

The concept of eco-efficiency is popularized by theWorld Business Council for Sustainable Development (WBCSD) [20]. Eco-efficiency is usually described as a reverse ratio between two elements: environmental impact, to be reduced, and value of production, to be increased. That is to say, a larger eco-efficiency means more value created with less impact induced [21].

The basic expression proposed by WBCSD is adopted, which is written as: eco-efficiency = product or service value/environmental infiuence [22].

The work of Chen and colleagues [23] focused on the contradiction matrix of TRIZ. The authors sought, at first, to establish a correlation table between the 7 principles of eco- efficiency by WBCSD described below and the parameters of the TRIZ matrix.

A/ Reduced demand for the materials for products and services;

B/ Reduction of the energy intensity of goods and services;

C/ Reduction of the dispersion of toxic substances;

D/ Improvement of the recyclability of materials;

E/ Optimization of the sustainable use of renewable resources;

F/ The extension of the durability of products;

G/ The increase of the operating intensity of goods and services.

In the present work we have grouped some factors given by the WBCSD considered materials, energy, waste (liquid, gaseous and solid). Two other new ones that we have to introduce for the first time are the use of parameters (form, strength, stability, durability and facility of use) and the degree of ownership of the eco-design by the designer.

Presentation of a matrix (with 25 cells) which consists in answering a series of questions related to the situations, and then noting the environmental impact (from 0 to 5, with 5 representing minimal impact) of five phases of the life cycle (prefabrication, manufacture, transport and packaging, use, end of life) for five environmental components (materials, use of resources, rejections of matter, user parameters, eco-design capacity).

The grid proposed is illustrated in Table 1.

The total score varies between 0 and 125 (125 being the maximum of points to be collected for an eco-designed product).

Table 1. Example of a matrix guide for the designer

Environmental concerns	**Life cycle**				
	Materials	**Manufacture**	**Packaging, transport**	**Product use**	**End of life**
Materials Consumption	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}
Energy consumption	A_{21}	A_{22}	A_{23}	A_{24}	A_{25}
Releases	A_{31}	A_{32}	A_{33}	A_{34}	A_{35}
Use of parameters	A_{41}	A_{42}	A_{43}	A_{44}	A_{45}
Ownership of ecodesign	A_{51}	A_{52}	A_{53}	A_{54}	A_{55}

Aij: Score obtained at the end of the evaluation following the answers to questions (grid 0-5, where 0 is the worst case).

The results of this matrix will help the designer to focus his vision on one or more stages of the life cycle related to environmental (eco-efficiency factors) to be considered.

3.3 Selection of the TRIZ Method

3.3.1 The resolution of contradictions matrix

TRIZ is a multitude of tools allowing to help solving creative problems. The simplest of tools and the best known of them is the resolution of technical contradictions matrix. It concerns a statistical summary of 400,000 patents of which were extracted the 40 000 most inventive ones.

The remaining patents have been analyzed in more detail in the following areas:

The relationship between the problem before the patent has an opposition between 2 technical parameters which can be reduced by 39 generic parameters (Table 2).

Methods having allowed to obtain the solutions in each patent are grouped into 40 families of Inventive Principles (Table 3). The resolution matrix is based upon thousands of resolved and past situations because these cases are similar in view of the engineering parameters in opposition, and could lead to resolutions through inventive principles most frequently used.

3.3.2 TRIZ in our methodological approach

For designers the problems arising from two or more conflicting parameters are often complex. These contradictions are often encountered when we are challenged by environmental assessments, particularly when it comes to dealing with situations of transfer of pollution. Different models of problem solving by TRIZ are used. We chose to apply the contradiction matrix. This matrix consists of 39 engineering parameters (Table 2) disposed on the abscissa axis and ordinate (Table 3).

Since the principle itself of the resolution without compromise is perfectly suited to the challenge of eco-innovation we adapted the method of Inventive problem solving using TRIZ.

The improvement of a parameter selected on the y-axis (vertical column) can degrade another one placed on the abscissa (horizontal line): the solution is to have generic principles that allow to eliminate the conflict rather than to be a compromise. Once the conflicting parameters (to be improved and deteriorating) have been chosen, the designer will be placed in the contradiction matrix (Table 3). The inventive parameters from 1 to 40 (Table 4) which can be a solution to the contradiction at the root of the problem are given by the matrix (Table 3) at the intersection of the conflicting parameters.

For some inventive principles that appear most often in the 39x39 matrix engineering, it is clear that their consideration leads to a high success rate for solving innovative design.

To apply TRIZ in our field of eco-innovation, we have built a new matrix by combining engineering parameters in relation to eco-efficiency corresponding parameters (Fig. 2).

Table 2. The 39 engineering parameters (Ep) [24]

Num	Characteristic	Num	Characteristic
Ep1	Weight of moving object	Ep21	Power
Ep2	Weight of stationary object	Ep22	Loss of energy
Ep3	Length of moving object	Ep23	Loss of substance
Ep4	Length of stationary object	Ep24	Loss of information
Ep5	Area of moving object	Ep25	Loss of time
Ep6	Area of stationary object	Ep26	Quantity of substance/matter
Ep7	Volume of moving object	Ep27	Reliability
Ep8	Volume of stationary object	Ep28	Measurement accuracy
Ep9	Speed	Ep29	Manufacturing precision
Ep10	Force (intensity)	Ep30	Object-affected harmful factors
Ep11	Stress or pressure	Ep31	Object-generated
Ep12	Shape	Ep32	Harmful factors
Ep13	Stability of the object	Ep33	Ease of manufacture
Ep14	Strength	Ep34	Ease of operation
Ep15	Duration of action of moving object	Ep35	Ease of repair
Ep16	Duration of action by stationary object	Ep36	Adaptability or versatility
Ep17	Temperature	Ep37	Device complexity
Ep18	Illumination intensity	Ep38	Difficulty of detecting and measuring
Ep19	Use of energy by moving object	Ep39	Extent of automation
Ep20	Use of energy by stationary object		

Table 3. Part of the contradiction matrix table [24]

Parameter do not degrade / Parameter to improve		EP1 Weight of Moving Object	EP2 Weight of stationary object	EP3 Length of moving Object	EP4	…	EP39 Productivity
EP1	Weight of Moving Object			15,8 29,34			35, 3 24,37
EP2	Weight of stationary object						
EP3	Length of moving Object	8,15 29,34					
EP4	Length of stationary object		35,28 40,29				30,14 7,26
….							
EP39	Productivity				30,7 14,26		

Inventive principles used most

Inventive principles used most

Table 4. The 40 inventive principles [24]

Num	Principle	Num	Principle
1	Segmentation	21	Rushing through
2	Extraction	22	Convert harm into benefit
3	Local quality	23	Feedback
4	Asymmetry	24	Mediator
5	Combining (Integrating)	25	Self-service
6	Universality	26	Copying
7	Nesting	27	Disposable objective
8	Counterweight	28	Replacement of a mechanical system
9	Prior counteraction	29	Pneumatic or hydraulic construction
10	Prior action	30	Flexible film or thin membranes
11	Cushion in advance	31	Porous material
12	Equipotentiality	32	Changing the color
13	Inversion	33	Homogeneity
14	Spheroidality	34	Rejecting and regenerating parts
15	Dynamicity	35	Transformation of the physical/chemical states
16	Partial or excessive action	36	Phase transition
17	Moving to a new dimension	37	Thermal expansion
18	Mechanical vibration	38	Use strong oxidizers
19	Periodic action	39	Inert environment
20	Continuity of useful action	40	Composite materials

The distribution of engineering parameters in the eco-efficiency settings is often done by associating parameters of assessment or evaluation in relation to

the situation to be resolved with one or more engineering or generic parameters [25]. In this situation several cases can arise:

1 – The assessment parameter(s) are equivalent to one or several engineering parameters: this situation is the easiest since the inventive parameters to consider are those that can be read at the intersection of the engineering parameters and which are considered inconsistent.

2 – The parameter(s) of assessment are synonymous with an engineering parameter in the matrix: in this case, this or these parameter(s) can also be used to resolve the contradiction.

3 – The assessment parameter has no equivalent or synonym among the 39 parameters: in this case, we propose to associate each group of parameters selected in affinity with each environmental topic considered.

The goal is to find creative parameters that can remove the contradiction and that lead towards the solution, especially when there is no action where engineering parameters are not present or have no equivalent or synonymous among the 39 parameters.

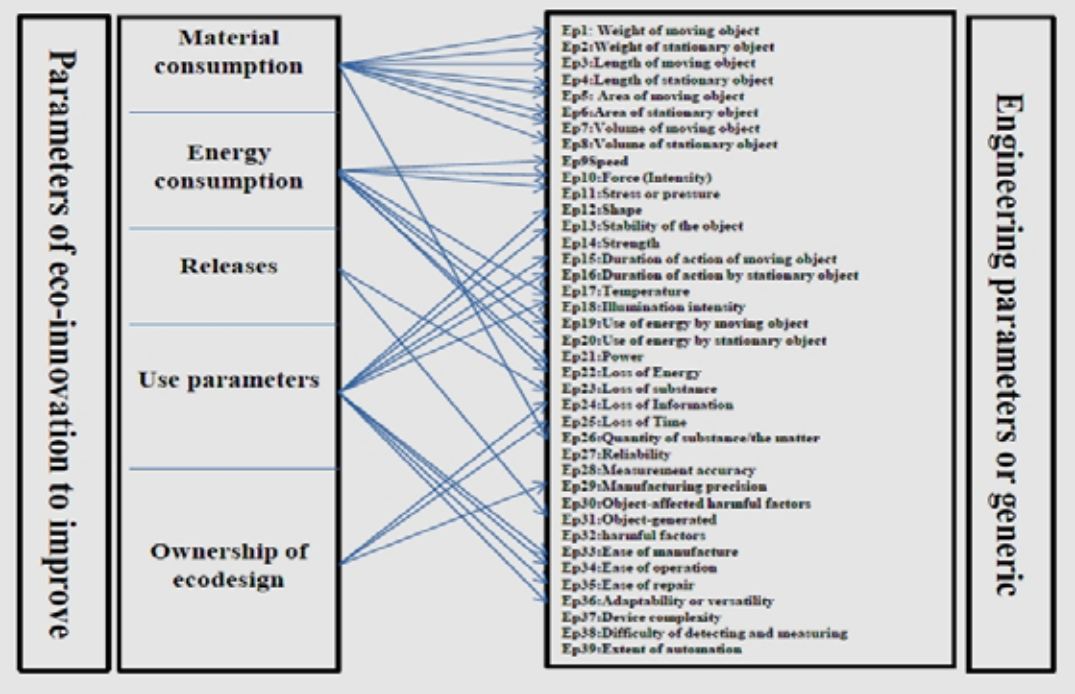


Fig. 2. Correspondence between the parameters of eco-innovation and engineering

3.4 Methodology Step by Step

Our choice of this tool is its strength for the upstream phase of the process (strategy and clarification of the problem) and downstream (selection of ideas). We used it for our downstream process in the selection of ideas, based on inventive principles adopted (Fig. 3).

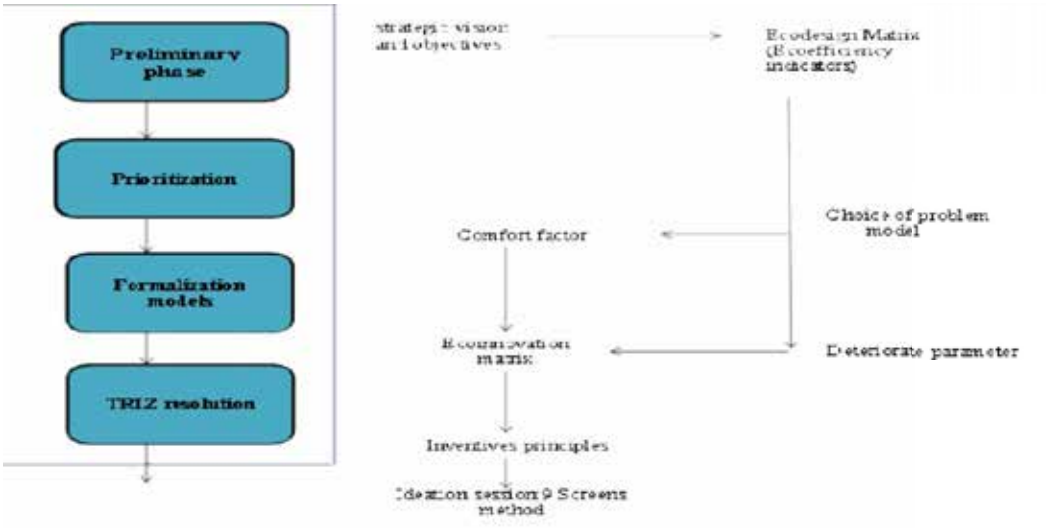


Fig. 3. Establishment of an eco-innovative initiative

The methodology is based on the following steps.

1st Step: This is a preliminary phase which is based on a strategic vision with clear objectives. During this phase, the matrix will inform us, depending on the objectives, about parameters of eco-efficiency to support.

2nd Step: Definition of the model selection for the problem. This concerns a physical contradiction with which the technical parameters can be associated.To these factors of eco- efficiency will be joined engineering parameters in the original matrix of TRIZ by associating parameters of assessment or evaluation in relation to the situation to be resolved with one or more engineering or generic parameters.

From this, we construct a new matrix suitable for eco-design and eco-efficiency with 5 settings. They are supported by a new matrix Easting and Northing.

The inventive principles that appear on each box of the new matrix were obtained from the matrix of the 39 TRIZ engineering parameters grouped into

eco-efficiency settings then account for the frequency of occurrence of inventive principles that correspond to each crossing.

In order not to exclude creative solutions, we considered for each crossing, the first four inventive principles that appear frequently. Ultimate ideation session can help the designer to guide his choice to the right solution with respect to a given problem.

3rd Step: In the case of a single conflict, we note the four inventive principles possible (given by the new matrix). Case of several conflicts we record the frequency of occurrence of each inventive principle for every situation.

A high eco-efficiency depends on the improvement of one or more elements at the same time. For some inventive principles that appear more often it is clear that their consideration leads to a high success rate for solving innovative design problems.The designer can find corresponding inventive principles from our new matrix of inventive principles. The inventive principles to remember arise from the frequency of repetition.

4th Step: Using the method of the ideation for the selection of ideas based on the inventive principles adopted.

An ideation session is organized to stimulate the creativity of the participants and go to the most innovative solution. A simple brainstorming session was organized with the method of the 9 Screens for example.

This tool aims at describing the system in time (past/present/future) and space (subsystem/system/meta-system).

4. RESULTS

According to the steps described in Table 1 the designer will make the choice of the most relevant eco-efficiency parameters, consistent with the frequency of occurrence of each parameter. The choice of the corresponding inventive principles will be made from the engineering parameters. To apply TRIZ in the field of eco-innovation, we have constructed a new matrix consisting of the

engineering parameters, as indicated in Table 5 in relation with eco-efficiency related parameters. To account for strategies to be implemented for the operating parameters, we give in Table 6, a detail parameters to improve. In each scenario, the inventive solutions are shown at the intersection of the parameters that can be inconsistent (for example, if we want to improve the strength of a product without material consumption, the inventive principles that can be a solution to the problem are in order of importance or of frequency of occurrence 40,1,29,27). In the example mentioned, principle 40, the use of composite materials, seems to be a solution to this problem, without excluding the other principles which canalso be solutions. At this stage, it is recommended that the design team organizes ideation sessions to propose the strategy to adopt.

The goal is to find creative parameters that can remove the contradiction and direct towards the solution. In each case, the selected inventive parameters are those that appear frequently.

We wanted to highlight the usage parameters in relation to eco-efficiency parameters. This reflection has become possible because the original matrix contains settings for using the designer may operate individually to solve issues related to the situation considered. The search of the inventive parameter, in this case, will be thinner.

In Table 5, the notion of general use parameters so that the inventive parameters obtained differ from those obtained in Table 6. However, we can find in Table 6 and column the same inventive principles as corresponding to the same position in Table 5.

Table 5 presents the new resulting matrix obtained from the matrix of contradictions and covered widely in the literature. It was built on the base of engineering parameters that are listed and grouped there according to rules established in sections called eco-efficiency parameters on which we used to base ourselves to achieve our goals of a design respecting the environment and in a innovative context of the product or process. The new inventive principles were obtained based on their repetition frequency relative to the new matrix

configuration starting from the original matrix. From the preliminary remarks, we find for the eco-design box, the inventive principle 10, notably that the "prior action is found in all cases. This is in accordance with the principles of eco-design for early action in terms of environmental protection. The parameters used were divided into several properties. Using the same approach, Table 6 obtained shows the corresponding inventive principles for each situation. As a simple example of consistent results obtained from the inventive principles when we want to improve the strength of a product without consuming materials, principle 40, i.e. the use of composite materials is a perfect example to test our approach, which is consistent with the practices used before.

Table 5. New Eco-efficiency matrix of inventive parameters

Parameters do not degrade Parameters to improve	**Material consumption**	**Energy consumption**	**Releases**	**Use of parameters**	**Ownership of eco-design**
Material consumption	-	18,19,6,3	35,3,5,22	2,35,1,25	10,35,28,24
Energy consumption	19,18,6,3	-	35,2,27,18	19,2,35,1	10,35,18,19
Releases	35,6,22,3	35,2,27,18	-	2,35,39,40	10,35,15,4
Use of parameters	3,35,27,25	1,13,15,22	2,35,40,28	-	10,4,32,1
Ownership of eco-design	10,35,28,32	32,10,19,2	35,10,18,22	1,32,10,35	-

Table 6. New user parameters matrix of inventive numbers

Parameters do not degrade Parameters to improve	**Material consumption**	**Energy consumption**	**Releases**	**Ownership of eco-design**
Shape	10,36,8,15	14,2,6,40	35,14,1,29	32,14,10,30
Stability	35,15,21,26	27,14,13,4	35,2,40,14	35,27,18
Strength	40,1,29,27	10,35,19,17	35,15,18,22	3,29,27,28
Durability	19,35,5,3	18,35,6,28	21,28,39,27	10,3,20,27
Brilliance	10,36,8,15	14,2,6,34	35,29,8,1	32,14,10,30
Ease of use	13,25,12,6	13,2,1,19	28,32,2,24	10,4,1,32
Reparability	2,35,25,28	15,1,32,28	35,2,27,34	10,25,32,1
Adaptability	15,19,1,3	35,18,19,15	15,10,2,13	35,28

It is well to remember that the inventive principles obtained may not apply to situations ceratines problem solving.

A graphic presentation of the different situations of contradiction, for the eco-efficiency parameters considered is given in Fig. 4.

Various inventive principles and their corresponding frequency of occurrence are illustrated respectively.

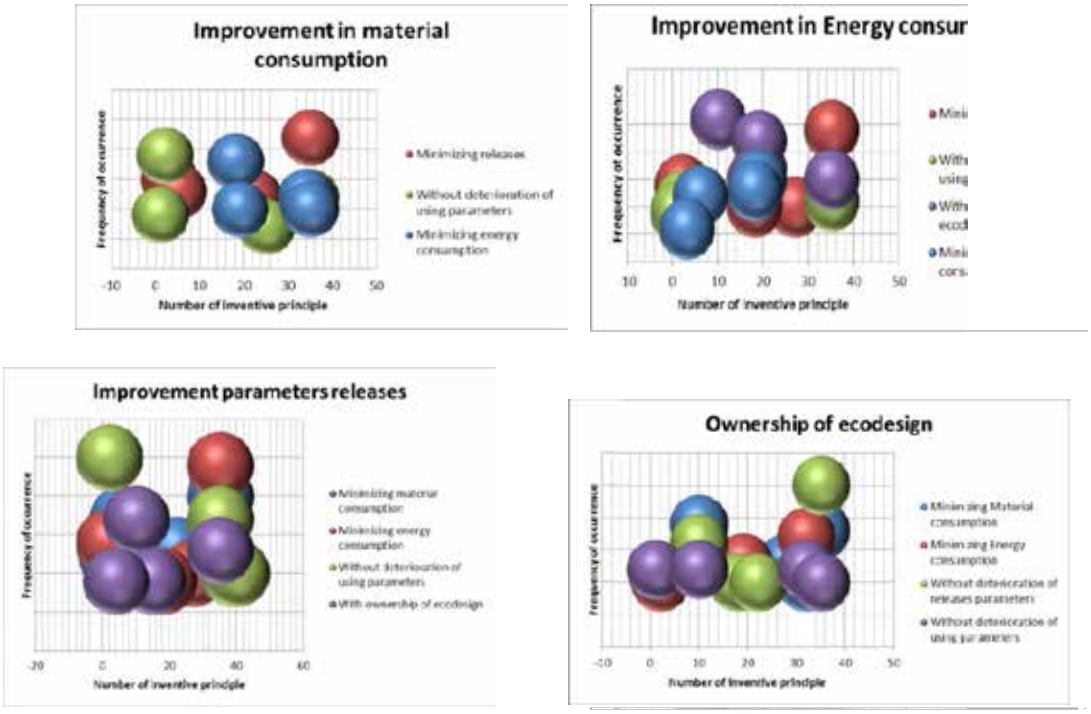


Fig. 4. Eco-innovation parameters obtained for different situations

5. APPLICATION: CASE STUDY

5.1 The Methodology Applied

In order to validate our methodological approach and verify its application related to with other examples we have applied this approach to different projects and challenges that require eco-innovating solutions.

The methodology was tested on examples of projects or issued patents ecodesign.

The first step is to select, one hand eco-efficiency parameters improve and secondly, the eco-efficiency parameters that can deteriorate as a result of the change. These parameters (five) are given in horizontal and vertical in the matrix.

If several conflicts or contradictions appear, all combinations must be reviewed. The second step is to make all possible crosses between the parameters to improve (Vertical) and the parameters that can deteriorate. For each situation we face at the intersection corresponding inventive principles (using the matrix Table 5).

In the third step, in the case of a single conflict, we note the four inventive principles possible (given by the new matrix).

Case of several conflicts we record the frequency of occurrence of each inventive principle for every situation.

Ranked by frequency of occurrence will select the four inventive principles may be the solution (x) conflict (s).

In the final step, we choose the inventive principle can best adapt to the issues raised. We note that some of our inventive principles resulting matrix may be far from the reality of the problem considered. An ideation session may be necessary for the selection of inventive principle adapted to meet the problems posed.

5.2 Examples of Ecoinnovant Projects

The proposed matrix has been used by work groups during ideation sessions and the results have been compiled in Table 7.

In our case, the results of our contradiction matrix obtained by our approach shows several cases of inventive numbers that can be the no-compromise solution to the problem. It is obvious that not all principles are applicable. It is at this stage that the designer or group of ideation will intervene to choose from the inventive principles selected and build a solution concept based on the situation.

5.3 Example of Applications to Publication Patents

As another application, we considered interesting to apply the results of our methodological approach by focusing on some cases of published patents for products designed ecoinnovants.

We have audited the methodology compared to other cases, including published patents. The results are given in Table 8.

6. CONCLUSION

The methodological approach implemented has given quite interesting results which can be a direct and easy application for any user. The developed tool has helped to build an inventive matrix that will guide the designer towards eco-innovative solutions, particularly in situations of contradiction in the choice of eco-design solutions. The basis of our initiative is the idea of using a simplified matrix taking into account the life cycle of the product or of the process with a multi-criteria approach and a resolution of contradictions by using a suitable TRIZ. Potential inventive principles for possible solutions are obtained. Some of these principles may not apply to cases of design. However, the matrix can help the designer to reduce the scope of his creative investigations.

The results obtained were tested on recognized case studies and published patents and related to situations of resolution of environmental issues.

We note for the eco-design case, the inventive principle 10, namely that the prior action is found in all cases. This is in accordance with the principles of eco-design for early action in terms of environmental protection.

Among the inventive principles obtained, when we want to improve the strength of a product without consuming materials, principle 40, i.e. the use of composite materials, is a perfect example to test our approach, which is consistent with the practices used before.

Table 7. Comparison to other research results

Practical cases inventive	Reference	Improved parameter	Not adversely affected parameter	Inventive principles from the authors' results	Inventive principles from our matrix (table 5)
Human powered lifesaving radio : very convenient product for use in case ofemergency	(Chih-Chen, L., Jahau Lewis,C, 2001)	Energy consumption	Parameters use	35, 19, 2, 10 Inventive principle 19 selected « periodic action ». It can listen to the radiofor one hour, give the alarm signal for twelveminutes, or provide five minutes of light.	35, 2, 19, 1
Ultrasonic washing machine: Innovative ideas for developing ultrasonic washing machines	(Chih-Chen, L., Jahau Lewis, C, 2001)	All situations: - materials - energy - releases	Consumption of : - materials - energy - releases	35, 2, 18, 10 Inventive principle 35 (transform the physical/chemical **s**tate to washing machines design problem is to change the physical state of water. Therefore, thewashing machines may fill with micro air bubble**s** during clothes washing processes) and 18 (mechanical vibration canbe interpreted as to utilize the method of ultrasonicvibration to clean clothes)	35, 18,27,2

Table 8. The methodological tool applied to examples of published patents

Name of concept or product	Presentation	Choice of inventive parameter consistent with our approach
Shoe sole[26] Publication number EP1928277A	Choosing a shape and sole with improved strength, with minimizing energy consumption and recyclable. Concept: antibacterial composite yarn, three-dimensional textile structure and multilayer	**To improve** Ep12: Shape Ep13: Stability Ep14: Strength Without damaging: Energy, materials and releases (Table 6) **Inventive principles selected** 40: Composite materials 17: Multidimensional structure, multilayer assembly
Ceramic based on clinker garbage[27] Publication number EP 1215182 81	The present invention relates to a crystalline based material of clinker. It finds particular use in the field of the crystalline ceramic-like materials. Objective: Save energy by lowering the temperature while maintaining the mechanical properties.	**To improve** - Energy consumption **Without damaging** shape, strength and stabilityInventive principles: 19,2,35,1 (Table 5) **Inventive principles selected**: 35 parameters change
cross railroad[28] Publication number EP2539508A1	Composite rail sleepers essentially polyurethane material typically, with excellent mechanical properties.	**To improve** - use parameters (Ep14: Strength, Ep12: shape, Ep13: stability) **Without damaging** - Releases (Table 6)Inventive Principles: 2,35,40,2835,2,40,14 - Material consumption Inventive Principles: 40,1,29,27 - Energy consumption Inventive Principles:14,2,6,40 **Inventive principle selected**: 40(Composite materials)

The results of our methodological approach applied to the different situations considered show perfect consistency in the choice of the strategies used for solving problems occurring. This method can be applied to any resolution of conflicting issues, in particular in a situation of ideation. It can also serve as a referential kit for businesses objectives for improvement and innovation of their products or processes with support for environmental concerns without transfer of pollution.

Moreover, it is worth noting that this tool, which was developed to be a solution approach, can not explain some design problems which are only determined by a thorough and detailed analysis.

COMPETING INTERESTS

Authors declare that there are no competing interests.

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Research methods of controlling solids in the tails of Norilsk concentrating factory

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Исследования методов контроля содержания твердого в хвостах Норильской обогатительной фабрике

Необходимость разработки методов контроля содержания твердого в трубах большого диаметра, частично заполненных пульпой, возникла на обогатительных фабриках, металлургических заводах, везде, где в результате технологического процесса получаются жидкие отходы- «хвосты», которые либо перерабатываются, либо складируются в хвостохранилищах с целью их дальнейшего использования.

Исследование метода контроля содержания твердого на данный момент проводится на устаревших датчиках, с учетом полностью заполненной трубы [1]. Следовательно данная разработка будет актуальна для многих фабрик, сбрасывающих «хвосты».

Среда пульпопровода представляет собой сложную, условно трехфазную систему (твердое, жидкое, газообразное), характеристики каждой из которых и объемные соотношения между собой постоянно меняются. В настоящее время, отсутствует корректная система и технические средства контроля параметров хвостовой пульпы. Масса отвальных хвостов от обогащения всех типов сырья определяется расчетным методом по разнице объемов рудной массы и полученного концентрата. Такой метод позволяет получить только интегральные оценки количества хвостов за длительный период времени – декада, месяц, квартал и т.д. Точность расчета при этом определяется точностью используемых инструментальных средств контроля количеств рудной массы и концентрата, учета влажности руды и полученного концентрата за период измерения и др. факторов, таких как время запаздывания, текущие запасы промпродуктов в буферных емкостях и др. Следовательно, используемая методика расчета принципиально не позволяет получить текущие оценки количества хвостов, поступающих в магистральный пульпопровод. Точная информация может быть получена только путем установки на магистральных пульпопроводах, выходящих с фабрики, систем контроля расхода твердого в пульпе.

Измеряемыми параметрами являются расход пульпы, плотность пульпы, уровень незаполненного пространства в трубе и плотность твердого продукта в пульпе. Конечным параметром измерения является комплексный показатель - расход твердого продукта, выносимого с пульпой, полученный косвенным измерением.

Для составления точного материально баланса флотации, используемого при разработке систем управления данным процессом, необходимо знать расход твердого в пульпе (G_m)

$$G_m = k \cdot Q \cdot (\rho_п - \rho_ж) \quad (1)$$

где $k = \frac{\rho_ж}{\rho_ж - \frac{\rho_ж}{\rho_m}}$,

Q– объемный расход пульпы, $\rho_ж$ – плотность жидкости, $\rho_т$ – плотность твердого.

Следовательно, для выбора и обоснования методики определения массы хвостов необходимо исследовать влияние этих параметров на точность измерения расхода твердого.

Исследование влияния плотности пульпы на расход твердого.

d_p=1.22 - плотность пульпы, т/м3

d_t=3.3 - плотность твердого, т/м3

d_g=1 - плотность жидкости, т/м3

Формулу (1) представим в более удобном для расчетов виде

$$g = \frac{dp-dg}{dt-dg}dt \qquad (2)$$

Тогда g=0.316 - содержание твердого в пульпе, т/м3

Gp=3200 м3/ч расход пульпы.

Зависимость расхода твердого от плотности пульпы.

При прочих равных условиях изменение плотности пульпы в рабочем диапазоне приводит к изменению расхода твердого в пульпе.

$D = \left(\frac{Gt_{25}-Gt_0}{Gt_{25}}\right)100$ и D=62.5

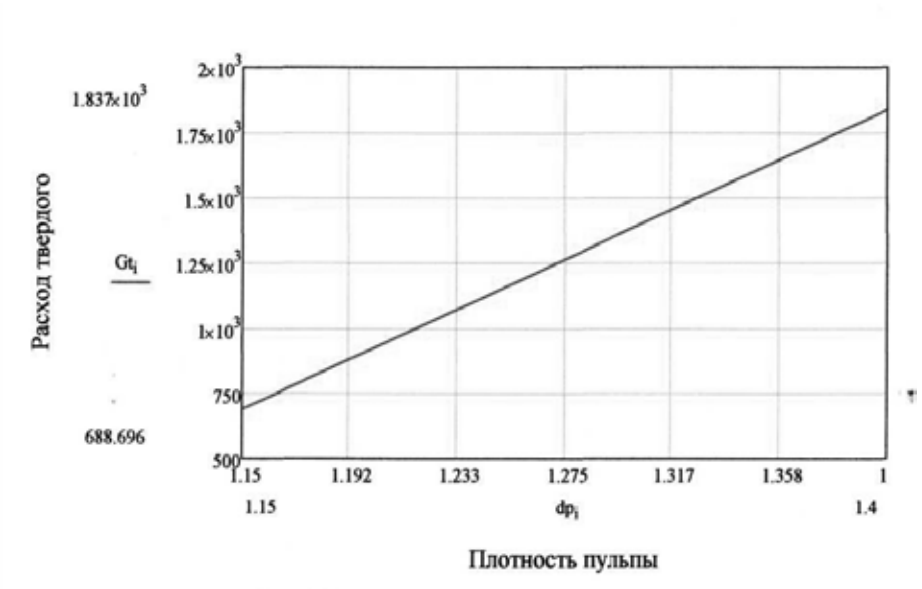


Рис.1. Влияние плотности пульпы на расход твердого

Исследование влияния плотности твердого на расход твердого. В соответствии с формулой (2)найдена зависимость расхода твердого от плотности твердого

dt_0= 3.2, i=0..25, $dt_{i+1}=dt_i+0.01$ (плотность изменяем через 0.01), тогда

$$g_i = \frac{dp-dg}{dt_i-dg}dt_i$$

и расход твердого$Gt_i=Gp\cdot g_i$ т/ч.

Результаты расчета представлены на рис.2.

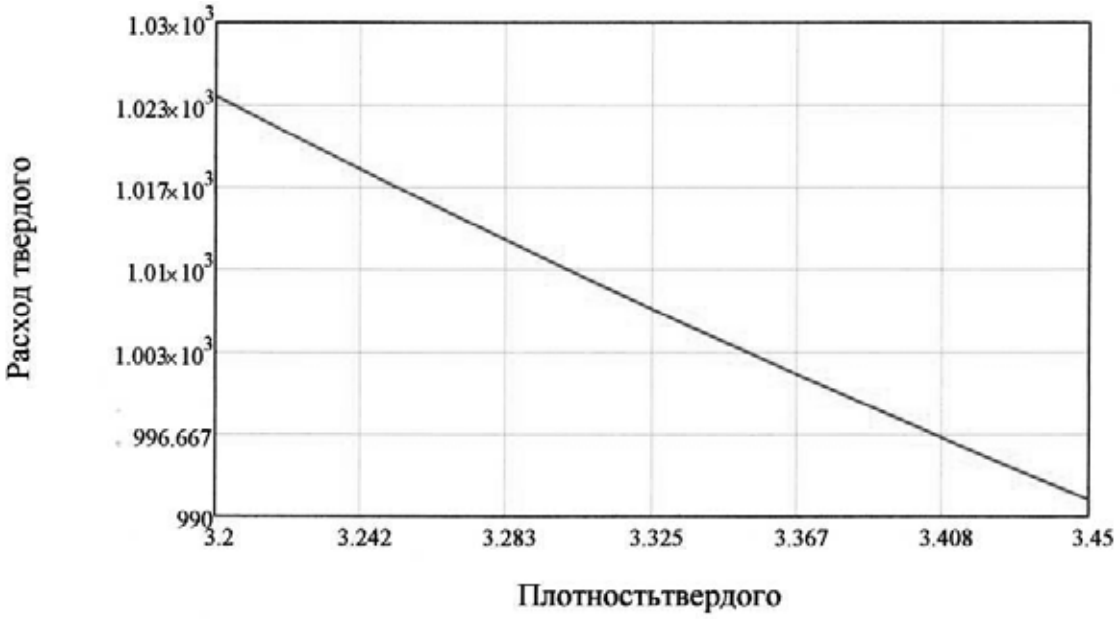


Рис.2. Влияние плотности твердого на расход твердого

Из графика следует, что при прочих равных условиях изменение плотности твердого в рабочем диапазоне приводит к изменению расхода твердого в пульпе на

$D = \left(\frac{Gt_0 - Gt_{25}}{Gt_0}\right) 100$ и D=3.189%

Анализируя полученные результаты, можно сделать вывод о том, что наиболее сильное влияние на расход твердого, выносимого с пульпой, оказывает изменение плотности пульпы (т.е. содержание твердого в пульпе). Это влияние практически в 20 раз сильнее, чем изменение плотности твердого.

Следовательно, основным параметром, который должен измеряться при автоматическом контроле расхода твердого в пульпе является плотность пульпы. Кроме того необходимо контролировать расход пульпы.

Плотность твердого можно считать постоянной величиной и учитывать в процессе автоматизированного контроля путем периодического ручного ввода по данным лабораторного анализа.

Измерения технологических параметров пульпы в самотечном частично заполненном пульпой хвостопроводу (трубопроводу) осуществляется с применением измерительных систем.

Рекомендуемые структурные схемы измерительных систем с

применением различных средств измерений (СИ) приведены на рисунках 3 — 4.

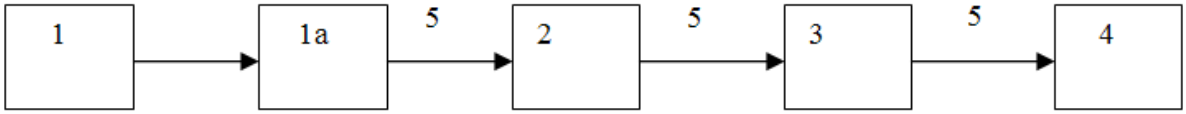


Рис.3. Структурная схема измерительной системы плотности пульпы бесконтактным радиоизотопным измерителем, 1 — излучатель; 1а — первичный измерительный преобразователь плотности; 2 — вторичный измерительный прибор плотности пульпы; 3 — микроконтроллер; 4 — ИИС; 5 – линия связи.

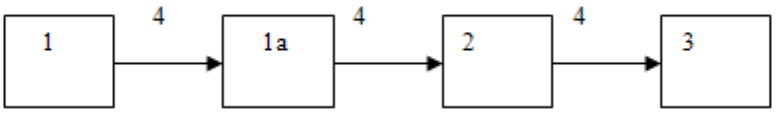


Рис. 4. Структурная схема измерительной системы расхода пульпы, 1 — бесконтактный первичный измерительный преобразователь расхода; 1а вторичный измерительный прибор расхода пульпы; 2 – микроконтроллер; 3 – ИИС; 4 – линии связи.

Измерительная система уровня пульпы в трубопроводе выполнена аналогично (рис.4.).

Плотность твердого в пульпе определяется периодически лабораторным анализом с погрешностью, не превышающей 1%.

Процедура обработки и вычисления результатов измерений состоит из вычисления действительного значения текущего расхода твердого в пульпе, его среднесуточного расхода и количества (массы) твердого за сутки и месяц.

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Powdered prefabricated yacon as a prebiotic ingredient of bakery products

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Порошкообразный полуфабрикат якона как пребиотический ингредиент хлебобулочных изделий

Интерес к здоровому питанию обусловлен не только возможностью обеспечения за счет потребляемых нутриентов энергетических затрат организма, но и поддержания его в физиологически активном состоянии. Соответственно, обсуждая эту проблему, целесообразно обратить внимание на сырьевые ингредиенты, обладающие свойством или совокупностью свойств, обеспечивающих как технологичность процессов, так и получение инновационных пищевых продуктов. С этих позиций представляет интерес изучения потенциала интродуцированных культур, к числу которых относится якон.

Якон (род Polymnia, вид Polymnia Sonchifolia) относится к семейству сложноцветных (Compositae). Произрастает в разнообразных почвенных условиях в регионах, расположенных в пределах 40^{o} южной широты … 45^{o} северной широты [1].

Корневые клубни якона достигают в длину 20 см, диаметр – 10 см. Снаружи пурпурно-коричневого цвета, внутри белые, желтые. Хрустящие, освежающе сладкие на вкус.

В корневищах и корневых клубнях якона накапливаются углеводы, в частности инулин, способный в процессе хранения или гидролитического расщепления трансформироваться в фруктозу и другие соединения в виде фруктанов. В свежеубранных корневых клубнях якона содержится 37,5 % фруктозы в расчете на сухое вещество [1]. В состав корневых клубней входят амиды, аминокислоты. Белок якона по содержанию незаменимых аминокислот значительно превосходит протеин зерна пшеницы, кукурузы, сои [1]. Кроме того, корневые клубни якона способны накапливать селен до 1,1 мг/кг. Эту особенность якона можно использовать для получения диетических продуктов, содержащих важнейший антиоксидант – селен [1].

Богатый физиологически важными нутриентами состав якона позволил предположить его перспективность в технологии пищевых продуктов, в том числе относящихся к продуктам массового потребления хлебобулочным изделиям. В связи с чем, целью работы стало определение потенциала продуктов переработки якона как обогащающего ингредиента хлебобулочных изделий, способного повысить функциональность готового пищевого продукта и интенсифицировать его технологический процесс [2].

В ряде работ известно применение продуктов переработки якона в технологии хлебопечения [3]. Установлено, что пюре якона в составе питательной смеси жидкой ржаной закваски интенсифицирует жизнедеятельность молочнокислых бактерий и дрожжей при сохранении симбиотических отношений между ними. Вероятно, интенсификации процессов способствует преимущественное потребление дрожжевыми клетками фруктозы по сравнению с основным технологическим дисахаридом мальтозой, а также дополнительным внесением с яконом магния, фосфора и глутаминовой кислоты [3]. Более существенное позитивное влияние на микрофлору закваски и качество готовых изделий оказывает предварительно гидролизованное пюре якона [3]. Однако применение продуктов переработки якона в виде пюре и гидролизованного пюре имеет сложности практической реализации ввиду высокой влажности продукта и, соответственно, сложности хранения и нецелесообразности транспортирования. Кроме того, высокая влажность является ограничивающим фактором дозировки пюре и, соответственно, не позволяет в полной мере использовать его потенциал как функционального пищевого ингредиента. В связи с чем, в наших дальнейших исследованиях была рассмотрена

целесообразность получения и применения высушенных продуктов из якона [2].

В исследованиях использовали корнеплоды якона сорта Юдинка, полученные из Всероссийского НИИ селекции и семеноводства овощных культур. Получение порошкообразного полуфабриката осуществляли путем конвективной сушки предварительно вымытых и разрезанных на пластины корнеплодов якона с последующим измельчением до гранулометрии 0,5 мм.

Исследования химического состава продуктов переработки якона проводили стандартизированными методами. Микробиологические испытания - путем посева предварительно активированных лиофилизо-ванных культур молочнокислых бактерий и жидкой ржаной закваски с заваркой на сусло-агар с содержанием сухих веществ 12 %. Посевы инкубировали в термостате при 37 ^{o}C в течение 3 сут. [4].

Характеристика органолептических показателей и состава порошкообразного полуфабриката якона представлена в табл. 1.

Таблица 1 - Характеристика порошкообразного полуфабриката якона

№ п/п	Наименование показателя	Характеристика порошкообразного полуфабриката якона
1	Цвет	Светло-кремовый, однотонный
2	Запах	Фруктовый, менее выраженный
3	Вкус	Сладкий, выраженный, фруктовый
4	Консистенция	Однородная порошкообразная масса, без комочков
5	Массовая доля влаги, %	7,1±0,1
	Массовая доля, % на СВ	
6	белка	3,8±0,08
7	жира	1,3±0,03
8	углеводов	89,1±1,2
	в том числе	
9	инулина	46,6±0,8
10	глюкозы	4,8±0,1
11	фруктозы	25,8±0,5
12	сахарозы	3,1±0,06
13	клетчатки	3,1±0,05
14	золы	4,7±0,8
	Содержание, мг/100 г СВ	
15	кальция	237±4,4
16	фосфора	215±4,2
17	магния	116±2,0
18	калия	Не опр.
19	железа	11,6±0,2
20	цинка	0,58±0,01
21	марганца, мкг/100 г	215±4,2
22	меди, мкг/100 г	82±2,0

Как показали результаты исследования, порошкообразный полуфабрикат якона имеет светло-кремовый цвет в традиционной цветовой гамме хлебобулочных изделий, выраженный сладкий вкус. Отличается высоким содержанием инулина и клетчатки и золы, что подтверждает целесообразность применения продуктов переработки якона в технологии хлеба.

Для подтверждения пребиотических свойств якона была проведена серия модельных опытов, в которых были сделаны посевы молочнокислых бактерий (МКБ) на агаризованные среды с солодовым суслом массовой долей сухих веществ 12 % (контроль), экстрактом из якона (опыт).

Экстракт из якона готовили путем смешивания порошка якона и воды в соотношении в масс. долях 1:9, экстракции водорастворимых веществ при 80 ^{o}C в течение 30 мин и последующим фильтровании. Содержание сухих веществ в экстракт-агаре составляло 8 %.

В качестве источника МКБ использовали лактобактерин – сухой лиофилизат, представляющий микробную массу лактобактерий штаммов Lactobacillus plantarum 8P-A3, L. plantarum 38, L. fermenti 90T-C4, L. fermenti 39, лиофилизованную в среде культивирования с добавлением защитной сахарозо-желатиновой или сахарозо-желатино-молочной среды.

Результаты серии модельных опытов представлены на рис. 1, 2.

В обоих исследуемых вариантах обнаружен один из характерных видов колоний МКБ при глубинном посеве на твердую питательную среду – нежные, белого цвета, напоминающие комочек ваты. Учитывая лучший рост МКБ без доступа воздуха, характерный для факультативных анаэробов, на поверхности были обнаружены единичные округлые колонии с гладкой поверхностью, слегка выпуклые, сероватого цвета.

В целом, как показали результаты исследования, среда на основе экстракта якона по источникам питания для роста и развития МКБ не уступает солодовому суслу. Известно, что именно агаризованное солодовое сусло рекомендуют использовать для выделения молочнокислых бактерий [4]. Таким образом, исходя из определения пребиотика, как вещества с избирательной стимуляцией роста и/или повышением биологической активности нормальной микрофлоры кишечника, можно предположить, что якон обладает пребиотическими свойствами.



Рисунок 1. Посев МКБ на сусло-агаре (контроль)



Рисунок 2. Посев МКБ на экстракт-агаре (опыт)

Вторая серия модельных опытов была направлена на установление технологической целесообразности применения порошкообразного полуфабриката якона, как ингредиента хлеба из смеси ржаной и пшеничной муки. На агаризованные среды - сусло-агар (контроль) и экстракт-агар (опыт) - сделаны посевы молочнокислых бактерий и дрожжей, традиционно применяемых в приготовлении

жидкой ржаной закваски. Источником микрофлоры служила жидкая ржаная закваска с заваркой, микрофлора которой представлена молочнокислыми бактериями L. plantarum-30, L. casei-26, L. brevis-1, L. fermenti-34 и дрожжами S. cerevisiae Л-1. На поверхности агаризованных сред контрольной и опытной проб установлены колонии круглой формы, белого цвета, сочной консистенции, маслянистые, культуральные признаки которых характерны для дрожжей S. cerevisiae. При этом визуально количество колоний на экстракт-агаре больше, чем на сусло-агаре. Что также является подтверждением технологической целесообразности применения продуктов переработки якона в технологии хлеба.

Таким образом, комплекс проведенных органолептических, физико-химических, микробиологических исследований подтвердил технологическую целесообразность применения порошка якона в технологии хлеба из смеси ржаной и пшеничной муки. При этом исследования состава порошка якона, его влияния на рост и развитие молочнокислых бактерий позволил рекомендовать порошок якона в качестве функционального пищевого ингредиента, обладающего пребиотическим действием.

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Section 9. Economics

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Consolidation in Banking Industry – A Cross Country Experience

1. BACKDROP

Consequent to economic liberalization, financial deregulation, globalization and technological revolution, unprecedented changes have taken place in markets worldwide. The instability of the business environment has altered the ways and means by which transactions are carried out. Perpetual existence of an enterprise has become very difficult, given the complex and fluctuating nature of the surrounding environment. There is thus, a need for almost continuous reshuffling of business organizations. Profitable growth can be achieved internally by developing new product lines, expanding existing capacity, acquiring new assets, moving on to technologically advanced equipment and appreciating the need for investments in research and development. Alternatively, the growth process can be facilitated through various forms of corporate combinations such as absorptions, acquisitions, amalgamations, de-mergers, divestures, joint ventures, leveraged buyouts, mergers, sell-offs, spin-offs, strategic alliances, takeovers, and so on [1,2,3].

Banking consolidation is big news these days, with a new mega merger announced almost every month. Consolidation in the banking sector should largely be synergy-driven to acquire a quantum jump in the performance of the combined entity (2+2 " 5). It can be

achieved by combining complementary strengths, giving a better geographical spread, serving a larger number of customers in a better way with more diversified products and skills, realizing the opportunities for cross-selling, containing the cost of the merged entity, reduced competition, better utilization of available resources and deriving economies of scale.

2. REVIEW OF LITERATURE

American Bar Association, "Bank Mergers and Acquisitions: A Handbook Book (2007), this paper presents a general model of bank merger review that are unique to banking institutions such as the statutory framework, banking agency review, and Justice Department standards and draws on learning from recent transactions in which one or more of the reviewing agencies raised concerns. Its focus is practical; complementing the Antitrust Section's other publications on merger review including Mergers and Acquisitions, and the Pre-merger Notification Practice Manual etc. Bernulf Bruckner, Jonathan 0 Shea, "Mergers in European Banking: A Managerial Perspective (2006), presents an introductory overview of the current situation in the European banking industry, and a classification of M&A activity is also offered. Although this classification covers activity across a broad spectrum of sectors and industries, the case studies, which form the central part of this study, focus on the banking sector. Two cases from the European banking sector are examined in detail. First, a domestic UK merger is analyzed, namely the fusion of Halifax and Bank of Scotland. Secondly, in contrast to the first case, a cross-border deal, namely the marriage of Bank of Austria with Germany s HypoVereins bank, is also examined. Elena Carletti, Philipp Hartmann and Giancarlo Spagnolo, "Implications of the Bank Merger Wave for Competition and Stability (2002), discusses implications of consolidation in the banking sector. The authors state that market power/domination and competition issues need to be carefully evaluated before going in for bank mergers because such mergers could have a special relation with the financial stability of the country. Overall, the article stresses that competition considerations need to receive enough consideration, before a bank merger takes place. Eric J Gouvin, "Bank Mergers in North America: Comparing the Approaches in the United States and Canada (2006), The US and Canada have adopted different approaches to the approval of large bank mergers. The book provides the

comparison of the approaches. The US approach places most of the discretion in the hands of administrative agencies like the Federal Reserve Board, Comptroller of Currency, the Federal Deposit Insurance Corporation, etc., while the Canadian process will not permit any bank merger to go through regardless of the guidance eventually provided by the Department of Finance. The process is designed in a way that political sentiment will sway decisions on these matters and, given the current political climate; there is little chance that a member of the cabinet is likely to support bank mergers in any form. Ebodume Epizitone Anabi, "Do Mergers and Acquisitions Improve Efficiency of the Banks? - DEA approach in the case of European banks (2007), this study analyses technical efficiencies of 134 individual bidder banks across 11 European countries before and post merger during the period 1994-2001. The non-parametric Data Envelopment Analysis (DEA) approach is applied to detect potential efficiency gains resulting from bank mergers. The study employs the intermediation model of the production process of the banking firm. It find that consolidation in the banking sector is beneficial and mergers appear to have improved efficiency. The analysis also indicates that savings banks have benefited the most from M and As and that the German banks have experienced smaller efficiency increases compared to the banks of the other countries of study. Fadzlan Sufian, "Mergers and acquisitions in the Malaysian banking industry: technical and scale efficiency effects (2009), this paper investigates the effects of mergers and acquisitions on Malaysian banks' technical and scale efficiency employing an event study with a three-year window analysis together with the non-parametric frontier approach, Data Envelopment Analysis (DEA). The results suggest that the merger has resulted in a higher mean technical efficiency of the Malaysian banking sector post-merger. In five out of the seven merger cases, the empirical findings suggest that the acquirers were relatively more technically efficient. The empirical findings also suggest that the acquiring banks' mean technical efficiency improved (deteriorates) from the merger with a more (less) efficient bank in five out of the seven merger cases analyzed. Gary A Dymski, "The Global Bank Merger Wave: Implications for Developing Countries (2004), discusses the types, causes and implications as well as numerous limitations of global bank mergers. It analyzes whether developing countries really benefit from cross-border mergers, and if so, to what extent. The article argues that large banks have traditionally and increasingly engaged in harvesting, not seeding and cultivating activities. It also brings out the differences between defensive and offensive mergers that

have come in. Mishra Shashidhar, "Bank Mergers: Is it the right solution? (2006), mentions phase of transition in the Indian banking sector which has added technological orientation in their services like, enhancing retail loan portfolio, reducing NPAs adopting other latest technologies to improve their performances etc. Mergers of two public sector banks with two weak banks, The Punjab National Bank and Andhra Bank with Nedungadi and Centurion Bank respectively are examples of reviving weak banks. Strong public sector banks have the social as well as, business responsibilities to take over weak banks as a long-term business proposition and also to protect the interest of innocent depositors and good borrowers of the weak banks. The author argues that value enhancing mergers are welcome, but one has to take care of the risks inherent in the mergers of unequals, as, in the long-term, mergers may not be a permanent solution for the sick banks, as they need to make concerted efforts to enhance their productivity to sustain themselves in future. Mishra Santap Sanhari, "Consolidation in the Banking Industry: Global Perspective (2008), this book deals with the most critical element of Bank Consolidation Issues and Evidence, Privatization, Consolidation and the Increased Role of Foreign Banks, Bank Mergers and Crime: The Real and Social Impact of Competition in the Credit Market, Banking Consolidation and Small Business Lending, A Review of Recent Research Impact of Bank Mergers on Asian Stock Market: A Review, Value Creation by Domestic and Cross- border M and A Transactions in the European Banking Market, Rebuilding the Indonesian Banking Sector - Economic Analysis of Bank Consolidation and Efficiency, etc [4,5,6,7,8,9,10,11,12].

Thus, the above review of the studies as a whole gives a very mixed picture of M and A in banking industry. Although there is a plethora of research literature on bank merger, most of the researchers studied only country wise wave of bank mergers. The present work is a humble attempt to make a comprehensive study on M and A in banking sector on worldwide frame.

3. OBJECTIVE OF THE STUDY

The main objective of this study is to know mergers and acquisitions activity in banking sector all over the World.

4. RESULTS AND DISCUSSION

The United States banking sector is a classic example of a steady transition of a fragmented market to one the last few decades. At year-end 1984, there were 15,084 banking and thrift organizations. By year-end 2006, this figure declined by 51% to 7,479. Deregulation combined with the bank's drive to expand market share has led to significant consolidation since the early 1980s. Some of the acts [1,5,13] that have driven the US banking consolidation are as follows.

4.1 Reigle-neal Interstate Banking and Branching Efficiency Act of 1994

This act permitted bank holding companies to acquire banks in any state and since 1997, allowed interstate bank mergers.

4.2 Gramm-leach-bliley Act of 1999

The act authorized financial holding companies (FHCs) to engage in a full range of financial services such as commercial banking, insurance, securities and merchant banking.

Consolidation in the US banking sector was also accompanied by a phenomenal growth in the sector. Commercial bank assets, as a percentage to GDP, increased to 75% in 2006 from 55% in 1994. However, compared with the banking systems of most developed countries, the US banking sector is still highly fragmented. There are numerous smaller players that try to compete with industry leaders in terms of pricing and services. A peculiar feature of the US banking industry is the way it is divided into different asset sizes, ranging from less than USD 100 million to greater than USD 100,000 million. Distributed by size, nearly all the decline over the years occurred in the community bank sector (organizations with less than USD 1 billion in assets), particularly among the smallest size group (less than USD 100 million in assets). Yet the community banking sector still accounts for 94% of the banking organizations.

4.3 Europe

Europe saw fairly hectic activity too, and would have probably seen even greater M&A activities had not heterogeneous banking regulation held up cross border mergers.

Among recent deals are the takeover of Abbey National (UK) by Banco Santander (Spain) in 2004, Uni Creditos (Italy) acquisition of Hypo Vereins bank (Germany), INGs acquisition of Barings, Equitable of IOWA, and earlier, the mergers between Credit Agricole and Banque Indosuez in France, Dresdner bank with Advance Bank and Kleinwort Benson Iberfomento of Germany, etc. During the period 2001-05, the total number of EU credit institutions decreased by 12% while assets increased by 33% indicating an ongoing trend toward creating larger credit institutions. There were around larger credit institutions. There was [9,10] around 30% cross-border M and As out of the total consolidation activity in the EU banking sector in the period 2001-06.

4.4 Latin America

In Argentina, bank mergers were driven largely by financial sector liberalization and tightening of prudential norms in the early 1990s. Most mergers took place between banks with complementary strengths in different regions, as against mergers involving overlapping operations because the latter posed problems such as employee downsize, losing customers to counterparts, etc., during attempts made to rationalize the overlapping activities. As a result, the number of banks declined from 180 in 1994 to102 in 2000. This, in turn led to the rise in the share of the top ten banks in the total deposits from 75% to 81% during the same period. In Brazil, the family-owned banks are probable takeover targets due to their inefficient management though the family ownership structure makes it a tough task. The entry of foreign players and increasing privatization is anticipated to lead to more such acquisitions in future. In Chile, the concentration level of banks has been moderate as compared with other Latin American nations. However, the country has gradually embraced consolidation, resulting in a higher penetration of banking offerings. Bank loans, as a percentage of GDP, increased from 52% in 1992 to 70% in 2000. Besides, consolidation in Chile has also led to the emergence of universal banks, which provide a wide range of financial services. A linked outcome of the bank concentration is an increase in the proportion of fee-based income and declining transaction costs. Notably, the number of NBFCs reduced from 4 in 1992 to just 1 in 1999. The late 1990s brought the Colombian financial system closer to universal banking. By early 2000, financial conglomerates owned about 70% of the total bank assets. These conglomerates comprised commercial banks, financing companies, savings and loans

corporate, leasing companies and insurance companies, among others. Besides there were no restrictions imposed on the fusion of credit intermediaries with non-bank institutions. In Mexico, [5,21] consolidation mainly took place due to lack of capital after the banking crisis in 1995. As domestic players were not in a position to provide the required funding, regulations governing the entry of foreign player were eased. In 2004, the top 5 banks controlled approximately 80% of the total banking sector assets. The number of banks reduced from 36 in 1994 to 23 in 2000.

4.5 The Asia-Pacific Region

The banking sectors in countries in the Asia-pacific region have not witnessed any common trend. While the concentration seen in the Australian banking system remains the same over the past decade due to the existence of the four-pillar policy, the Chinese banking industry has witnessed the deteriorating market share of the big-four State-owned Commercial Banks (SOCBs) over the years. On the other hand, the number of financial players in Singapore has been shrinking over the past decade due to financial sector liberalization and the influence of the global consolidation trend. The Government Australia has maintained four- pillar policies that prohibit mergers between the "Big Four" banks, namely, Commonwealth Bank, National Australia Bank, Westpac and the Australia and New Zealand Bank. This was done with a view to maintain competition within the domestic market. However, there is an ongoing debate in Australia over whether this four-pillar policy would be sustainable in the long-run as it prevents them from increasing their scale and efficiency level. As of June 2007, the top four banks accounted for around 80% banking assets.

'Big-four' state-owned banks dominate the Chinese banking industry, accounting for nearly 50% of the total banking assets as of 2007. ICBC, Bank of China, China Construction Bank and Agricultural Bank of China have collectively contributed to China's economic development and reforms by providing the requisite funding support for various infrastructure projects neglected by private capital, thereby, promoting balance economic development. The Chinese banking sector can be considered a three-layered hierarchy, with the Big Four state banks at the top, followed by the 13 joint stock commercial banks and the 117 city commercial banks at the bottom.

The Government of Malaysia believed that bank mergers could effectively offset future banking system crises as well as equip home-grown entities to compete with international banks. In April 2000, it envisaged merging 55 financial institutions into 6 banking groups, each with an anchor bank chosen by the government to control the group. These institutions included commercial banks, merchant banks and finance companies.

Indonesia witnessed large scale infusion of public funds into the banking system through a specialized restructuring agency. Regulatory forbearance was also present in good measure to facilitate bank recovery. As against Basel Capital adequacy norm of 8%, banks were allowed to operate with 4% as an interim measure. Only banks which had Capital Adequacy ratio reduced to below 25% were marked for immediate closure. Consolidation among banks was actively encouraged and FDI was allowed up to 99%. Net result was that the number of banks in Indonesia which stood at 239 in 1996 came down to 138 in 2003. In Indonesia, after the financial crisis, four of seven existing banks consolidated into a new bank (Bank Mandiri), which controlled nearly one-fourth of the total commercial bank deposits. Besides, in 2000, eight private banks taken over by the Indonesian Bank Restructuring Agency were merged into one Bank, Bank Danamon. Consolidation was most visible among private banks with the number of such banks coming down from 164 to 76 during the period. Post restructuring, the banks are now healthier and their branch network and coverage has increased significantly in recent years. In the late 1990 s, the Government of Korea envisaged consolidation in the form of a three- tier banking system-the first tier comprising few mega banks operating as universal banks, offering a full range of financial products; the second tier of several medium-sized banks providing retail banking and housing finance and the third tier comprising small regional banks operating in specific regions. In 2000, the concept of Financial Holding Companies (FHC) was introduced in Korea to promote consolidation by passing the Financial Holding Company Act. Healthier banks were induced to merge with the prospect of increasing their market share, while weaker banks came together under a separate FHC umbrella to convert themselves into large, financially viable entities. The FHC model reduced the number of individual financial institutions specializing in specific businesses while enabling banks to offer other services such as insurance, broking and asset management. This enlarged the scale and scope of business of FHCs and made them more competitive.

Japan is a country which has witnessed a virtual collapse of the banking system along with economic stagnation which lasted over 15 years. Japan had some of the leading names in global banking arena. The economic slowdown saw the NPA levels going up over the roofs and the banks virtually looking for governments support. Needless to say, the low interest rate regime (near zero rates) would have eased their sufferings somewhat. However, the banking system has recovered in recent years helped by liberal financial assistance from the government and an environment of extremely loose monetary policy. Consolidation process which was kicked off as restructuring strategy has resulted in emergence of three large banks viz. Mitsubishi UFJ, Mizuho and Sumitomo Mitusui. Today NPA levels have come down to an acceptable level of 1% from a peak level of 8.4% in the year 2002. Capital adequacy ratios have improved above the Basel benchmark of 8%. Banks have started showing profits and there is a pick-up in their credit portfolio. Japanese banks may still have a long way to go as their ratings continue to be low and they are heavily dependent on interest income with heavy reliance on low margin corporate loans. Another interesting development taking place in Japan is the government move to privatize the postal agency, which doubles as a financial institution that holds the world s largest pool of household savings. The Housing loan Corporation managing the advances of the postal agency had, at one time, nearly 50% of all mortgage loans in Japan. As part of privatization this corporation is being wound up with the assets getting transferred to the banking system.

The banking structure in Hong Kong has been relatively more static as compared with a few other mature markets. The local banks are inclined to acquire a gateway to China, which is another reason for them to increase their scale, they have to meet the size criterion of at least USD36 million worth of assets to be eligible to establish a branch in Mainland China. Few examples of bank mergers in the last few years are acquisition of the First Pacific Bank by Bank of East Asia and that to Dao Heng Bank by DBS HK Ltd.

Thailand has implemented a financial sector master plan aimed at removing obstructions to M and A and also allows FDI flow to strengthen the banking system.

Five major banks continue to dominate the banking sector of Singapore since the 1960 s, namely, Development Bank of Singapore (DBS), Overseas Chinese Banking Corporation (OCBC), United Overseas Bank (UOB), Keppel TatLee Bank and Overseas United Bank. The mergers among these five banking groups led to the formation of three main financial groups, namely, OCBC, UOB and Keppel. M and A continues to characterize the banking sector of Singapore since the 1970s and 1980s. This concentration of financial activities within the major banking groups has intensified with

the assimilation of finance companies, catering to merchant banking, securities and insurance, thereby creating an oligopolistic pattern.

Over the last one and a half decade, the banking sector in India has not only grown in terms of size but also matured, diversified and consolidated to contribute towards building a robust financial system. The Global mantra Liberalization, Privatization and Globalization (LPG) process which was started in early 1990s has brought so many changes in the economic scene of the country. This process of economic reforms has brought competition not only from India but also from overseas. In order to compete with these competitors, Indian corporate sector has tried to reorganize and restructure the companies by adopting various strategies. These strategies include Mergers and Acquisitions. Consolidation of banks through Mergers and Acquisitions is not a new phenomenon for the Indian banking system. It has been going on from the early days of modern banking through the setting up of English Agency House in the 18th century; the most significant merger was that of the three Presidency banks, founded in the 19th century, in 1935 to form the Imperial Bank of India (renamed as State Bank of India in 1955). Because of bank failures and amalgamations the number of reporting commercial banks declined from 561 in 1951 to 89 in June, 1969. Merger of banks took place under the direction of the Reserve Bank of India during the 1960 s. [5,14,15,16,17,18,19,20] During 1969 to 2013, 37 banks, both in the public and private sectors, were merged with other stronger banks. There have also been mergers between private sector healthy banks, driven by the business and commercial considerations. However, merger of public sector healthy banks have not taken place till now.

Fig. 1 show that number of Bank s M and A cases increased in all over world between 1985 to 2006.

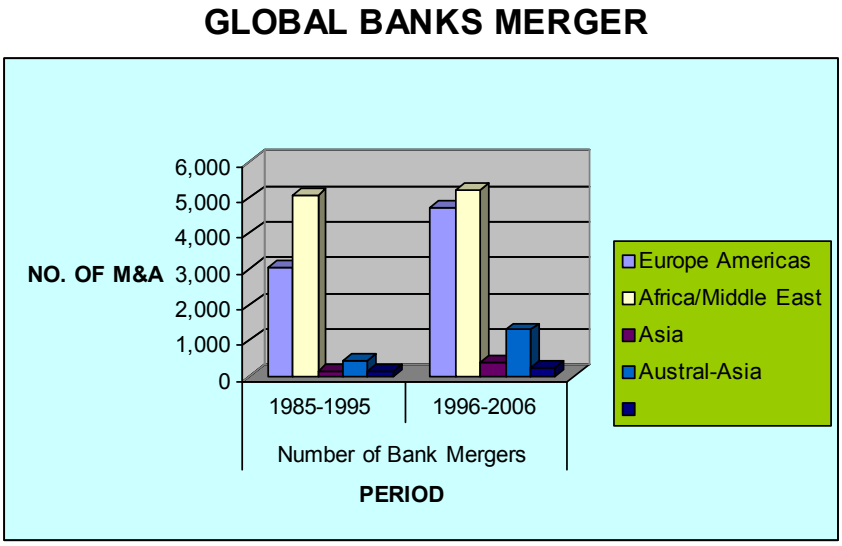


Fig. 1. Global Bank Mergers 1985 to 2006

In most of the emerging economies, consolidation has mostly been government-led than being market-driven. In Latin America, most government-led mergers took place following the Latin American crisis in the early 1980s whereas in the South-East Asian economies, these mergers happened after the Asian financial crisis in the late 1990s. However, on account of deregulation, privatization and the entry of more and more foreign players the scenario is gradually undergoing a change. In certain mature financial markets such as Singapore and Hong Kong, consolidation is viewed from the point to competitiveness. The European banking industry is characterized to a large extent by cross-border consolidation mainly due to deregulation, market integration and the adoption of a single currency in the European Union (EU). Meanwhile, the US banking industry has consolidated over the past decade due to favorable regulatory measures that facilitated interstate bank mergers.

Fig. 2 shows increasing trend of Values of Cross-Country Bank s Merger that shows Values of Cross-Country Bank s Merger increased in all countries between 1995-99 to 2000-04.

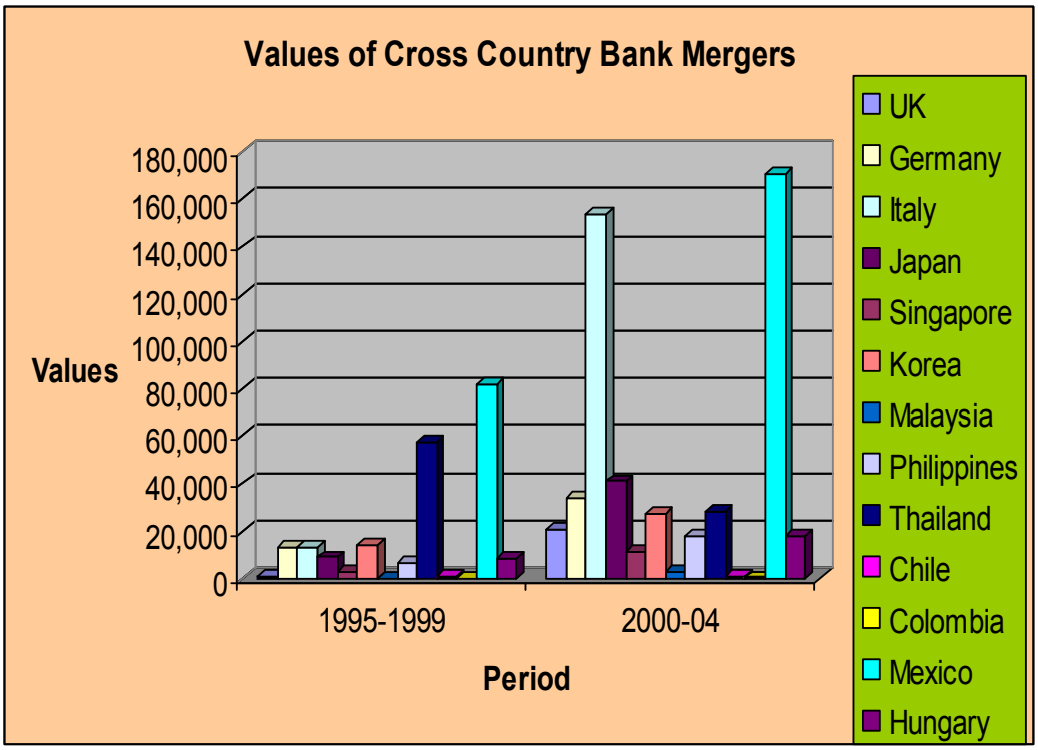


Fig. 2. Values of Cross-country Bank's Merger

Fig. 3 shows decriesing trend of number of banks all over the World.

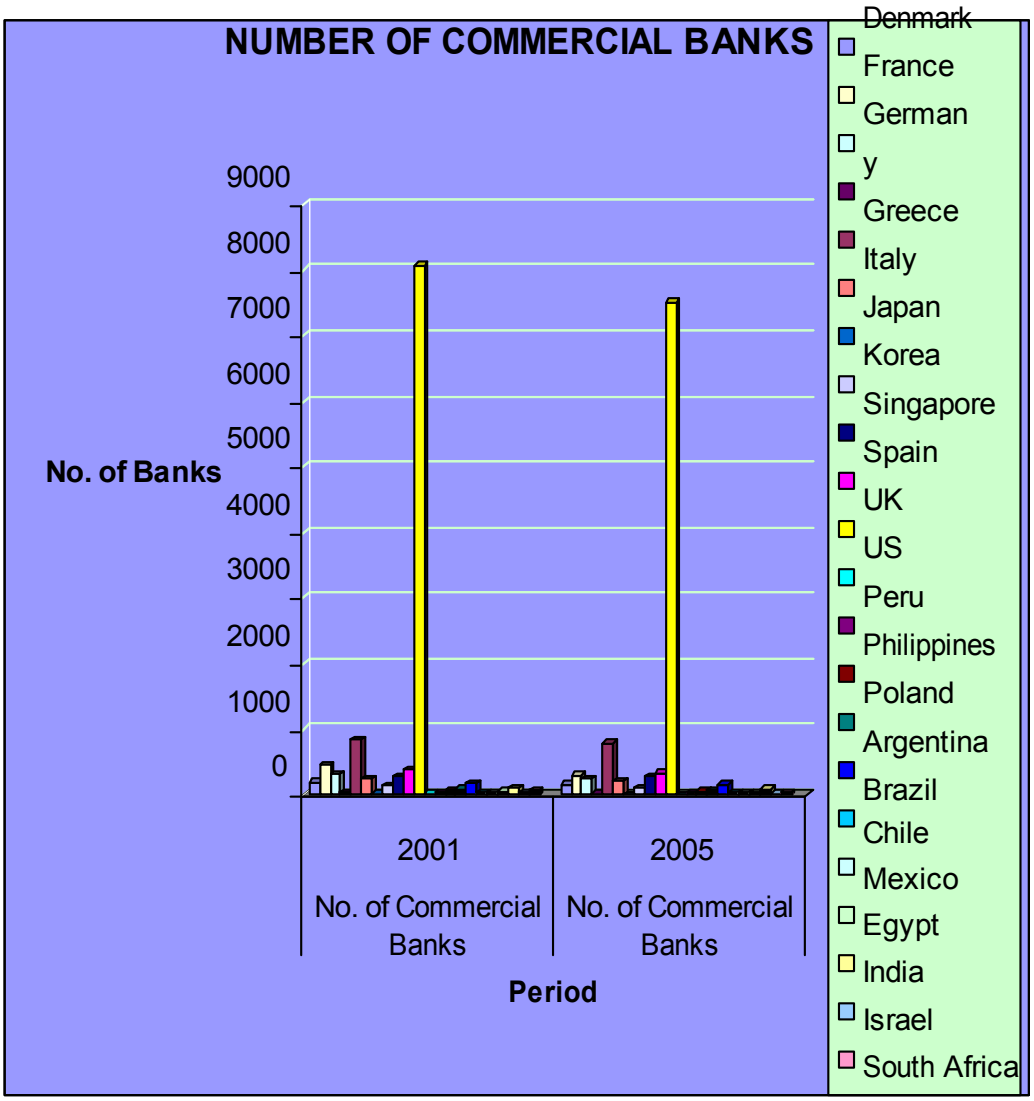


Fig. 3. Numbers of Commercial Banks

5. CONCLUSION

The goal of a bank merger is to increase the bank's value in one way or another. Consolidation in banking industry is the need of the hour. A lot of companies have merged with other companies to make a mega company. Consolidation will positively amplify the business prospects of the industry in the domestic as well as international market place. "Collectiveness is strength will hold true on consolidation in Banking

Sector. Banking consolidation is big news these days, with a new mega merger announced almost every month. The financial services industry around the globe is consolidating. Starting in the United States (US) in the 1980s, a wave of bank merger reached Europe in the 1990s. Over the past two decades, deregulation in the banking industry has generated a sweeping trend of bank mergers and acquisitions, which has changed the banking landscape across the world. The change in banking structure is especially notable in the United States, which used to be characterized by a large number of small banks. The pressures on capital structure [20] to meet prudential capital adequacy norms necessitate the need for Consolidation in the banking industry. Consolidation will provide banks the 'size advantage . There is a need for consolidation in the banking industry to compete for the pie in the domestic as well as global market. Off late the Indian banking industry has realized that size matters a lot when it comes to face the competition in the banking industry and rise to global standards. Size would bring along with it economies of scale by bringing down the transaction costs. Mergers and Acquisitions would help build up financial strength, capture larger portion of the growing retail business and secure better regional presence. Bank mergers are not as easy as it seems on the paper. No doubt everyone knows the criticality of the issue and urgent requirement of mergers in banking sector, But then river also have to face various rocks, pebbles and other interruptions in its natural flow and so does Banking sector has to face various challenges for mergers.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Current Account and Exchange Rate Dynamics in Presence of Risk and Economic Shocks

1. INTRODUCTION

The recent oil shocks,[1] the huge debts,[2] the financial crisis,[3] and the deep recession,[4] created an enormous mistrust for the international financial system, a big disturbance to the real sector of the economy, and an uncertain future for the entire world. For an oil importing country a rise in the price of oil leads to currency depreciation (direct effect), which causes an increase in the value of imports and an improvement in exports. The high income of oil exporting countries is going to be spent on purchases of goods or assets from the country with the devaluated currency and its currency will appreciate (indirect effect). Thus, if the value of imported oil (capital outflow) is equal to the value of foreign investment (capital inflow) by the oil producers, the currency must stay unchanged. The elasticity of demand for importing oil is inelastic and the value of imports is large; but, the elasticity of demand for investment is relatively elastic, due to diversification and competition among financial assets issued by different countries, so the value of capital inflow will be less than outflow. In this case the currency of the oil importing country will depreciate.

Recently there have been numerous studies of the determinants and behavior of current account balance for both the advanced developed countries and the developing countries. See for example, [1], [2], [3], [4], [5], [6], and [7] among

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[1] *It reached $143.67 per barrel on June 30, 2008. Now, the oil price is $96.16 .*

[2] *The U.S. national debt was $16.028.*

[3] *The DJIA from 14,164.53 (October 9, 2007) fell to 6,547.05 (March 9, 2009); an enormous decline by -7,617.48 points or -53.78%, a loss of $18 trillion. Now (3/12/2013), its nominal value has surpassed the 2007 level, it is 14,447.29, but the real (inflation-adjusted) level is where it was in 1999. (The Wall Street Journal, March 6 and 12, 2013).*

[4] *The real GDP fell drastically in 2008:Q4 ($g_Y = -6.78\%$) and the unemployment rate became a double digit in October 2009 ($u = 10.1\%$). Lately, the $g_Y = 2.2\%$ for 2012 (and for the 4th quarter of 2012, it was -0.14%) and the unemployment rate was $u = 7.9\%$ (January 2013).*

many others. Given increased globalization over the past twenty years it is not surprising that there is tremendous interest in studying current account balance. The behaviors of current account balance for most countries have also been sufficiently varied to warrant such renewed interest in current account balance, after the latest debt crises and the enormous unemployment.

Consider for example the current account balance for the United States. Fig. 1 shows the behavior of the U.S. current account balance since 1980. Starting from a zero current account deficit in 1980 within about twenty five years the current account deficit increased to $800 billion. Over the last thirty years the current account deficit in the U.S. increased marginally during the recessions of 1982-83 and 2001. There was significant improvement in the current account balance during the recession of 1991-92 and in the first half of the recession of 2008-2009, while the second half of the 2008-2009 recession witnessed a worsening of the current account balance. The rise and fall of the current account deficit occurred over periods of increasing or stable oil prices, increasing uncertainty in global economic and political arena. Such diverse behavior of the current account balance is not limited to the United States. But, it implies that the behavior of the current account deficit in the United States and elsewhere cannot often be easily explained by traditional theories of the current account balance and that it needs to be constantly examined and reexamined.

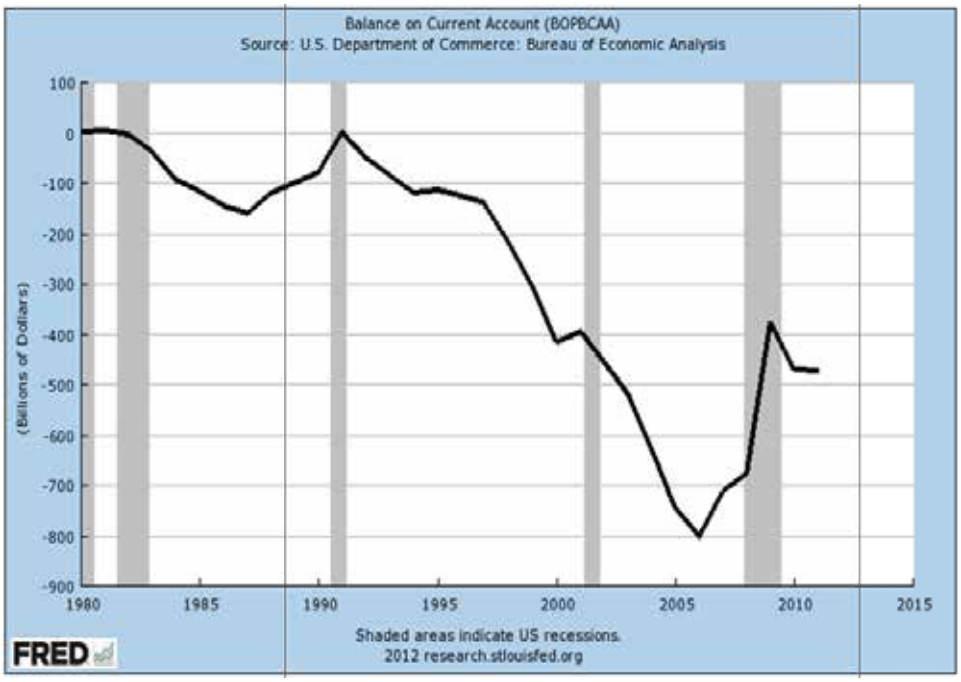


Fig. 1. U.S. Current account

Note: Current account = exports - imports (of goods and services).

Source: Federal Reserve Bank of St. Louis: Federal Reserve Economic Data (FRED)

The purpose of this paper is to analyze the determinants of the current account balance in the U.S. using a micro theory based intertemporal model of capital account balance and also to empirically examine the behavior of the spot dollar exchange rate. The structure of the paper is as follows. In section 2, we develop the intertemporal model of consumption and capital account balance and provide a graphical analysis of the effects of various economic shocks on the current account balance. In section 3, we estimate the U.S. current account balance using the data for 1999-2011. We also provide a related empirical estimation of the U.S. spot exchange rate using similar explanatory variables as used in the current account balance estimation. Concluding remarks are made in section 4.

2. CONSUMPTION AND CURRENT ACCOUNT BALANCE

In this section we develop a two period model of consumption and current account balance following [8]. The economy consists of identical consumers who live for two periods. Their preferences are characterized by a quasi concave utility function $U(C_1, C_2)$ where C_1 and C_2 are the levels of consumption in periods 1 and 2. The consumers maximize their utility subject to a lifetime resource constraint given by,

$$C_1 + \frac{C_2}{1+r} = R \tag{1}$$

where R = Lifetime Wealth of households + Firms' Value + Value of oil, as follows,

$$R = W + V + N^D \tag{2}$$

Let us consider each component of the resource constraint

$$W = (w_1 L_1 - t_1) + \frac{(w_2 L_2 - t_2)}{1+r} \tag{3}$$

where w_1, w_2, are the wage rates, L_1 and L_2 are the levels of labor supply, t_1 and t_2 are the taxes in periods 1 and 2, and r is the underlying interest rate.

$$V = (Y_1 - I - w_1 L_1 - q_1 N_1) + \frac{(Y_2 - w_2 L_2 - q_2\ N_2)}{1+r} \tag{4}$$

where Y_1 and Y_2 and real GDP, I, is real investments carried out by the firms, N_1, N_2 are the usage of oil and q_1 and q_2 are the world oil prices in periods 1 and 2. Finally,

$$N^D = q_1 N_1^D + \frac{q_2 N_2^D}{1+r} \tag{5}$$

where N_1^D and N_2^D are the levels of domestic oil production in periods 1 and 2.

Note that governments taxes and expenditures are governed by the familiar intertemporal budget constraint for the government

$$G_1 + \frac{G_2}{1+r} = T_1 + \frac{T_2}{1+r} \tag{6}$$

Now, substituting (3) – (6) in (1) and collecting terms we get,

$$W + V + N^D = (Y_1 - G_1 - I_1 + q_1(N_1^D - N_1)) + \left(\frac{Y_2 - G_2 + q_2(N_2^D - N_2)}{1+r}\right)$$

$$= Z_1 + \frac{Z_2}{1+r} \tag{7}$$

where $Z_1 = Y_1 - G_1 - I_1 + q_1 (N_1^D - N_1)$ (8)

$Z_2 = Y_2 - G_2 + q_2 (N_2^D - N_1)$

Thus, the optimization problem of the consumers is given by:

Maximize $U(C_1, C_2)$

Subject to $C_1 + \frac{C_2}{1+r} = Z_1 + \frac{Z_2}{1+r}$ (9)

Now, (8) yields the fundamental characterization of the Current Account Balance (CAB).

Note, $Z_1 - C_1 = (Y_1 - C_1 - G_1 - I_1) + q_1 (N_1^D - N_1)$ = Net exports of goods and services + Net export from oil = CAB_1 (10)

But, by virtue of (9),

$$(Z_1 - C_1) = \frac{(Z_2 - C_2)}{1+r}$$

or $CAB_1 = -CAB_2(1+r)^{-1}$ (11)

Because of (11), in our discussion we can simply focus on Current Account Balance in period 1.

2.1 Shocks to the Economy and Current Account Balance

The closed form solutions for capital account balance and the related comparative static effects are somewhat messy. So we use graphical analysis instead to show how the capital account balance is affected by shocks and changes in economic variables. For our discussion we consider an oil importing country that has a current account deficit. Fig. 2 shows a standard graph for intertemporal utility maximization, where the budget line is BL1. The endowment point and the equilibrium points are A1 and E1 respectively. Since C1 exceeds Z1, we can conclude that the country has a deficit in its current account balance.

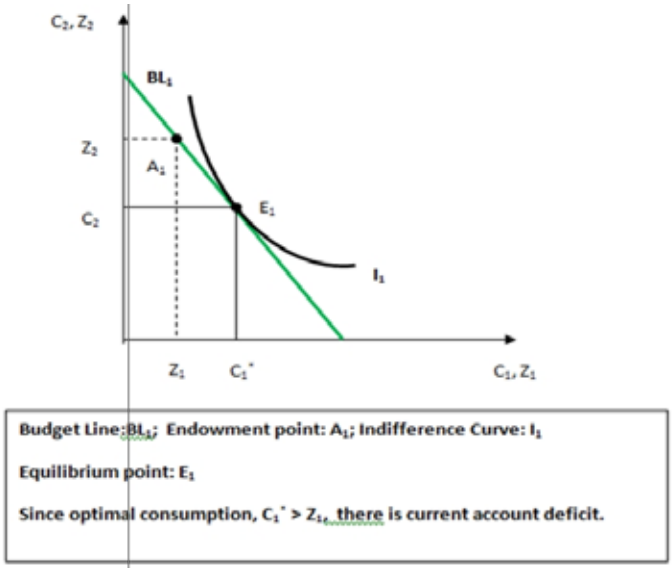


Fig. 2. Determination of current account balance

Using the above graph we can determine the effects on current account balance of various shocks to the economy, such as a reduction in GDP, increase in price of oil or increase in government spending. Consider Fig. 3. Initially, as in Fig. 2, the country has current account deficit. The initial budget line is BL1. The

initial endowment point and equilibrium point are E1 and E2 respectively. A reduction in current GDP, Y1 or an increase in price of oil q1, for an oil importing country, lowers Z1 and shifts the intertemporal budget line from BL1 to the left to BL2. If the shock is temporary the endowment point shifts horizontally to A2. The new equilibrium is at E2. Current consumption falls but due to the consumption smoothing motive, it falls by a smaller amount than the decline in Z1. As a result, the current account deficit (in period 1) increases.

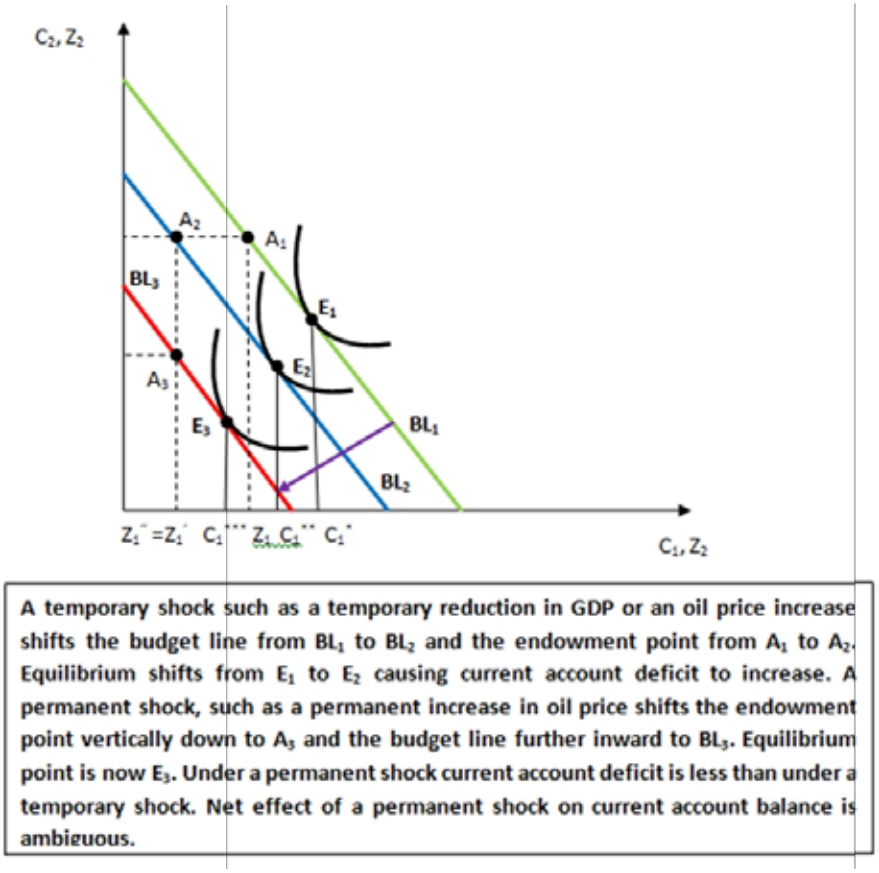


Fig. 3. Effects of temporary and permanent shocks on current account balance

Now, if the shock is permanent such as a permanent increase in oil price, since q^2 also rises by the same amount, the budget line shifts further to BL_3 with the endowment point shifting vertically down to A_3. The new equilibrium is at E_3. Compared to the temporary shock, the current account deficit improves. The net effect on current account balance is ambiguous.

Fig. 4 is used to illustrate the effect of a temporary increase in Government

spending G_1. The increase in G_1 is assumed to be paid for by a corresponding future spending cut – i.e., reduction in G_2, so that the Government budget constraint (6) continues to hold. As a result, the budget line does not shift but the endowment point shifts up from A_1 to A_4. Consequently, the current account deficit increases.

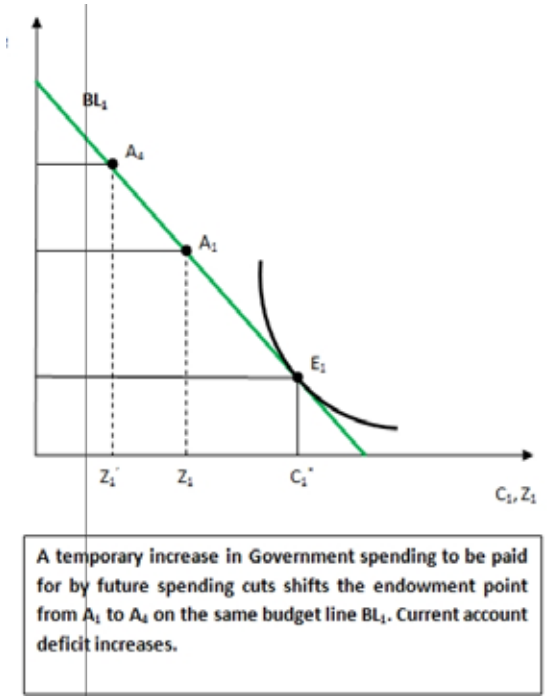


Fig. 4. Effects of temporary increase in government spending on current account balance

At this point, we should note that in this model a temporary slump is caused by an adverse shock such as an adverse productivity shock or an increase in price of oil. The temporary reduction in Y_1 or Z_1 causes current account deficit to increase. Conversely, temporary increase in Y_1 or Z_1 caused by a favorable productivity shock or a reduction in price of oil can reduce the current account deficit. These results are different from the conventional macroeconomic prediction that a boom (slump) causes current account deficit to increase (decrease) by increasing (decreasing) demand for imports. However, the current model can also accommodate the conventional macroeconomic prediction. For example, if GDP increases due to the multiplier effects associated with the increases in G, there may be competing effects on the current account deficit and for such demand induced increase in income, current account deficit may actually increase.

The above graphical framework can be used to demonstrate the effect of

interest rate on current account deficit. If the interest rate falls, the budget line becomes flatter but still passes through the same endowment point. The current consumption for a country that has a current account deficit, falls and as a result the current account deficit increases.

We summarize the basic results of the model in Result 1, below.

Result 1: Consider an oil importing country that has a current account deficit. The amount of the current account deficit increases if (I) there is a temporary slump that reduces GDP; (II) there is a temporary increase in price of oil; in case of a permanent increase in price of oil, the effect on current account deficit is ambiguous, (III) there is a temporary increase in government spending to be paid for by future spending cut and (IV) if interest rate falls.

2.2 Current Account Balance under Uncertainty

In this section we briefly discuss the effect of uncertainty on current account balance. The framework is very similar to the previous section. However we assume that the households maximize expected utility from consumption, where the utility function exhibits constant absolute risk aversion. The consumers are exposed to risk from various sources, such as the risk associated with future price of oil or political instability or the risk of a slump. We further assume that the risk is captured by a random variable л, which enters the budget constraint (9) additively. Because of the structure of our model, the source of uncertainty does not affect the main result.

The households' optimization problem can be formulated as follows

The households maximize

$$U(C1) + вEU(C2) \qquad (12)$$

Subject to $$C_1 + \frac{C_2}{1+r} = Z_1 + \frac{Z_2}{1+r} + л \qquad (9`)$$

where л is the additive random variable that captures risk and в the utility discount factor.

The following result summarizes the effect on current account balance of an increase in riskiness associated with л. For details see, [9].

Result 2: An increase in the risk as captured by a mean preserving spread of lowers current consumption and thus improves the current account balance.

3. EMPIRICAL RESULTS

In this section we estimate U.S. current account balance using the monthly data from 1999:01 to 2011:12. The data source is economagic.com. We also run a related regression on the U.S. spot exchange rate by using data from 1999:01 to 2010:12.

3.1 Current Account Balance Regression

In this regression of current account balance (CAB) we first use the explanatory variables as suggested by the intertemporal model developed in section 2.1: GDP (Y), Government Expenditure (G), Price of oil (*poil*), and interest rate on ten-year U.S. government bond (I). All the variables are expressed as natural logs except interest rates. In addition we include two variables to capture risks: the TED spread, the three-month LIBOR minus the three-month T-Bill rate (TED) as a measurement of credit risk and the price of gold (*pGold*) as an indicator of a general investment risk. The use of price of gold as an indicator of investment risk is perhaps unusual, but can be easily explained. During the time period used in the data set, price of gold almost consistently increased since investors preferred gold over other risky financial assets. Finally, we also consider the spot exchange rate (s) as a determinant of current account balance, a variable that was left out of our single good intertemporal model of section 2.

The regression equation is given by

$$ca_t = \beta_0 + \beta_1 TED_t + \beta_2 p_{oil_t} + \beta_3 p_{gold_t} + \beta_4 s_t + \beta_5 i_t + \beta_6 y_t + \beta_7 g_t + \varepsilon_t \qquad (13)$$

The estimation results are presented in Table 1. As column 2 of Table 1 indicates both risk variables: TED and PGold are significant and that they have a positive effect on the current account balance. These effects are consistent with the results of the analytical model. As noted in section 2, an increase in price of oil has a negative effect on current account balance, but the effect is

statistically insignificant. The spot exchange rate also has a negative but insignificant effect on the current account balance. As explained in the intertemporal model, increase in interest rate has a positive and statistically significant effect on current account balance. Besides our explanation of the impact of the increase in interest rate one can also make the traditional argument that by virtue of the interest rate parity, an increase in the interest rate is due to the expected depreciation of the dollar which improves the current account balance. Finally, both GDP and Government spending have significant effects on current account balance. However, the negative effect of GDP and the positive effect spending are in contrast with the results of our basic model. They underscore the importance of the demand side effects of the macroeconomic shocks.

However, the regression has a low D-W statistic of 0.456 suggesting that the error term is serially correlated. We now re-estimate equation 13 with the same explanatory variables but adding three MA processes: MA (1), MA (2), and MA (3). As the values of column 2 indicate none of the qualitative results of the previous regression changes but the D-W statistic improves to 1.786. Also, a cointegration test for eq. (13) shows that a stationary linear combination exists for the time series (Table 3). This cointegrating equation can be interpreted as a long-run equilibrium relationship among these variables, as Engle and Granger have developed in their theory of non-stationary time series analysis [10]. Further, two other tests, a Q-statistics and a serial correlation LM test (Breusch-Godfrey Lagrange multiplier test) were performed to test for autocorrelation and partial autocorrelation of the residuals together with the Ljung-Box Q-statistics for high-order serial correlation [11]. The results show that there is no first-order serial correlation, but there is serial correlation of higher order.

3.2 The Spot Exchange Rate

We finally run a related regression of spot exchange rate [s_t^f ($/)]. We use similar explanatory variables as in equation (13) with the exception of the risk variables, TED and p_{Gold}, lag values of the p_{oil} to test its dynamic effect, GDP, and Government spending, g.

We however include a national debt variable (in natural log), nd. We also

include two dummy variables to capture the effects if Iraqi war and the European debt crisis: war dummy, WD, with values of zero (0) before 2003:03 and one (1) afterward, and European debt crisis dummy, EDCD, with values of zero (0) before 2009:10 and one (1) after.

Table 1. U.S. Current account balance regression [eq. (13)]

Variables	ca_t	ca_t
α_0	16.911***	12.959***
	(1.500)	(1.969)
TED_t	0.041***	0.016**
	(0.005)	(0.006)
P_{oil_t}	-0.013	-0.019
	(0.014)	(0.015)
P_{Gold_t}	0.204***	0.119***
	(0.017)	(0.022)
s_t	-0.020	-0.004
	(0.028)	(0.046)
i_t	0.018***	0.010*
	(0.005)	(0.006)
y_t	-2.383***	-1.957***
	(0.219)	(0.284)
g_t	0.513***	0.583***
	(0.096)	(0.119)
$MA(1)$	-	0.980***
		(0.088)
$MA(2)$	-	0.750***
		(0.108)
$MA(3)$	-	0.365***
		(0.085)
R^2	0.876	0.951
SSR	0.120	0.047
$D-W$	0.456	1.786
F	149.762	282.160
N	156	156

Note: ca_t *= current account balance, TEDt =TED spread (=* $i_{LIBOR} - i_{RF}$ *),* p_{oilt} *= price of oil,* p_{goldt} *= price of gold,* s_t *= spot exchange rate ($/€),* i_t *= interest rate on ten year U.S. government bond,* y_t *=GDP,* g_t *= Government spending,* MA *= moving average process,* R^2 *= R-squared,* SSR *= sum of squared residuals,* $D-W$ *= Durbin-Watson statistic,* F *= F-statistic,* N *= number of observations, (*), (**), and (***) = significant at the 10%, 5%, and 1% level, standard errors in parentheses. All variables except TED spread and interest rate are in natural log. Data Source: Economagic.com.* Data from 1999:01 to 2011:12.

The regression equation is given by,

$$s_t = \alpha_0 + \sum_{j=0}^{n} \alpha_j p_{oil_{t-j}} + \alpha_2 nd_t + \alpha_3 ca_t + \alpha_4 WD + \alpha_5 EDCD + \varepsilon_t \qquad (14)$$

The initial regression results are reported in Table 2, column 1. But as in the case of the current account balance regression, the D-W statistic is low (0.265) suggesting that the error term is serially correlated. We now re-estimate equation

14 with the same explanatory variables, but adding two MA processes: MA (1) and MA (2). The new regression results are reported in column 2. The D-W statistic improves to 1.729. In addition, a cointegration test for eq. (14) shows that a stationary linear combination exists for the time series (Table 3). This cointegrating equation can be interpreted as a long-run equilibrium relationship among these variables. Finally, the two other tests, a Q-statistics and a serial correlation LM test (Breusch-Godfrey test) were performed to test for autocorrelation and partial autocorrelation of the residuals for high-order serial correlation. The results show that there is no first-order serial correlation, but there is serial correlation of higher order, too.

Table 2. U.S. Spot exchange rate regression [eq. (14)]

Variables	s_t	s_t	s_t	s_t
α_0	0.897	-2.662***	-0.391	-0.636***
	(0.566)	(0.612)	(0.595)	(0.102)
p_{oil_t}	0.111***	0.130***	0.200***	0.126***
	(0.020)	(0.021)	(0.049)	(0.023)
$p_{oil_{t-1}}$	-	-	-0.012	0.023
			(0.069)	(0.020)
$p_{oil_{t-2}}$	-	-	-0.105**	0.028
			(0.048)	(0.023)
nd_t	-0.129**	0.252***	0.027	0.001
	(0.066)	(0.072)	(0.070)	(0.001)
ca_t	0.686***	-0.116	0.608***	0.029
	(0.132)	(0.149)	(0.119)	(0.158)
WD	0.264***	0.058**	0.236***	0.062***
	(0.026)	(0.025)	(0.025)	(0.024)
$EDCD$	-	-0.026*	-0.083***	-0.025
		(0.026)	(0.025)	(0.026)
$MA(1)$	-	1.257***	-	1.309***
		(0.076)		(0.077)
$MA(2)$	-	1.048***	-	1.211***
		(0.100)		(0.110)
R^2	0.849	0.969	0.875	0.972
SSR	0.614	0.126	0.557	0.125
$D-W$	0.265	1.729	0.326	1.936
F	190.552	513.154	148.176	455.652
N	141	141	156	156

Note: See, Table 1; = spot exchange rate ($/€) = price of oil, = ln national debt, = current account balance, = war dummy, = European debt crisis dummy, (*), (**), and (***) = significant at the 10%, 5%, and 1% level, standard errors in parentheses. All variables are in natural log. Source: Economagic.com. Data from 1999:01 to 2010:12.

The results of column 2 in Table 2 show that, as expected, national debt and price of oil have statistically significant positive effects on the spot rate causing dollar to depreciate. The Iraqi war (WD) has a significant negative effect on the value of the U.S. dollar (spot rate was increasing). The European debt crisis (EDCD) has a significant negative effect on euro and consequently lowers the spot rate and

causes the dollar to appreciate. Current account balance has a statistically insignificant effect. The details of exchange rate dynamics are discussed in [9].

Table 3. Cointegration tests of the multi-variables models

Eq. (13), Variables: $ca, TED, p_{oil}, p_{Gold}, s, i, y, g$

(Maximum lag in VAR=2)

Null	Alternative	Eigenvalue	Trace Test Statistics	Trace Test Critical Value 95%	Maximum Eigenvalue Test Statistics	Maximum Eigenvalue Test Critical Values 95%
$r=0$	$r>0$	0.574	257.790***	159.530	130.379***	52.363
$r\leq 1$	$r>1$	0.224	127.412**	125.615	38.864	46.231
$r\leq 2$	$r>2$	0.183	88.548	95.754	31.076	40.078
$r\leq 3$	$r>3$	0.127	57.539	69.819	20.720	33.877
$r\leq 4$	$r>4$	0.104	36.819	47.856	16.726	27.584
$r\leq 5$	$r>5$	0.075	20.093	29.797	11.986	21.132
$r\leq 6$	$r>6$	0.039	8.107	15.495	6.113	14.264
$r\leq 7$	$r>7$	0.013	1.994	3.841	1.994	3.841

Note: See Table 1; Trace test indicates 2 cointegrating equations at the 5% level. Maximum eigenvalue test indicates 1 cointegrating equation at the 5% level.

Eq. (14), Variables: $s, p_{oil}, nd, ca, WD, EDCD$

(Maximum lag in VAR=2)

Null	Alternative	Eigenvalue	Trace Test Statistics	Trace Test Critical Value 95%	Maximum Eigenvalue Test Statistics	Maximum Eigenvalue Test Critical Values 95%
$r=0$	$r>0$	0.202	102.765***	95.754	34.550	40.078
$r\leq 1$	$r>1$	0.183	68.214*	69.819	30.947	33.877
$r\leq 2$	$r>2$	0.108	37.267	47.856	17.487	27.584
$r\leq 3$	$r>3$	0.086	19.780	29.797	13.795	21.132
$r\leq 4$	$r>4$	0.033	5.985	15.495	5.180	14.265
$r\leq 5$	$r>5$	0.005	0.805	3.841	0.805	3.841

Note: See Table 2; Trace test indicates 1 cointegrating equation at the 5% level and 1 cointegrating equation at the 10% level. Maximum eigenvalue test indicates no cointegration at the 5% level. Source: See Table 1 and 2.

4. CONCLUDING REMARKS

The objective of this analysis is to determine the exchange rate dynamics based on shocks on the economy and on current account, due to oil prices, debts, and risk, between the U.S. dollar and the euro. Lately, the U.S. dollar was losing value with respect the euro and other major currencies of the world and we want to see if this depreciation depends on economic shocks and economic fundamentals or it is just speculation from individuals and countries, which hold large amounts of foreign assets denominated in different currencies or due to the current global financial crisis, recessions, instability, and the risk that the U.S. might freeze the foreign funds invested in its assets. The preliminary conclusion from this ex post analysis is, here,

that, international investors are investing in countries with higher return, lower risk, and safety. This increase in demand for these assets, increases the demand for currency in that country and its currency is appreciated,[5] the oil prices, the high risk and the enormous debts are affecting negatively the currency. Before 2001, people were invested in the U.S. and Japan, so the U.S. dollar and the Japanese yen were appreciated. After 2001, they invested in Euro-zone and the U.K. and the dollar and yen lost their value. Of course, due to high risk (wars and creeping ones, political conflicts, and a unique financial crisis) and low returns, many speculators have invested in euros and other currencies, instead in dollars denominated assets. Since November 2009, we have seen a change in this trend because of the Euro-zone debt problems. The current account is affected by risk and high debts, too.

Lastly, in this paper we have used the insights of an intertemporal model of consumption to analyze the recent behavior of the current account balance in the U.S. We have examined the roles of risk, price of gold, price of oil, TED spread, as well as interest rate, GDP and government spending. We have also analyzed the behavior of spot rate. In future papers we plan to use this framework to run a cross-country analysis of current account balance where we plan to include both the OECD and the developing countries.

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[5] *Here, the causality goes from* $i_{AAA} \uparrow \longrightarrow S \downarrow (\$ \uparrow)$ *and* ($\rho_{i,S} = -0.809$).

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The Effect of Change Management on Operational Excellence in Electrical and Electronics Industry: Evidence from Malaysia

1. INTRODUCTION

The rapidly changing landscape in the globalized market has put new demands on organizations. In order to stay ahead of competition, companies need to re-invent itself by injecting new ideas and strategies to achieve business excellence. Excellence can be achieved by meeting or exceeding the expectations of all stakeholders. Furthermore, pursuing excellence keeps companies on right track to achieve their goals and mission. More important, companies today face incredible pressure to continually improve the products quality while simultaneously reducing cost, remain flexible, to meet short lead time delivery, everlasting legal, environmental and social requirements. The ability to achieve these goals depends to a large extent on how the managing its resources against the ongoing changing environment [1].

Recent studies on operational excellence focused on industrial context such as security [2], oil and gas [3], and university [4]. On a contextualized perspective, the Electrical and Electronics Industry is crucial to be revealed particularly on the soft issues which have been neglected in many ways by the previous studies. This is in line with [5] stressed the failure of system implementation such as ERP is because of the lack of attention to the soft issues. Hence, the latest development on the management of change and operational excellence has evolved. The focus is on the enhancing of the customer value and ensures the sustainability (for example, [5,6]). [6] stated the departure from the status quo to a desirable state in accordance to the challenges and opportunities faced by

the companies. Furthermore, the alignment is necessary in the hard and soft factors with the company strategy.

To guide organizations on their journey towards excellence, investigations have largely focused on the identification of critical variables that might better explain how organizational change can be managed to the best effect [7,8]. Therefore, this study will provide an insight in understanding the contemporary influential systems that affect business excellence, particularly excellence in operations. The influential systems may serve as pre-conditions for any companies before embarking on the management of organizational change. The influential systems could be categorized either a 'soft' or a 'hard' [9]. [9] recognised the important of soft dimension in terms of skills, staff, style, system and shared values along with structure and strategy of hard dimension. Furthermore, [10] described hard system have precise objectives that can be expressed in mathematical terms while soft systems are used in relation to human activities where there is unlikely to be agreement about the precise objectives of the system.

In discussing the operational excellence, most of the researchers and practitioners like to relate it with manufacturers. The fact is, manufacturing operation is one of the prime strategic functions in any business. Manufacturing operation whether achieves its competitive position and strategic potential or not solely depends on how it runs its business [11]. Additionally, as manufacturing firms encounter global competition and the pressure to become global, there is a demand for firm's ability to manage its organizational resources with the desire to attain operational excellence at global level.

When review the development in the world business market such as the issues of globalization, fierce competition and technology advancements, [12] suggested that manufacturing organisations in Malaysia need to have an ability to adjust and change to survive the challenging business environment. Organizations need to have a new set of capabilities to ensure their survival and growth in the market. Managers in a firm need to build its own internal competencies to deal with organization issues, change and strategizing. Even through E&E manufacturing sector is an important contributor to Malaysia's economic with manufacturing output, exports and employment, however, Malaysian E&E industry faces significant challenges in maintaining growth with growing competition from Taiwan,

Singapore, China and other Asian countries. The E&E's share of Malaysia's exports has gradually declined from 59 percent in 2000 to 41 percent in 2009 [13]. Therefore, Malaysia E&E's organizations need to have a new set of capabilities to ensure their survival and growth in the market. Managers in a firm need to build their own internal competencies to deal with organization at issues, changes and strategies.

Operational management and performance have been an issue in both academia and industry for over three decades. The literature on operational excellence is growing, but Malaysian manufacturing industry is often lacking in these discussions. In Malaysia, studies of business or organizational performance were focus mainly in Small Medium Enterprises (SMEs) and little research solely in Electrical and Electronics (E&E) manufacturing. Among the studies in Malaysia manufacturing industry included Total Quality Management (TQM) practices [14,15] and best practices [11,16]. Therefore, present study attempts to understand further of Malaysia electrical and electronics firms managing change pertaining to operational excellence. In fact, the electrical & electronics (E&E) industry is the leading sector in Malaysia's manufacturing sector, contributing significantly to the country's manufacturing output (26.94%), exports (48.7%) and employment (32.5%) [17]. Due to that, the finding of this study is important and may contribute to the country economic.

2. LITERATURE REVIEW AND THEORITICAL FRAMEWORK

2.1 Resource-based View (RBV)

The RBV is the dominant theory being used in the empirical literature on organization's internal resources or capabilities and performance. The RBV theory emphasized the use of its internal resource and its developing capability within the firm as a source of competitive advantage. Numerous of its capabilities and resources on which competitive advantage are based, live entirely in its operational function [18]. The RBV deals with the competitive environment facing the organization but takes an '*inside-out*' approach. Its starting point is the organization's *internal* environment. Thus, its internal capabilities determine the strategic choice it makes in competing in its external environment. For

example, build up a high performance team for a company to remain competitive and long term success in both economic and social aspects.

On the operational excellence, RBV is found appropriate, presenting internal resources as a crucial element to gaining a sustained competitive advantage and superior performance that is the operational excellence [19,20]. The current study corresponds to the soft factors in E&E to the operational excellence. The core competencies explain the companies' competitive success based on their competencies [21].

The resource-based view (RBV) highlights the firm as a unique collection of resources [22, 23], but emphasizes that not all resources possess the potential to provide the firm with a sustained competitive advantage [24]. Previous literature on the RBV has frequently focused on resources as a stable concept that can be identified at a point in time and will endure over time [25]. RBV focus on strategic context, presenting resources and capabilities as essential to gaining a sustained competitive advantage and superior performance [20].

Furthermore, RBV points to intangible resources as the main drivers of the sustainability of performance differences across firms. In fact, such assets that are scarce, specialized and difficult to trade, imitate, or appropriate are viewed as intangible [19]. A variety of definitions have been offered when refer to these resources [26]. Therefore, the argument established in this study is focus on the managing firm's resources as determinants for operational excellence. The changes of the firm internal resource were identified through the operational excellence indicators.

2.2 Operational Excellence

According to [27], assessment of excellence is the process of evaluating an organization against a model for continuous improvement in order to highlight what has been achieved and what needs improving. European Foundation for Quality Management [28] defines excellence as "outstanding practice in managing the organization and achieving results". [29] argued that operational excellence is not just a matter of cost reduction and quality improvement, but also being smart about how to handle people and resources. It requires solid change management capability and strong leadership to become operational

excellence. Operational excellence is also very much dependent on employees' empowerment, ownership and a culture of continuous improvement. Its adoption and introduction usually confronts a company with the need to change the way its employees think and act. [30] conducted an investigation the use of business excellence in Asian organizations. Organizations in the manufacturing sector accounted for more than 40 percent of the total survey population. Even through organizations believe that deploy business excellence is important in helping them reach key objectives but the Asian region still suffers from some barriers including lack of development of a business excellence culture, a lack of resources and a failure to fully train the staff in business excellence. This study has examined the deployment of business excellence in five Asian countries (Japan, India, China, Thailand and Singapore) would be a gap undertake future study on other Asian counties which maybe at different stages of business excellence maturity. [31] analyzed the success rate factors of company in achieving the excellence of business subjects in the Slovak Republic. The results showed that success rate factors do not lie in monetary values but in the overall functioning of the company. In other words, in de facto non-economical factors which reflect the level of innovations, employee's satisfaction, customer's satisfaction and social responsibility. Therefore, identification of correct factors of success rate serves more and more for the needs of looking for correct decision of organization. In view of this, non-economical factors of success rate, also known as non- monetary factors are substantiated for the needs of a business company. On the other hand, [32] analyzed the meaning of sustainability and its relation to excellence in an era of management transformation, integration and evolution. They found that sustainability and excellence are two interrelated concepts. These two interrelated concepts have contributed in shifting the national, corporate and sometimes individual mentality to include the world and the society. The rapid enlargement and intensity of environmental and social consequences of the dominant global model push organizations towards an adoption of sustainability challenges and maintain their competitiveness through excellence. [33] identified important challenges to sustaining business excellence amongst award winning companies in Australia. The challenges included strategy, leadership support, people, process, data and information and customers. [33] also suggested future research could consider different stages in the process

of pursuing business excellence, for example, implementation, development, maturity and sustainability. In recent study, [34] examined factors that lead to sustained excellence whether they are "evergreen" or stayed the same over time. The eight factors included organizational design, process, strategy, technology, leadership, individuals and roles, culture, and external orientation. The finding shown that nearly 90 percent of the factors that create excellence found in studies done in and before 1995 are also found in studies done after 1995. Although the characteristics of factors may shift from time to time, however, those factor found to seem qualify as "evergreen of excellence" that are always crucial for creating and maintaining a high performance organization. In this respect, the research into factors that create excellence, as found in the earlier or recent literature, are constant over time.

In this study, results from application of operational excellence are focused operational performance and organizational sustainable performance. Operational performance reflects the performance of internal operations of a company in terms of quality improvements, flexibility improvement, delivery improvement, productivity improvement, cost and waste reduction. The organizational sustainable performance indicator measures in present study are environment performance and social performance, while the financial measures such as sales growth, profit growth, return on equity (ROE), return on assets (ROA) and gearing [35] will be ignored. In fact, many E&E manufacturing firms in Malaysia are owned by foreign investors and may listed in the their home country, thus the respondents may not be privy to the information and data related to financial performance. Although performance can be measured either as financial performance or as operational performance, operational priorities are more relevant than financial goals at the plant level [36]. It is therefore the discussed performance indicators (quality, time, flexibility, cost and sustainability) will be used to measure firm performance in achieving operational excellence. More specific, the dependent variable, operational excellence will be operationalized by quality, flexibility, speed, cost, social and environmental in present study. Moreover, managing people, technology, leadership, strategy, structure, culture and employees' involvement to change are important variables affect the operational excellence.

2.3 Evolution of Excellence

During the last 30 years, both definition and sustainability of excellence evaluations have undergone repeated changes. [37] have synthesized 'excellence' into five main stages and defining each excellence stage in details in literature. The synthetic conclusion of excellence is shown in Fig. 1.

Stage	Synthesized	Time	Explanations
Excellence 1.0	"Soft is important"	The early 1980s	Peters and Waterman (1982) reminded the world of professional managers that 'hard is soft'. In order to obtain hard results organizations need to take into account the soft side of the firm. Hard factors: system; structure; strategy; Soft factors: shared values; skills; style; staff.
Excellence 2.0	"Change"	1987	*Thriving on Chaos* (Peters, 1987). A new type of excellence is required: "Excellence firm don't believe in excellence – only in constant improvement and constant change".
Excellence 3.0	"Learning"	1990	*The Fifth Discipline* of Peter Senge (1990). Senge's analysis is at the base of a renewed interest for the concept of "learning organization".
Excellence 4.0	"Excellence models"	1990s	Increasing interest in "Excellence model" can be seen during the 1990s. Firms use these models to guide their efforts towards becoming "excellent" organizations.
Excellence 5.0	"Integrated development"	2000s	Difference schools of thought (e.g. social-technical, social-economic school) try to merge different approaches in order to better respond to management and organizational challenges, or the changing management paradigm.

Fig. 1. Synthetic Conclusion of Excellence

Source: Adapted from Hermal and Pujol (2003)

[37] further explain that the series of excellence stages proposed are only tentative and could certainly be disposed in many different ways. They just hope that the different points addressed are at the base of production debate. In authors view, operational excellence via best practices in business organizations seems to be a natural evolution going forward. As present, the term of *operational excellence* is widely used approaches to measure the business excellence either by the corporations themselves, management consultants, academicians, government authorities, etc. Furthermore, the very definition of "operational excellence" has been continuously modified to accommodate for the context of rapid changes in the global business environment.

2.4 Change Management

Due to the fact that the future and success of every organization depends on how well manager handle change [38], therefore, discussion on this research is assessing the relationship between change management and operational excellence. In addition, the integration of soft systems to predict operational excellence may not have a profound understanding by both academic and practitioners. This paper focuses on the soft systems in the E&E industry.

In the past organizational changes processes, many organizational only focus their efforts on hard factors. However, [9] argued that most successful companies work hard at the soft factors. Indeed, the soft factors can make or break a successful change process simply because we cannot impose hard systems on the organization without considering the effect on people [10]. With this approach, the researcher attempt to integrate the 'soft' elements under the Management of Change (MOC). Based on literature review, three soft elements were identified in this study were included leadership style, human resource and organizational culture.

2.4.1 Leadership style

Leadership is the other key component of successful change. Leadership is the first criterion of the European Foundation for Quality Management (EFQM) Excellence Model, a

model of organizational excellence which is used by more than 30,000 organizations across Europe [39]. While change management depends on leadership to be enacted, specifically, the leadership style that is primarily concern with the capabilities required enacts change successfully [40,41]. Recent study by [42] further addressed the importance of success in enacting change is a crucial issue faced by today's organizational leaders of today. Indeed, most of the research on the leadership paradigms has focussed on its relationship to followers [43,44]; the success of TQM programs [45]; organizational outcomes such team performance [46,47] and financial performance [41]. Based on researchers' knowledge, there were limited literatures done on leadership styles and its impact on operational excellence in manufacturing industry, especially in the Malaysian setting.

Leadership has been recognized as a major factor on organization success and this has been empirically validated throughout many fields. However, a leadership style in the context of change management and its impact on operational excellence in manufacturing industry has not been as widely research. Moreover, a transformational style of leadership is perceived can produce positive organizational change and create exceptional performance than transactional and laissez-faire leadership [40,48,49]. In the present study, we are interested in examining the positive impact of transformational leadership style on operational excellence. Hence, the researchers offer the following statement of hypotheses:

H_1: The inclination towards the transformational leadership style leads to achieving operational excellence.

2.4.2 Human resource

Any change program would revolve around people, changing their mind set, behaviour and motivational level. Human resource has always been central to organizations, to-day it has taken on an even more central role in building a firm's competitive advantage. Success increasingly depends on "people-embodied know-how". Thus, includes the knowledge, skills, and abilities imbedded in an organization's member. [38] argued that Human Resource is an intellectual asset, the sum total of the knowledge, skills and competencies that an

organization processes and channelizes for sustained organizational excellence. Excellence is surpassing on outstanding achievement, achievable by the use of Human resource strategies and practices as tool. [50] suggested the future role of the Human resource function should focus on helping their organization to learn how to build a capability to change. In authors view, the human resource practices are Human resource tools use by organization to achieve excellence. It helps to develop human capabilities and organizational competencies to achieve success. However, very little attention has been paid to address the impact of managing human resource change on operational excellence. The universal use of Human resource practices such as recruitment and selection, training and development, performance appraisal and compensation and benefits [38,51,52,53] could be explored in present study to predict operational excellence. New knowledge generate from this study could inform theory building efforts in the Human resource field, particularly as it related to human resource- based view to meaningful organization outcomes and in due course excellence. Therefore, we hypothesize that human resource practices lead to positive impact to operational excellence.

H_2: Effectiveness of human resource practices leads to an impact on achievement of operational excellence.

2.4.3 Organizational culture

Operational excellence is an enterprise culture that improves the way a corporation delivers products and services to its customers. Operational excellence calls for more than subject matter expertise and a talented internal team. It requires a deep commitment and a culture of change. Changing to a culture of continuous improvement usually requires a paradigm shift. This change requires taking risks, opening up the firm culture and a great capacity to learn [54]. [55] suggested that a link between corporate culture traits such as consistency, mission, involvement, and adaptability and business performance exits. These four different aspects of culture can be stressed by different functions. Its *consistency* and *mission* either tend or to encourage or promote stability. However, the *involvement* and

adaptability allow for change. Furthermore, consistency and involvement see culture as focusing viewpoint on internal dynamic of the organization. It mission and adaptability see culture as a way of life in addressing the relation between the organization and its external environment.

The present study embraces on managing change and focus on internal organization, therefore, the *involvement trait* (Internal Focus) is the best dimension to evaluate its effecting desired change within organization [55,56]. This trait is measured by the three indices namely empowerment, team orientation and capability development. In addition, [57] found empirical support for the involvement view of culture, higher levels of employee participation were correlated with better organizational performance. Whilst organizational culture has been researched worldwide, little research has been done in Malaysia, with its unique culture and concentred business environment. This leads to the following hypothesis: H_3: Higher levels of individual involvement cultural trait leads to an impact on operational excellence.

Overall, literatures indicate that firm managing change is vital in ensuring competitive advantage to the firms [58]. In essence, effective approaches in organizational change will involve not only one system but also have to understand other relevant systems of entire organization. Moreover, change management and these soft systems have not being integrated in any research which develop new knowledge in the study of operational excellence. Integrating change management maturity with associated soft systems in order to remain competitive, is absent in most Operational Excellence initiatives.

2.5 Hypotheses and the Research Model

Based on the previous literature, three hypotheses were proposed. The relationship among the various factors discussed in this literature is depicted in a framework as shown by Fig. 2 below. Based on the literatured syntheses, the authors develops a linkage that the change management systems are likely to have impact on operational excellence of the organization only in situations where change management practices are implemented.

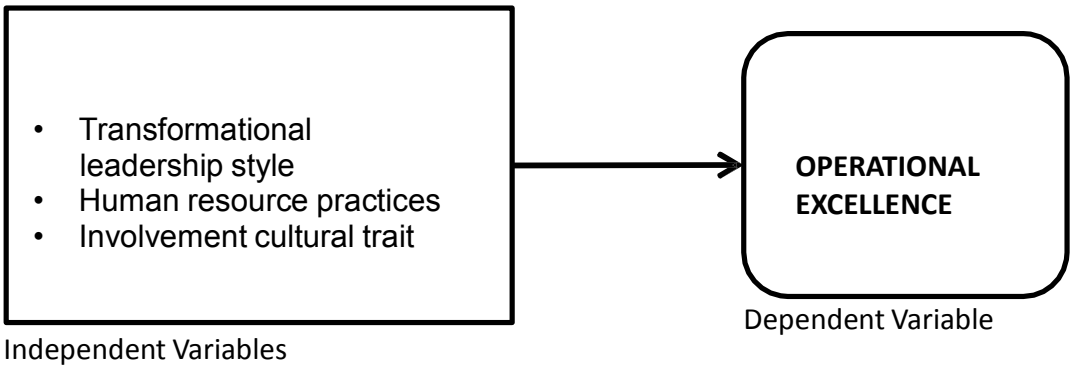


Fig. 2. Theoretical framework

3. RESEARCH METHODOLOGY

3.1 Population and Sample Size

The nature of the problem in this study determines that it leans more towards a causal. The main goal of causal research is to identify cause-and-effect relationship among variable [59]. The literature review was carried-out in sufficient details to provide the understanding on the change management and operational excellence. The researchers also investigated how the previous studies done in order to study the relationship of both change management and operational excellence. Therefore, the researchers believed that it is appropriate to consider the manager who involved in the manufacturing operations to give inputs on the subject matter. In this context, samples of the population are drawn from the FMM-MATRADE Industry Directory Electrical and Electronics Malaysia 2007/08 [60] and Federation of Malaysian Manufacturers (FMM) Industry Directory 2012 of Malaysian Manufacturers [61]. The sampling frame of this study is the manufacturing companies from electrical and electronics industry situated in Malaysia. By using systematic random sampling method, 321 firms were identified from population of 1952 firms. All questionnaires were distributed to the respondents using postal mail. The unit of analysis for this study was organizational where one respondent represent one organization. Between February 2013 and June 2013, a total of 121 usable questionnaires were obtained which yielding a response rate of 37.7 percent. Therefore, the response rate was normal and acceptable as compared with past studies in Malaysia.

3.2 Instrument Development and Measurement

The survey questionnaire was developed based on early studies [35,55,57,62, 63,64,65,66]. The Table 1 summarizes the reliability test of the measures. The results showed that all the Cronbach's Alphas measures were above the lower limit of acceptance (a >.70). Therefore, all the measures were highly reliable [67].

Table 1. Summary of variable measurement

Variables Names	Cronbach's Alpha	N of Items	Authors
Operational excellence	.942	23 31*	Laugen et al. (2005); Hubbard (2009); Kuruppuarachchi & Perera (2010).
Transformational leadership style	.915	12	Bass & Avolio (1992).
Human resource practices	.843	12	Snell & Dean (1992)
Involvement cultural trait	.772	9	Denison et al. (2003); You, et al. (2010).

In a Likert scale, each respondent will be asked to indicate the extent of each statement on a five-point. The options given in the questionnaires for Section A are "strongly disagree (1)"; "disagree (2)"; "Neutral (3)"; "agree (4)" and finally "strongly agree (5)". For Section B, respondents are requested to rank their answers to 5-points Likert-type interval scale, ranging from 1 for "worst in industry (1)"; 2 for "bad in industry"; 3 for "average in industry"; 4 for "good in industry" and 5 for "best in industry". Thus, researchers were able to solicit answers about the given statement through a set of response keys.

3.3 Respondent's Profile

3.3.1 Profile of the respondent companies

The E&E industry is further breakdown to four sub-sectors which included (1) consumer electronics (2) electronic components (3) industry electronics and (4) electrical products [16]. As presented in Table 2, the majority of the manufacturing firms that

responded to the survey were under the electronic component sector which comprised 43.8 percent of the number of respondents, followed by those in industrial electronics (24.8%), consumer electronics (15.7%) and electrical products (15.7%).

Table 2. Respondents by sub-sector

Sub-sector	Frequency	Percent	Valid Percent	Cumulative Percent
Electronic components	53	43.8	43.8	43.8
Industrial electronics	30	24.8	24.8	68.6
Consumer electronics	19	15.7	15.7	84.3
Electrical products	19	15.7	15.7	100.0
Total	**121**	**100.0**	**100.0**	

3.3.2 Profile of the respondents

For ease of understanding is a tabulation of the profiles of the respondents as per Table 3. In terms of gender, the majority of the respondents were male which comprised of 71.9 percent as compared to their counterparts at 28.1 percent. Generally, 45.5 percent of the respondents are from the age between 36 and 45 followed by age above 46 (34.7%), then age between 18 and 35 with a response if 19.8 percent. This showed that majority of the questionnaire were answered by the middle and senior management from manufacturing companies. Most of the respondents (33.1%) have less than 5 year's tenure employment to their current companies. In contrast, 31.4 percent of the respondents have more than 16 years attaching to their current companies. The remaining respondents were between 6 to 10 years are 21.5 percent and between 11 to 15 years are 4.0 percent respectively. Almost half of the questionnaires are answered by the managers (44.6%). Other respondents, which represent 19.0 percent of senior executive or senior engineer, 5.8 percent of section head and assistant manager respectively, 14.0 percent of senior manager, 6.6 percent of directors, 4.1 percent of director and of professional. The professional group includes Consultants and Advisors. The results imply that majority of the E&E manufacturing companies have followed the requirements as stated in the cover letter which attached with the questionnaire.

Table 3. Profile of the respondents

Characteristics	Frequency (n = 121)		Percent (Total 100%)
	Gender: Male	87	71.9
	Female	34	28.1
Age:	Between 18 to 35 years	24	19.8
	Between 36 to 45 years	55	45.5
	Above 46 years	42	34.7
Number of years working in this company:	Less than 5 years	40	33.1
	Between 6 to 10 years	26	21.5
	Between 11 to 15 years	17	14.0
	More than 16 years	38	31.4
Position held:	Senior Executive I Senior Engineer	23	19.0
	Section head	7	5.8
	Assistant Manager	7	5.8
	Manager	54	44.6
	Senior manager	17	14.0
	Director	8	6.6
	Professional	5	4.1

3.4 Factor Analysis

The factor analysis was based on principal component analysis (PCA) with Varimax rotation for all components. In determining the factorability of the dimensions, the Bartlett's test of Sphericity had to be significant and the Kaiser-Meyer-Olkin (KMO) Measure of sampling adequacy had to be more than 0.50 in order to be acceptable [67]. The following Table 4 shows the results of all variables. The Kaiser-Meyer-Olkin (KMO) measures of sampling adequacy from 0.692 to 0.906 which all above 0.5 acceptable level [68]. All results indicate that factor analysis can be conducted on the data [62,69]. Moreover, there is a sufficient correlation among the analyzed items when Bartleet's test was significant (Sig.0.000).

Table 4. KMO and Bartlett's test

		OPX	TLS	HRP	ICT
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.881	.906	.797	.692
Bartletts's Test of Sphericity	Approx. Chi-Square	1590.599	757.645	555.269	410.166
	Df	190	66	66	36
	Sig.	.000	.000	.000	.000

OPX=Operational excellence; TLS= Transformational leadership style; HRP= Human resource practices; ICT=Involvement cultural trait

3.5 Data Analysis

The data analysis tools such as Statistical Package for Social Science (SPSS) software will be used to process the data obtained from this survey. Responses on all parts of the questionnaire will be analyzed using frequency, means, standard deviations, reliability, and inter correlations to calculate different characteristics of the data. Factor and reliability analyses to test the goodness of measures, descriptive statistics to describe the characteristic of respondents and correlation analysis to describe the inter correlation among the variables. Moreover, multiple regression analysis was used to achieve the objective with testing the hypothesis.

4. RESULTS AND DISCUSSION

4.1 Descriptive Analysis

The means and standard deviations of each variable were shown in Table 5. The results of Pearson's correlation test for independent variables and dependent variable was shown in Table 6. This result revealed that all the independent variables and dependent variable were positive and significant at a level of 99 percent. The strength of relationship varies from lowest at 0.561 and to the highest at 0.639. These findings support the notion that change management systems as predictor variables had a positive correlation and linear with operational excellence. On the other hand, the correlation was also further evidence of validity and reliability of the measurement scales used in this study.

Table 5. Means and standard deviations

	N	Mean	Std. Deviation
Transformational leadership style	121	3.6515	.56765
Human resource practices	121	3.7576	.48233
Involvement cultural trait	121	3.7530	.41857
Operational excellence	121	3.7373	.48899

Table 6. Pearson's correlation test for independent variables and dependent variable

	Transformational leadership style	Human resource practices	Involvement cultural trait	Operational excellence
Transformational leadership style	1			
Human resource practices	.586**	1		
Involvement cultural trait	.561**	.586**	1	
Operational excellence	.616**	.639**	.563**	1

*** Correlation is significant at the 0.01 level (2-tailed)*
** Correlation is significant at the 0.05 level (2-tailed)*

4.2 Testing of Hypotheses

In order to measure the combined effect of all the soft systems in the change management towards operational excellence, the analysis of multiple regressions was performed on the variables in question. Refer to Table 7, results from the analysis of multiple regression show that among soft systems of change management which were proposed to have a significant relationship with operational excellence, all of them namely transformational leadership, human resource practices and involvement cultural trait were significantly supported.

Table 7. Results of multiple regression analysis of change management and operational excellence

Variable	Coefficient			*Model Summary*
	B	T	Sig.	
Transformational leadership style	.296	4.160	.000*	R square: .505
Human resource practices	.323	3.832	.000*	Adjusted R square: .493
Involvement cultural trait	.211	2.101	.038*	F: 39.839, P < .000 df1: 3, df2: 117
				Durbin-Watson: 1.996

*** Correlation is significant at the 0.01 level (2-tailed)*
** Correlation is significant at the 0.05 level (2-tailed)*

All the soft systems were found to have positive and significant ($p < 0.05$) relationship toward operational excellence. This statistical result suggested that a human resource practices, with Beta value of .323 has the strongest effect (most important) on operational excellence in this study, follow by transformational leadership style (important), with Beta value of .296. Organizational culture has least important, with Beta value of .211 to produce sufficient support of significance in its relationship towards operational excellence.

In *Model Summary* at Table 7, the adjusted R Square (.505), which is explained the change management (composite independent variables) accounted 50.5 percent of the variance (R squared) in operational excellence (dependent variable). According to [70], R Square between the range of 1.0 to 5.9 percent is consider as small size, follow by the moderate range between 5.9 to 13.8 and range which is above 13.8 percent is consider large. In the result of multiple regression analysis, the R Square, .505 means 50.5 percent consider large effect. Therefore, the results explain that is 50.5 percent of the variance (R Square) in operational excellence has been significantly explained by the three independent variables under change management.

4.3 Discussions

This paper is focused on linking between the change management to operational excellence within E&E companies of Malaysia. Furthermore, the paper organises the burgeoning change management literature soft systems, which are transformational leadership, human resource and organizational culture. The purpose of this study is to give an increased understanding of the operational excellence in Malaysian manufacturing industry and its implication on activities concerning organisation and managing change.

The respondents were top managers and those identified as responsible in running the companies which closely linked to manufacturing operations including General Manager, Operation Manager, Factory Manager, Production Manager, Engineering Manager, Manufacturing Manager, Planning Manager, Materials Manager, Lean Manager and Project Manager (involve in Change Management or Continuous Improvement programs). So this

study cannot be used to represent the operational of others industry because the effect of change management to operational excellence could be different.

Responding to the hypotheses, this study found all three soft systems of change management have effect on the achievement of the company's operational excellence. In respond to the findings, *transformational leadership style*, *human resource practices* and *involvement cultural trait* were found to have an effect on the achievement of operational excellence for Malaysian E&E manufacturing companies. The hypotheses were positive and significant and thereby confirmed.

This study has provided evidence that transformational leadership style have a significant positive effect on operational excellence. The hypothesis, H_1 accepted is not surprising because strong theoretical and practical support transformational leadership is enacting change successful. Present study also concur with the findings of past study by [48,49] who claimed that the transformational leadership style can produce positive organizational change and create exceptional performance. Furthermore, transformational leadership is directly correlation to long-term high performance [71], therefore, towards business sustainability.

This study adds another perspective into the earlier findings conducted in Malaysia, [41] found that the transformational type of leaders will give impact to company performance if best practices management takes place. Under these argument, transformational leader who promote the adoption of best practices leads to superior performance. This finding is consistent with the results from prior studies [11,16,62,72] on companies that adopted best practices showed better operation performance. In this study, the effect of transformational leadership style on achieving operational excellence is supported. In other word, lower and middle management of Malaysian E&E manufacturing companies perceived their top management use transformational leadership style in pursuing excellence.

The statistical result also revealed that the human resource practices have effect on operational excellence of Malaysia E&E manufacturing companies in this study. Therefore, the hypothesis, H_2 is fully supported. This finding is consistent with earlier studies by [38] who argue human resource is an intellectual asset that channelizes for sustained organizational excellence and has a positive effect on the firm's performance [73]. This study

also support past studies that the human resource practices included recruitment and selection, training and development, performance appraisal and compensation and benefits, are human resource tools use by organization to achieve excellence [38,51,52,53].

The aforementioned results have also provided the required empirical support that influence of human resource practices indicating positive and significant relationship on organizational performance in the area of research for the past 25 years [74]. The finding of present study provides empirical evidence again on the role of human resource practices on the achievement of operational excellence. Obviously, the human resource has taken into account as a crucial factor in E&E organizations to develop internal capabilities for better fit with changing environment.

The result indicates that the involvement cultural trait, H_3 does significantly have impact in achieving operational excellence. The involvement cultural trait comprises of empowerment, team orientation and capability development did played a major role in the effectiveness of operational excellence in E&E firms. This finding appears to be consistent with previous study that argued involvement as the most important dimension of culture for firms whose focus was employee satisfaction and overall performance [75]. Past studies by [76] stated that organizational culture is a key foundation for the high-performance work practices and employee involvement such as teamwork, capability development and empowerment positively influence outcomes measures. For example, high performing firms motivate their employees to achieve superior results by making decisions at the lower level. In addition, high performing firms have organizational structure based on teams, therefore they encourage teamwork. Moreover, these firms continually invest in improving their employees' skills. Hence, the high levels of employee involvement in the company's activities did play an important and integrated role in achieving operational performance outcomes.

The success of organization lies on how well the employees are empowered to take decisions through building their capabilities and harnessing their skills. Indeed, an organization with a high level of employee involvement will develop the employees' capability at all levels and create a sense of ownership, responsibility and loyalty toward their organization. Another plausible reason of significant relationship between involvement cultural trait and operational excellence was in the way the culture trait was measured. Past

research showed that internally focus traits involvement is generally better predictors of operating performance measures such as quality, flexibility, employee satisfaction [57,77] and change [56]. The finding of present study pointed to high involvement of employees as relatively important influential culture traits in determining operational excellence in the context of the Malaysia E&E industry.

Furthermore, present study supports resource-based view (RBV) theories. The RBV on inimitable recourses and dynamic capabilities suggest that organizational should have their own competence according to knowledge resources. These competencies must be rare and unique. Moreover, researchers also found many of resources and capabilities on which competitive advantage is based reside in the operations function [18]. Firstly, RBV may assist operations reach up to the leadership of excellence. Secondly, RBV helps to providing clear rules to develop and train human resource and retain talents in a systematic manner. Thirdly, the involvement cultural trait that is originated from organizational culture is unique and hard to imitate by any rival firms. Thus, the argument established in this study was transformational leadership style, human resource practices and involvement cultural trait.

5. CONCLUSION, LIMITATIONS AND FUTURE RESEARCH

5.1 Summary of Finding

This study is on the relationship among the change management and operational excellence. The multiple regression results revealed that the transformational leadership style, human resource practices and involvement cultural trait statistically significantly and positive relation with the achievement of operational excellence. Approaches to theory uses, this study utilize resource-based view.

5.2 Limitation and Directions for Future Research

The conclusions drawn from present study should be interpreted in a limited way, which would potentially represent opportunities for further exploration in future research.

First, this study is a cross sectional study, as it is carried out once and represents the issue at a specific time. Therefore, future study may look into a longitudinal study in order to expand the findings that are pre-changes and post-changes. Second, this study used the Electrical and Electronics (E&E) manufacturing firms that have high foreign ownership but also many restrictions in responding to the study. It is suggested that using Malaysian local owned firms like small-medium enterprise (SME) or small-medium industry (SMI) may add more insight. In addition, future study in service industry will add richness to the area of interest. Third, this study had proven the important of few change management systems in affecting the achievement of operational excellence. In contrast, further studies could focus on others systems or dimensions which have been excluded in this study. Fourth, future study can also investigate the change management due to external environment. Perhaps it will be able to provide a new insight on how firm react to external force and also improve the operational performance.

5.3 Implication and Conclusion

An evident in the data analysis findings above, this study has provided several contributions to practice, methodology and theory. The practical implications for E&E manufacturing organization is success in change initiatives depends on proper integration of transformational leadership style, human resource practices and involvement cultural trait. Hence, management is advised to establish policy, systems and process that integrate three soft systems in their planning and strategic direction. On the other hand, the finding is hoped to provide the managers with the insight in order to assist them to identify the appropriate operational excellence model based on organizational needs. As for methodology contribution, this study was add-on sustainability performance metrics (non-economic measure) on top of the conventional performance metrics (economic measure) in a composite performance index by averaging scores across the six performance indicators. Since sustainability is very important aspects of today business environment [35,78], therefore, this methodology can be validated in future research to measure operational excellence or business excellence. The new measurement method in this study could fill up

the perceived performance gaps by merging both economic and non-economic measures. From the theoretical perspective, it is discovered the originality in terms of the model to reflects a growing interest in extending operational management paradigms to emerging in developing country context, particularly on the knowledge on the insight of change management and operational excellence. In contrast to most previous studies identified each of system separately, this paper will be among the first few studies that examine the soft systems of change management to predict operational excellence. The integration of soft systems in this study has developed new knowledge that could assist theory building efforts particularly in the operation management field and organizational change management. The researcher might use the findings for further research.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Agritourism for Rural Development in Italy, Evolution, Situation and Perspectives

1. INTRODUCTION

Italy is the only country within the European Union with specific laws regulating agritourism, which is considered an agricultural activity. This paper has been written to share the Italian experiences and to illustrate what has been made and still needs to be improved, for the benefit of the farmers and of the whole society, in Italy and in other countries.

The Italian tourism industry employs, directly and indirectly, about 2.5 million people and provides about 4 per cent of the Gross Domestic Product [1]. When all linked activities are computed, its relevance rises to 9.4 percent of GDP; in 2010, foreign tourists have brought to Italy about 29 billion euros. These figures position the whole Italian tourism industry at the fifth place, after France, USA, China and Spain, but there are wide margins for improvement [1]. Within the tourism industry, in the last 30 years the phenomenon of agritourism has represented the revival of ancient traditions, coupled with integrated rural development. Within the more general definition of multifunctionality [2,3], agritourism represents one of the major sources of income for farmers. It has also allowed to diversify the tourist offer and to attract visitors out of the most famous mainly urban destinations. Wine and food tourism is enormously important [4] (Osservatorio Nazionale sul Turismo, Rapporto sul turismo 2011, unpublished document, Rome) and has represented in both 2010 and 2011 about 5% of total tourist flow, with a higher relevance for Foreigners (6.9% in 2011) than for Italians (4.2%), but only 11.7% overnight in a farm.

The history [5] of on farm hospitality goes back through the centuries, when travellers and pilgrims had to ask for food and shelter along the routes, whenever a monastery, a guesthouse or a trading post were not available. More recently, in XIX century, the German cultural and philosophical movement called "Romanticism" invited its followers to leave the towns and discover again the nature; walking through fields and

woods, as well as climbing on mountains and sunbathing near the seaside became fashionable for the cultural elites. This demand for nature motivated rich entrepreneurs to build luxurious hotels in the Swiss, Austrian and Italian Alps or along the coast in the French Riviera, many of which are still in operation, but it also favoured some clever farmers and landlords, who begun to diversify their activities, by opening guesthouses and small restaurants to accommodate both less demanding guests and very rich clients, searching for a touch of "rural life".

It is however only in the last 30 years, with the very recent explosion of mass tourism, that agritourism (not to be confused with tourism in rural areas) has become a mass phenomenon, involving thousands of farms and moving millions of tourists. Foreign and Italian tourists may now enjoy a day of cultural visits to the abundant cultural heritage and the next day can move to a nearby rural area for a food and wine tasting, or can spend a full week on a farm, relaxing near the swimming pool or engaging into some outdoor sporting activity. Agritourism has exploded everywhere in the world [6] and it represents a viable source of employment and income for smallholders and estate owners in many countries, in all continents.

2. METHODOLOGY

This paper is based on a literature survey and own experiences by the Author. The desk work has been performed during the months July – December 2012, by consulting published articles [1,2,3,13,15,17,18,19,20,21] and books [4,5,6,7,9,10,11, 12,14,16] as well as unpublished documents (fully referred to in the text, as the guidelines for this Journal impose), produced by associations, institutions, and interest groups. Taking into account that the international literature about agritourism is nowadays enormous, only the most relevant papers are mentioned in this paper. Data about tourism and agro-tourism in Italy have mainly been found in the ISTAT website (*www.istat.it*) the Italian national bureau for statistics, while some unofficial data have been provided by Agriturist, a farmers' association, and made public by INEA [8], the National Institute for Agricultural Economics (*www.inea.it*).

3. RESULTS AND DISCUSSION

Italy has always been a major tourist destination [5]: centuries ago, it was the pilgrims who came from the whole Christianity to worship in Rome and to pay homage

to famous Saints scattered all over the country. Then it was the desire to see the ruins and the legacy of the Roman Empire and the masterpieces of the Renaissance, which motivated nobles and artists to visit Italy for the so called "grand tour".

After the II World War and during the economic boom that characterized the 50's and 60's, the natural beauties of the Mediterranean coast and of the Alps were discovered by millions of foreigners, mainly European. Italians too, thanks to their increased income, started to enjoy their holidays and begun discovering the beauties of their own country. In recent years, although the rivalry with traditional competitors (France, Spain, and Greece, just to mention a few) remains strong and competition with newcomers (Turkey, Egypt, Morocco, Emirates, etc.) is fierce, the flow of tourists has remained quite strong. One of the challenges of the tourism industry has been to attract tourists out of the usual routes, main towns and destinations (Naples, Rome, Florence, Pisa, Rimini, Venice, the Alps, etc...), to discover the nature, the cultural heritage and the foods of the whole country.

An increasing number of tourists, not only in Italy [7], is searching new experiences and expresses the desire to reconnect with the cultural roots of foods, in the places where the ingredients are originated and where gastronomy was born. Within this framework, agritourism has played and will play a major role, because the farms are perceived by the urban consumers as the best places for leisure, and at the same time the farmers need to diversify their sources of income.

The number of farms offering some sorts of hospitality (Table 1) has increased from 8,905 in 1998, when this type of data were first collected, to 19,973 in 2010, equal to an average annual growth of +7.96%, thanks to the investments by the farmers themselves, partially supported by capital grants provided by various Funds of the European Union. The number of beds has annually increased even more, by 9.86%, from 68,754 in 1998 to 193,480 in 2009 (data for 2010 and 2011 not available). The average availability in 2009 is consequently 10.1 beds per operator, versus the initial number of 7.7 beds per farm in 1998. A similar expansion can be observed for the estimated turn-over, defined as the gross value of goods and services sold to clients.

Table 1. Evolution of agritourism in Italy

Year	Farms no.	Beds no.	Turn over*
1998	8,905	68,754	
1999	8,758	100,000	400
2000	9,314	110,000	500
2001	10,662	111,000	620
2002	11,487	118,000	710
2003	12,603	129,000	780
2004	14,719	152,700	797
2005	15,327		
2006	16,765	167,087	880 2007
	17,720		1.000
2008	18,480	189,013	1.100
2009	19,019	193,480	1.000
2010	19,973		1.025
2011			1.230 *In

10^6 current euro; missing data not made available by the source.
Source: [8]

The 19,019 agritourism farms registered in 2009 were unequally scattered all over Italy (Table 2), with peak concentrations in a few regions like Tuscany and Trentino - South Tirol, where respectively 21.3% and 16.8% of the Italian agritourism farms were located. In the same Table it is possible to notice that in these two Regions the relevance of agritourism is extremely high: in Trentino - South Tirol, on the Alps at the North-eastern border with Austria, 11% of the active farms are engaged in agritourism activities, and in Tuscany 10% of the active farms are involved in this sector, against an Italian average of 2.4%.

It is clear that also in this case, like for all other kinds of innovations, there are early adopters as well as laggards [9] and that in many parts of the Italian Peninsula and of the Islands still there are potentialities to be explored. In Sicily and Puglia, for example, only 0.6% and 0.3% of farmers are involved in agritourism, while both regions offer incredible landscapes, beaches, cultural heritage sites and an extremely rich gastronomy. Low cost flight operators have discovered these destinations and masses of tourists are pouring into these two regions, from Northern European countries, but farmers still have to mobilize themselves to intercept at least a small part of this flow.

3.1 Institutional Involvement and Development

When the first modern agritourism activities started in the early '60s, several problems appeared, because of the lack of formal regulations and the consequent

struggles with the local branches of the Ministry of Interiors, responsible for the recording the movement of tourists, the Ministry of Finances, responsible for the tax system, and with the Health Ministry, responsible for the health of customers. Even the Chambers of Agriculture and the Municipalities, responsible for issuing the authorizations to operate, did not know how to act. In several occasions, the first pioneers have been fined and even obliged to close their activities, or they were given the option the set up a totally different firm, regulated, registered and taxed as a normal restaurant and hotel. For most small operators, with a few rooms and a seasonal business, this was unrealistic.

Table 2. Operating farms and agritourism farms in 2009

Regions from north to south	All farms	Agritourism farms			
	no.	no.	%	% of all	Index*
Piemonte	59,884	963	5.1	1.6	68.2 Valle
d'Aosta	1,761	53	0.3	3.0	127.7
Lombardia	49,911	1,246	6.6	2.5	105.9
Liguria	11,563	441	2.3	3.8	161.8
Trentino-South Tirol	28,987	3,192	16.8	11.0	467.1
Veneto	73,831	1,261	6.6	1.7	72.5 Friuli-
VG	16,715	524	2.8	3.1	133.0
Emilia-Romagna	64,881	896	4.7	1.4	58.6
Toscana	40,401	4,046	21.3	10.0	424.8
Umbria	17,624	1,020	5.4	5.8	245.5
Marche	31,049	771	4.1	2.5	105.3
Lazio	45,100	704	3.7	1.6	66.2
Abruzzo	29,874	663	3.5	2.2	94.1
Molise	10,828	89	0.5	0.8	34.9
Campania	68,510	849	4.5	1.2	52.6
Puglia	84,434	282	1.5	0.3	14.2
Basilicata	18,830	224	1.2	1.2	50.5
Calabria	30,556	482	2.5	1.6	66.9
Sicilia	87,868	538	2.8	0.6	26.0
Sardegna	34,202	775	4.1	2.3	96.1 Italia
	806,809	19,019	100.0	2.4	100.0

**Index number, calculated with Italy = 100 as base.*
Source: Chambers of Agriculture for All Farms; [8] for agritourism farms.

Already in 1965 a first association had been established: *AGRITURIST (www.agriturist.it)*, by a small number of members of the large farmers' union, mainly based in Tuscany, to lobby at local and national level. A few years later, in 1973, the largest family farmers' union, Coldiretti, established its own movement, named *Terranostra* (*www.terranostra.it*) (Our land). In 1978, a first training course was organized, by *AGRITURIST* in cooperation with the national Ministry of Agriculture, to inform a group of local officers and potential operators. *Turismo Verde*

(*www.turismoverde.it*) (Green Tourism) was set up in 1980 by another union of small farmers. To coordinate their actions, these three organizations have joined in the national association ANAGRITUR.

The continuous pressure by the agricultural sector finally has led the National Parliament to issue the Law 730/1985, updated in 1996 by the Law no. 06, recognizing that agritourism, within certain limits (number of rooms, number of beds, number of seats at the restaurant, source of ingredients for the meals, etc.) is an agricultural activity, regulated for the value added taxation and for income taxation purposes by the same rules that supervise all other agricultural activities. Each one of the 19 Regions and two autonomous provinces composing Italy has then issued its own regional or provincial legislation, sometimes with some minor adaptations to the specificities of local agriculture, culture and traditions.

It is worth mentioning that several local administrations have been very active for the promotion of agritourism. Agricultural products, special foods, cheeses, wines and olive oil, have been used to attract tourists out of the main tourist attractions and into smaller towns and the countryside. In 1990, the Association "Towns of the Truffle" was established, followed in 1993 by the Movement "Tourism of the Wine" and in 1994 by the Association "Towns of the Olive Oil". In 1999, the National Parliament issued the national Law no. 268 "Routes of the Wine", with the norms and guidelines to set up and manage, at local level, an entire system, where the agritourism farms play a major role to attract national and international tourists.

Local authorities, in cooperation with the private sector, have done much for the promotion of their territories, through an active participation in national and international tourism fairs, where large operators interact to elaborate package tours. Another action is the coordination of events, linking local products, culture, art exhibition, music and sports, to have something – always new and attractive, to motivate tourists to come. Another important public action, often implemented also with European funds, has been the rehabilitation and maintenance of common goods, such as pathways, lakesides, natural ponds and rivers, which can be used by the agro-tourists for walks and excursions.

Since 1985, within the first Integrated Mediterranean Programs, and then with the reform of the structural policy in 1988 (Objective 1 and Objective 5b and the Community Initiative LEADER), and nowadays within the Rural Development Plans

several actions for the expansion and improvement of agritourism have been co-financed by the European Union to local authorities, to groups and even to individual farmers: feasibility studies, training courses and extension activities, rural museums, territorial promotion, etc. have facilitated the synergies between public and private actors (Pesce A. Lo stato dell'agriturismo in Italia: situazione attuale e prospettive nella politica di sviluppo rurale. unpublished ppt, Osservatorio Nazionale sull'Agriturismo – INEA. Roma. 2010).

3.2 Heterogeneity of Agritourism

Within the broad concept of agritourism, there are at least two main categories: the landlords and the family farmers. Although the reality shows itself as a continuum, some typologies might be listed:

- Absentee landlords, living in town, even at great distance, with a mansion in the farm and several independent houses (once occupied by sharecroppers or seasonal workers) that have been restructured into independent apartments, each one with kitchenette; swimming pool and other facilities complete the offer. The relationships with the guests are minimal and managed by an administrator;
- Landlords with large mansions, even a castle, with luxurious rooms, very elegant dining room and several elegantly furnished common spaces (reading room, *fumoir*, billard room, piano, etc.); facilities include swimming pools, gym, spa, various sports, horse riding, game reserve. High quality staff manages the whole business, with occasional presence of the owner.
- Production cooperative, established decades ago for productive purposes, whose members have understood that through diversification they can achieve better incomes. Available buildings have been restructured into rooms and apartments, dining rooms and restaurant. The coop members are involved in the various tasks, from management to reception, cooking, serving in the restaurant, accompanying the guests, etc.
- Farmers with medium – large farm, with buildings transformed into several rooms and apartments (with or without autonomous kitchenette), some

common spaces, small swimming pool, some facilities (bikes, archery), occasionally with a restaurant also open to outside guests. Most work is provided by family members, who try to have a relationship with the guests;

- Small farmers, with a small mansion, where only two – three rooms and apartments have been created, simply furnished, with a small dining room, where sometimes guest and family eat together. Outdoor facilities are minimal;
- Didactic or teaching farms are designed for urban children, to teach them subjects related to nature, agriculture, food and nutrition, and are normally managed by cooperatives or medium size farmers;
- Organic agritourism farms, normally managed by cooperatives or by medium and small farmers, are characterized by the organic production methods [10] respected by the farmers on their fields and sometimes by their respect for organic management of the entire structure (water recycling, solar and wind energy, composting of food wastes and leftovers, etc.).

To the first two categories belong all those operators who once managed their large estates with share croppers and farm hands, and also used large amounts of seasonal landless workers. During the green revolution, from the '50s through the '70s, these large producers have simplified their cropping systems and mechanized all operations. Many of these landlords lived and still live in town, have other sources of income, and the farm is managed by a supervisor. These estates had a large number of houses for the sharecroppers and their families, and buildings for the farmhands. In this category, we often find luxurious agritourism operations, offering independent apartments, hotel – like treatments, facilities such horse club, spa, archery, etc. The human relationships between the landlords or the farm supervisor and the clients are almost zero. Tourists are mostly received and interact with employees, who generally have received some training or even an higher education for the hotel industry.

To the 3rd, 4th and 5th category belong the "evolved" family farmers, who have always managed their relatively small farms with the workforce provided by the family members, occasionally helped by some neighbours and more rarely by farmhands. Also the operators of this category have mechanized their operations and simplified their production systems, but they live on the farm and their family income is largely

dependent on agriculture. Compared to the '50s, the size of the family has decreased and there are vacant homes and other buildings suitable for agritourism. Within this category, we find simpler on farm accommodations (rooms and apartments), restaurants if the case, and other facilities. Concerning human relationships, in these farms the guests may link directly with the farmers and their families, but the quality of the services might not be as good as in the previous category. In several parts of Italy, back in the '60s and '70s, these types of farmers have established production cooperatives, some of which have recently diversified into agritourism.

Another specialisation within the agritourism, dealing mostly with kids, from 5-6 to 14 years, is represented by the so – called [11] *Didactic or Teaching farms*, where urban kids, accompanied by teachers and sometimes by some parents, can learn about several aspects of the countryside and more generally about natural cycles. There are presently about 2,225 farms of this type, with their own association (*www.fattoriedidattiche.it*). The establishment and the operations of a didactic farm require special attention and very qualified people. The whole farm must be carefully organized, to avoid even the smallest risk for kids, and all facilities must be sized to let kids work and learn. Some didactic farms have a bakery or a dairy lab where kids can make bread and cheeses under the guidance of an instructor. All didactic farms have a sort of a small zoo, where most farm animals can be seen and touched. The home garden is designed to facilitate the work of kids, who have properly dimensioned tools and implements. The didactic farms offer a variety of options, from the half a day visit to one week stay, full board, from Monday to Friday. There are even didactic farms offering summer weeks with full immersion in English, with mother tongue animators who take care of the young guests.

Another peculiar type of agritourism is represented by the 1,299 *organic agritourism farms*, [12] where the customers are ensured that the surrounding environment is chemical free and that the food is 100% organic. In some cases, also the renovation of the farm buildings has been realized by respecting the guidelines of organic architecture, and the furniture and all textiles have been produced organically. Other aspects are also considered, regarding energy production and energy saving devices, water use and its recycling, composting of food wastes, etc. ICEA, an important Italian certification body for organic products, certifies and classifies the organic agritourism farms into five categories (from one to five "suns"), based on a set

of five groups of criteria (protection of environment, ecological management, promotion of local culture, organic food and sustainable transportation; some criteria are compulsory, whereas other ones are optional); presently, this voluntary certification has been asked only by 105 operators.

3.3 Farmers' Motivations

On farm tourism represents an opportunity for farmers and landlords to make full use of their assets and to diversify their activities, with a positive impact on employment and incomes. To practice agritourism, existing buildings need to be renovated and to respect the most recent norms about safety for all visitors and access for people with disabilities. In Italy, where tens of thousands of farm buildings, houses, mansions and even castles in the countryside had been abandoned during the "rural exodus" of the '50s and '60s, agritourism has represented a great opportunity for many landlords and family farmers alike, who have recuperated and modernized empty buildings often with astonishing results of great quality. The impact of such renovations on the rural economy has been impressive, because small local firms and craftsmen have been involved,.

In some cases, the decision to venture into agritourism is accompanied by an at least partial modification of the crops and of the whole farming system, to produce goods for the tourists and, when the case, for the on farm-restaurant. Fruit trees of all sorts and several types of small animals, eliminated from the farms during the "industrialization" of agriculture have been reintroduced. Horses are quite frequent, normally of breeds known for their peaceful and calm attitudes, and in recent years even mules and donkeys have been reintroduced, for riding and for transporting heavy loads, if excursions lasting several days are among the possibilities offered to the guests. Very frequently, small facilities, always controlled and authorized by the Health Service, are realized for on farm processing of jams, sauces, meats, dairy products, breads, cakes and pies, etc. There has been an enormous effort to revitalize ancient and typical products and recipes [13], to be used at the on farm restaurants and for items to sell to customers.

The family members can be engaged in activities which are generally less heavy, less dangerous, better paid and more rewarding (INEA, Indagine sulle tipologia

di offerta e sulle motivazioni delle imprese, unpublished document, Rome. 2010) than the traditional agricultural tasks: receiving the guests, cooking the meals, guiding the tourists through the farm and nearby wild areas, explaining how to rear animals, teaching how to make marmalades and pies, etc. Some of these tasks might seem simple and traditional, but they require good communication skills and proper attitudes, while other tasks surely demand appropriate training and even specific education. For example, many potential and actual clients are not Italians and do not speak Italian. Nowadays, most advertising and booking take place through internet and potential customers expect that agritourism operators can write and talk at least in English. Such tasks and the consequent good income normally give more space to the younger members of the family, who might otherwise be tempted to leave and move to town. When young people are not available within the family, there are job opportunities for outsiders, who can be employed with annual or seasonal contracts.

The final result of all these efforts is that the average net farm income per adult working unit is much higher for the agritourism farms than for the farms without agritourism. When the agritourism farms are managed with organic methods, the economic result is even better (Pesce A. Lo stato dell'agriturismo in Italia: situazione attuale e prospettive nella politica di sviluppo rurale. unpublished ppt, Osservatorio Nazionale sull'Agriturismo – INEA. Roma. 2010).

3.4 Diversification of the Offer

The diversification of the offer is very important. Most tourists come to the countryside to relax (Table 3), but they do not want to lay idle. After motivations like relax and natural beauty of the surroundings, guests are attracted by the agritourism experience to practice sports, or to taste food and wines, and to visit the surroundings and the cultural heritage.

To meet the expectations of the incoming guests (Table 4), tasting activities are organized by 66.5% of the operators, walks by 53.3%, followed by cultural activities by 43.7%, bike rides by 40.9%, cooking classes by 33.5% sporting events area available by 20.8% and so on. Many operators rent bikes, horses, canoes, organize excursions to natural attractions and to nearby monuments. In many villages and small towns there are museums, churches, and ancient manors open to the public worth a visit. In some

cases, weekend long courses or one week courses are proposed, generally in cooperation with local artists or craftsmen to learn how to paint, to make ceramics, or to carve objects in wood. In other cases, very exotic programs are offered, such as yoga courses, alternative medicine, or classes of various philosophies.

Table 3. Motivations of agritourists (%) in 2009

Motivations	Italians	Foreigners
Ideal place for relax	46.7	44.0
Natural beauty of the place	44.8	49.9
Ideal place for sports	30.7	15.0
Exclusive location	18.1	6.6
Good prices	16.6	17.6
Desire to visit a place never visited before	15.0	13.3
Food and wines	8.3	14.1
Available amusements	7.7	7.9
Ideal place for kids	7.4	16.1
Cultural heritage nearby	6.3	15.2

Source: [14]

Table 4. Services offered at agritourism farms in 2010

Services	%	Activities	%
Rooms / apartments	89.1	Tasting	66.5
Farm shop	79.2	Walks	53.3
Restaurant	68.5	Cultural activities	43.7
Swimming pool	37.1	Bike rides	40.9
Camping	10.7	Cooking classes	33.5
Tennis	4.8	Didactic farms	33.2
Indoor gym	2.3	Cultural meetings	28.4
Other services	5.6	Excursions	24.4
		Sporting activities	20.8
		Horse rides	14.0
		Handicraft courses	8.4
		Other activities	10.9

Source: INEA, Indagine sulle tipologia di offerta e sulle motivazioni delle imprese, unpublished document, Rome. 2010

When these activities are not possible within one single farm, the presence of this flow of tourists ignite other off farm activities, proposed by local firms, such as fishing and canoeing, paragliding, ballooning, tree climbing, etc., all activities linked with nature and normally managed and staffed by young rural people.

To accommodate the tourists, not only the buildings, but also the surrounding areas must be improved and nice looking. The road leading to the farmhouse, from the farm gate to the parking lot must be kept in good status, decorative shrubs and trees must be planted, and flowers must embellish the entire area. Taking into consideration the long and hot Italian summers, the presence of a swimming pool is nowadays almost a must and as a matter of fact the pool is present in 37% of the agritourism farms. In some cases, there are also other facilities, like a small gym and a sauna. All these aspects do not only make the tourists happy, but they also contribute to the improvement of the life quality of all farm family members [15], who also obviously enjoy the pool, the gym and the whole improved setting.

Agritourism operators normally show a higher level of self and job-satisfaction, when compared with the normal farmers, because they feel more appreciated and better understood by the society at large. It is not only a matter of higher income (which is normally the rule), but a sum of different factors: the higher quality of their houses and surroundings, the appreciation of the clients, the fact that many visitors express their positive judgement in the international websites, etc.

3.5 Growth with Some Clouds

The expansion of the number of agritourism farms has been accompanied by a constant increase of the arrivals of guests, from Italy and abroad (Table 5). The number of Italians coming to agritourism farms to spend at least some of their holidays has grown from 847,000 in 2005 to 1,298,000 in 2010 (+ 53%), without any sign of downturn. The number of days spent at the farms has shown a lesser growth (+ 39%) and these two combined phenomena determine that the average stay of an Italian tourist has decreased from 3.95 nights to 3.59 (Table 6). The same can be said about the foreign visitors, whose total number of arrivals from 2005 to 2010 has grown even more, by 61%, but whose average stay has decreased from 6.38 to 5.96 nights.

Table 5. Arrivals and nights of stay in agritourism farms

Years	Italians				Foreigners				Total			
	Arrivals		Days of tay		Arrivals		Days of stay		Arrivals		Days of stay	
	n000	Δ%	n000	Δ%	n000	Δ%	n000	Δ%	n000	Δ%	n000	Δ%
2005	847		3,346		504		3,212		1,350		6,558	
2006	929	9.7	3,619	8.2	579	14.9	3,595	11.9	1,508	11.7	7,214	10.0
2007	1,092	17.6	4,132	14.2	680	17.5	4,115	14.5	1,772	17.6	8,246	14.3
2008	1,169	7.1	4,350	5.3	709	4.3	4,436	7.8	1,878	6.0	8,786	6.5
2009	1,213	3.7	4,433	1.9	741	4.5	4,530	2.1	1,954	4.0	8,962	2.0
2010	1,298	7.0	4,654	5.0	812	9.7	4,843	6.9	2,110	8.0	9,498	6.0

Source: Elaboration on ISTAT data

Table 6. Average stay (no. of nights)

Year	Italians	Foreigners	Total
2005	3.95	6.38	4.86
2006	3.90	6.21	4.79
2007	3.78	6.05	4.65
2008	3.72	6.26	4.68
2009	3.65	6.11	4.59
2010	3.59	5.96	4.50

Source: ISTAT

Much of this modification can be due to changing patterns of tourism, with people preferring shorter and more frequent holidays, distributed throughout the year, with the so called "vagabond tourism", with people moving, during the same holiday, from region to region, and consequently changing hotel or agritourism every two-three days.

The nationality of the foreign guests is another important aspect (ISMEA. La domanda di agriturismo in alcuni mercati europei, unpublished document, Rome. 2012), since it influences their behaviour and must be considered in any promotional activity. Most foreigners come from nearby German speaking countries, like Germany, Austria and Switzerland and they normally reach their destination with their own car. A similar behaviour can be observed for the Dutch, who have enormously increased their presence in the agritourism farms and more recently for citizens of Eastern European countries, like Croatia, Slovenia, Poland, Czech Republic, etc.

Most European tourists [16] plan carefully their holidays and spend long time browsing the net: they visit the websites of the likely destinations, ask for more information from the agritourism operators, and compare prices. Tourists from other countries, like Spain, United Kingdom, the Nordic Countries and Russia normally arrive by air and tend to prefer the traditional destinations: towns like Rome, Venice, Naples, sea resorts like Capri or the Riviera and the Alps. Something similar can be said for the Japanese, Korean and Chinese tourists [17], who furthermore rarely travel alone and normally came with well organized package tours, which leave no time to the countryside and agritourism; most US citizens come to Italy in groups and just a small minority comes to visit the countryside, but their number is growing.

3.6 Problems and Perspectives

A major problem for agritourism farmers is the growth of non farm rural tourism. The rising demand for holidays in the countryside is luring non agricultural investors and operators, to offer several other types of hospitality: hotels, pensions, *maison de charme*, *relais et chateaux*, bed and breakfast, hotels with a nearby farm, rural houses, camping sites, etc. Another type of competition, in the upper part of the market, is represented by the wellness centres established in the countryside,

sometimes built from scratch, sometimes built on pre-existing farm buildings, where rich people come for a one or two week body and mind treatment, with massages, spa, personalised menu (generally bio, macrobiotic and vegetarian), relaxing walks in the countryside, etc. All these activities are surely positive for the rural economy, but many customers, both Italians and foreigners, confuse these experiences with agritourism, and consequently they represent a direct competition with the original on farm tourism.

The relative gravity of the situation is demonstrated by the decreased utilization rate of the available rooms (Table 7), that for all agritourism farms was in 2012 only 31.7%, twelve points below the average of all hotels.

Table 7. Utilization rate of rooms (%)

Category of accomodation	2011	2012
Hotels (all classes)	48.4	44.0
Other types of accomodations	37.6	36.6
-- Agritourism	32.8	31.7
Italy	43.8	40.6

Source: Osservatorio Nazionale sul Turismo. Rome. 2013

The best performance was shown by the five star hotels, with a utilization rate that was near to 60%. This difference is surely due to several factors, that make the 5 star hotels unique and unreachable, such as the locations and the quality of services, but another aspect to consider is the amount of resources spent for advertisement, promotion and coordination with large scale tourism operators. Most agritourism farmers are aware of this weakness [14]: 80.9% think that their promotion needs a profound change and only 7.5% believe that they are already doing the best they can do.

In the actual competitive and globalized world, the individual promotion, implemented by each agritourism, must be mainly made through internet, with an updated and interactive website, in several languages, with videos and photo gallery and possibly at least one video cam offering 360° view of the farm in all moments of the year. Old style leaflets and brochures may still be used, to be distributed at national and international fairs of the sector, like Agri&Tour held in Italy annually, and the BIT (International Exchange of Tourism) held also in Italy in Milan, mainly for international operators, but to attract large numbers of clients, the links with some

foreign and domestic tour operators could be a more appropriate – although partial solution, proposing some sorts of packages. In this case the problem is that tour operators purchase in advance a large number of nights, beds and services, but squeeze the prices and the margins become extremely thin. Another option, not yet fully explored is a more attractive and diversified prices policy for the different moments of the year (peak season, mid-season, national holidays, low season, etc.) and for the different categories (singles, elderly, families with children, groups of at least n persons, etc.). There are periods of the year when families with kids at school cannot travel, but older people have more freedom. In some periods, the climate might not be attractive for Italians, but it could be more than satisfactory for Northern Europeans, who fear the hot of the summer instead.

More and always diversified activities are needed [17], on the farm or nearby, also in cooperation with other agritourism farms, artists and local craftsmen. The local and national consumers can be attracted when a range of possibilities are offered, ranging from pottery to textiles, from food processing to paintings, all sorts of yoga courses and so on.

Time has also arrived to recognize formally that agritourism farms do not all belong to the same category. Like hotels and pensions, there should be national standards, based on multiple criteria, to assess the quality of the structures, of the personnel and of the services. Like for the hotel industry, agritourism farms should be given a final score, from one to five, with one meaning very low quality and five meaning top class; the Ministry of Agriculture has already elaborated a proposal (Proposta per una metodologia unitaria di classificazione dell'agriturismo italiano. unpublished document. Rome. 2010) that must be shared and improved by the Regional Governments, to which in Italy agricultural policy has been devoluted. About ten Regions, out of the twenty composing Italy, have already introduced a classification system, with farms having from one to five "wheat ears", but the parameters and the scoring methods are not homogeneous.

4. CONCLUSION

For almost three decades, since the early '80s, agritourism has represented a very good opportunity for increasing on farm employment and income. Within the

new paradigm of multifunctionality, agritourism has facilitated both horizontal and vertical diversification. Millions of tourists have been at least partially diverted from the classic destinations and attracted into rural areas. Places never visited before by any tourist have been discovered by Italians and foreigners, lured by the beauty of landscapes, the quality of foods, the relaxing atmosphere and the friendly hospitality. Agritourism has played a pivotal role for rural development, with a multiplying effect on induced activities [18,19].

This initial take-off phase, characterized by a good dose of naпvetй, with many operators entering into the sector with much enthusiasm but without proper planning or proper training, is nowadays over. This is not typically Italian, because similar problems can be found also in other countries [20] The low and decreasing utilization rate of the last two years, also in comparison with other segments of the tourist sector, confirms that the Italian agritourism movement needs a higher level of professionalism and a better organization. The sustainability, i.e. long term economic survival of the whole sector, without continuous public financial support for private (investments) and common goods (promotion), needs to be revisited and better understood [21].

Concepts like market segmentation should become familiar and should be applied: the same type of offer cannot be proposed to young Italian couples and to older Germans. Each category of potential clients (children, the elderly, families, organic and vegetarians, rich Russians and alternative Americans, animal lovers, adventurers and relax lovers, and so on) should be the object of study and of appropriate offers, organized in a package, to be marketed online or through travel agencies.

The individual promotion, which remains of extreme importance, should progressively be accompanied and complemented by integrated offers, developed together by different operators to realize the much needed scale and goal economies. A territorial marketing approach, that links together agritourism, culture, outdoor activities, indoor activities, food and wine tasting, and more, should be sought, to propose diversified and rich experiences, where the guests can enjoy a sort of full immersion into that specific part of Italy. Another type of package could be organized around the rich gastronomy of Italy, offering guided tours through different regions, to discover the variety of Italian foods and wines, exactly in the

places where they were born; also this latter proposal clearly requires a collaborative approach by many operators, coordination and professionalism.

Several typologies of public – private partnerships could be implemented, to develop synergies and to cooperate for the enhancement of both public and private goods, for strengthening and expanding this sector, that represent an important source of jobs and income, mainly for women and younger generations. In this specific economic moment, such peculiar aspects of agritourism are more important than and deserve a special attention.

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Case Study on Performance Management. A Comprehensive Approach

1. INTRODUCTION

Performance management systems (PMS) embody the set of organizational activities employed by managers to focus employee attention and motivate behavior for the ultimate purpose of implementing the organization's strategy [1]. PMSs consist of several interrelated but often loosely organizational practices, typically strategic planning, budgeting, incentive compensation design, and organizational structuring. Much of the early literature on this topic has been categorized under the heading of management control systems, following the seminal work of Robert Anthony [2]. However, in our view, this has become a more restrictive term than was the original intention and we prefer to use the more general descriptor of PMSs to capture a holistic approach to the management and control of organizational performance.

This article builds on the view that too much attention in the performance management literature has been given to the analysis of control tools in isolation in opposition to a comprehensive discussion. Additionally, literature has focused on ex post measurement of performance while ignoring the analysis of the ex ante setting needed to create the conditions that increase the likelihood of achieving that performance [3].

The purpose of this study is twofold; first analyze a PMS in a holistic manner, and evaluate the goodness of this PMS based in its ability to create the ex ante conditions to achieve organizational objectives. Since it is virtually impossible to fully guarantee the achievement of organizational objectives, perfect control is not a realistic expectation; however PMS does enable organizations to influence the behaviour of its members to increase the likelihood of achieving organizational objectives. A PMS creates the ex ante conditions when its components, not only are individually well designed, but also they are coherently linked to each other [1]. Like any other system, a PMS is greater than the sum of its parts and there is a need for alignment and coordination between the different components for the whole to deliver efficient and effective outcomes.

Consequently, research would benefit from studies providing a broader view of

PMSs. The article uses Ferreria & Otley's framework [4] as a research tool for describing the structure and operation of performance management and control systems of the case company in a holistic manner. The case company is a retail and merchandising business incorporated as a result of the agreement between a leading global merchandising and image rights management company and a major European football club.

Our research contributes to literature by showing how the strength and coherence of the links between the components of the PMS of the case company was able to create the ex ante conditions that increase the likelihood of achieving organizational objectives. The study also shows that weaknesses in one area of the PMS can be, at least partly, compensated for by strengths in other areas. Finally, practitioners can use the framework as a guideline in assessing the coherence of their PMSs.

The article is structured as follows: the first section defines performance management and control and presents the framework used. Next section describes the research methodology used and data gathering techniques. The data collected through research on the case company is then presented and the strength and coherence of the system is discussed. The final section provides conclusions and limitations of the research.

2. PERFORMANCE MANAGEMENT AND CONTROL

The purpose of performance management systems is to influence the behaviour of people as members of a formal organization to increase the probability that they will achieve organizational goals [5]. Therefore, a fundamental requisite for PMSs is defining objectives and key success factors, which are then used to assess performance [6]. Thompson and Strickland [7] define key success factors as those activities, competencies, and capabilities that are seen as critical pre-requisites for success. These key success factors need to be attained for the organisation to accomplish its objectives [8].

The strategy literature suggests that an organisation needs to develop strategies and plans that address its key success factors [9]. Previous control literature has highlighted the need for expressing strategic goals into operational goals to attain alignment [10,11]. These operational goals usually take the form of a budgetary planning that defines acceptable outcomes and results [12] or performance indicators [10]. According to literature, an organisation needs to have performance indicators for each of the key success factors linked to corporate strategy [13,14].

Setting targets for performance indicators and budgets is a critical aspect in performance management [15]. Research has found that perceived difficulty of the target affects performance, with moderately difficult goals enhancing group performance [16] and aggressive target setting not necessarily leading to higher performance [17].

To motivate managers to consistently meet strategic corporate objectives, it is important to have performance-based incentives linked to the accomplishment of these objectives [18]. It is widely accepted that incentive systems are used to motivate individuals and align the goals of the managers with those of the organisation [19] and that when expected behaviours are not rewarded, they tend to be overlooked [20].

Finally, feedback and feed-forward information flows are essential enabling mechanisms to any PMS [1]. They are directly related to learning [21] and provide a communication channel for inculcating changes facilitating discussion of issues, and improving knowledge for decision making [22].

PMS do not operate in isolation. While much of the PMS research considers single themes or practices, such as activity-based costing/management, the balanced scorecard or value-based management, that are seemingly unconnected from each other and the context in which they operate, these invariably sit within a broader control system [11]. There is a widespread acceptance of the need for performance management to adopt a comprehensive approach to its study [11,23], taking research beyond specific aspects of control systems [24]. Alternative conceptual frames available for studying control elements as a package are: Levers of control framework [25,26], Performance Management framework [1], or Performance Management Control framework [4]. This article uses Ferreira & Otley's framework [4] as a research tool since, not only it is the latest, but also it builds on the other two.

The framework aims to reflect the interdependency between different control mechanisms operating at the same time in the same organization, a shift from compartmentalised approaches to a broader perspective in managing organizational performance.

This framework was developed to provide a comprehensive description of an overall control system rather than normative or prescriptive. The framework is organized in twelve areas providing a powerful means of outlining the main features of a PMS and the ways in which it is used in the context of a specific organization. The areas of the framework are:

1. What is the vision and mission of the organization and how is this brought to the attention of managers and employees? The first step in analysing the PMC is to establish the broad orientation and the overall direction that an organization wishes to follow.

2. What are the key factors that are believed to be central to the organization's overall future success and how are they brought to the attention of managers and employees? Key Success Factors are those activities, attributes, competencies, and

capabilities that are seen as critical pre-requisites for the success, they are a codification of the vision and mission in more concrete terms and in a more compressed timeframe.

3. What is the organization structure and what impact does it have on the design and use of the PMSs? Organisation structure essentially determines the responsibilities and accountabilities of organizational participants and it also defines activities that individuals with specific roles should not pay attention to.

4. What strategies and plans has the organization adopted and what are the processes and activities that it has decided will be required for it to ensure its success? Strategy is the direction the organization chooses to pursue over the long term as means of achieving organizational objectives.

5. What are the organization's key performance measures deriving from its objectives, key success factors, and strategies and plans? Are there significant omissions? Key Performance Measures are the financial or non-financial measures used by organizations at different levels to evaluate success in achieving their objectives, key success factors, strategies and plans.

6. What level of performance does the organization need to achieve for each of its key performance measures? The issue of setting targets and using them for evaluating and rewarding performance has been the subject of discussion in the literature.

7. What processes, if any, does the organization follow for evaluating individual, group, and organizational performance? It is an essential issue in because managers will pay more attention to areas that senior managers have pointed out as being important to them.

8. What rewards will managers and other employees gain by achieving performance targets or other assessed aspects of performance? This is the next step in the cycle of performance management, given that rewards are the final outcome of performance evaluations.

9. What specific information flows, systems and networks has the organization in place to support the operation of its PMS? Information flows are critical to make any performance management system possible; it is the connexion that holds the entire system together.

10. What type of use is made of information and of the various control mechanisms in place? The use made of feedback and feed-forward information flows and the various control mechanisms in place can be predominately diagnostic, interactive, or a combination of both.

11. How has the PMS changed in light of the change dynamics of the organization

and of its environment? Performance management systems need to change in order to sustain their relevance and usefulness.

12. How strong and coherent are the links between the components of the PMS and the ways in which it is used? Strength and coherence between the links of a performance management system are a crucial aspect of its design. Although the individual components of the control system might be well-designed, when they do not fit together well (either in design or use), control failures can occur.

3. RESEARCH METHODOLOGY

The justification for case-based research in the area of accounting and control systems is now widely recognised. Otley and Berry [27] hold that the nature of controls requires their study within the particular settings in which they are used. They maintain that case study research makes possible a comprehensive approach to the study of controls in use. Moreover, they encourage the pursuit of exploratory studies as means of capturing the richness of accounting and control systems when examined within organisational contexts. A case study is a research option that is used to gather intimate and sensitive contextualised information concerning real management practices [28]. This case study aims to analyse how a PMS is used to create ex ante conditions to achieve organizational objectives at a sport retailer. According to Yin [29], case study research enables investigating a contemporary phenomenon, within its real context when the limits between the phenomenon and the context are not clear and when the main questions that need to be answered are 'how' or 'why'.

For this research, data were collected by means of open questionnaires and semi-structured questionnaires, internal documents and meeting observations.[1]

Separate face-to-face interviews with the people who were in charge of the management of the company were carried out from January to July 2011. Interviews strictly lasted for 1S hours each and were recorded for further reference. They took the form of open questionnaires and included a component of semi-structured questions developed from the performance management and control framework and existing literature on performance management and control in retail. Report was produced from the analysis of transcribed recordings and the notes taken by the interviewers.

Triangulation of the information was achieved by interviewing individuals at different

[1] APPENDIX 1 presents a description of the fieldwork. APPENDIX 2 lists the internal documents analyzed.

levels of the organisation. Further triangulation was achieved by observing meetings and studying internal company documents. All interviews were recorded for later reference and a final interview with the General Manager was conducted in order to confirm the accuracy of the information and clarify any possible discrepancies.

4. RESULTS AND DISCUSSION

AU Merchandising was incorporated in 2002 following an agreement between a leading global merchandising and image rights management company and Athletic United Football Club with the aim of *"(…) managing the merchandising rights while respecting the historical values of the Club"* (General Manager). Athletic United is located in a major tourist-oriented European city (8 million visitors in 2009) and it is recognized as one of the most important football clubs in the world. Through its history it has long been associated with patriotic values and 'fair play' and it has a strong media resonance.

AU Merchandising commercializes Club kits and sports apparel as well as other sundry third party licensed merchandise (e.g. key rings, mugs, etc.) of Athletic United. Products are sold, through 7 stores in the city (one of which is located at the Athletic United stadium, contributing 70% to total turnover), two more stores are placed outside the city in strongly tourist-oriented locations. Sales in this business have a strong correlation not only to tourism flow to the city, but to Athletic United's performance in competitions and the popularity of star players.

4.1 Vision and Mission

The first step in analysing the performance management and control is to establish the orientation and the direction that an organization wishes to follow. The mission of AU Merchandising is: *"(…) the exploitation of the merchandising rights and all other forms of the image of the Club"* (General Manager), and its vision *"We aim to reach every corner of the world in commercializing the brand Athletic United"* (Retail Manager). All this, *"(…) having inl mind that we are not only a sport apparel retailer, we are also souvenir shop"* (Retail Manager), while not forgetting that organizations have different key stakeholders with multiple and sometimes competing expectations:

"Our business is addressed to tourists, but also always mindful of local supporters. Therefore we need to be aware of the historical values of Athletic United,

patriotism, star players, old glories, supporter's clubs, fair play tradition, and the Clubs' social responsibility" (Retail Manager).

Despite not being articulated in explicit statements or formalised in a document, the mission, vision and values of Athletic United were clear to managers at different levels, and mentioned in internal communications.

"Managerial decisions are mediated by the fact that any transgression of the values of the Club has a notorious media impact, it goes in the news right away getting everyone on their nerves" (Retail Manager).

"Everyone knows the values of this Club and how careful we need to be" (Sales Floor Manager).

4.2 Key Success Factors

Key success factors are a codification of the vision and mission in more concrete terms and in a more compressed timeframe, recognizing that control measures need to be reported on a routine basis. Although not formally articulated, three key success factors were mentioned repeatedly or recognised by all interviewed managers: (1) Stores' traffic, (2) Product availability and (3) Check-out speed:

"Most important thing is traffic" (General Manager).

"We need to avoid cues, encourage impulse buying with appropriate store lay-out and wide range of products" (Sales Floor Manager).

"During rush time, we must speed up check-out and restocking and make sure there are no empty shelves" (Stadium Store Manager).

"Product must be permanently on display, specially the most expensive one, Club's shirts" (Stock Room Manager).

4.3 Organization Structure

Although organizational structure tends to be assumed, it is a key control element to be defined. The research found that there were managers accountable for each one of the key success factor, so that no key success factor was left without supervision. Table 1 shows which managers were responsible for the key success factor and their scope of decision.

Table 1. Key success factor and the organizational chart

Position		Accountable for	Key success factor
General Manager		Marketing campaigns, advertising, promotion among tour operators.	Store traffic
Inventory Planner		Stock Management and Purchase forecasting.	Product availability
Store Manager	Stock Room Manager	Shelf restocking, clothes alarming and labelling.	
	Sales Floor Manager	Number of check-out counters opened; Alarm tag removal, and credit card charging process.	Check-out speed

Stores behave as profit centres, so managers are given responsibility for sales and expenses, and they are required to meet profit objectives of their stores. Within this decentralized structure, managers are given the capacity to hire/fire store staff or make decisions such as product mix or work schedules. On the other hand they must follow parent company guidelines such as the Store Style Book regarding decoration, lay out, or workers uniforms.

4.4 Strategies and Plans

Despite AU Merchandising having clear goals and objectives; as the business is highly dependant on strong uncertainties (e.g. club and player performance in competitions or signing of star players), there was no formal strategic plan in place. Strategic planning was believed to be so unreliable that the company adopted a more flexible and adaptive approach to respond to such uncertainties, *"(…) we think it is better to be able to promptly react to the turn of the events than blindly follow a plan"* (Retail Manager). The actions believed to be necessary to quickly adapt to the events, and that are thought likely to help in achieving the key success factor are presented in Table 2:

Table 2. Key success factor and associated processes and activities

Key success factor	Processes and activities
Store traffic	– *"(…) we make marketing campaigns in foreign countries"* (General Manager) – *"(...) advertisements in travel guides or city sight-seeing buses to attract more people"* (Commercial Manager)
Check-out speed	– *"We try to speed up the process of credit card charging and de-alarming of shirts"* (Stadium Store Manager) – *"I must assign cashiers to the counter as required by the number of customers so as not to have long lines"* (Sales Floor Manager) *"We required all store floor employees to be able to communicate in English not to slow down sales to tourists"* (Sales Floor Manager)
Product availability	– *"(…) at rush time, everyone must be at the check-out counter or restocking shelves"* (Sales Floor Manager) – *"(…) we work in the backroom alarming and tagging prices for products, so they are ready when needed"* (Stadium Store Manager)

4.5 Key Performance Measures

Key performance measures are the financial or non-financial measures used by organizations at different levels to evaluate success in achieving their objectives, key success factors, strategies and plans. Research found one key performance measure, Number of visitors, evaluating the first identified key success factor, Traffic. No measures were found for appraising Check-out speed and Product availability, or the processes and activities necessary to achieve them.

The company made use of five more measures: Sales (Total sales and sales by product class), Contribution Margin (Total and per product class), Average Basket (Average amount per sale), Conversion Rate (Sale transactions / total visitors), Units Per Transaction (Average number of products per sale transaction). These indicators measure the achievement of sales objectives, but not of success factors believed to be critical to achieve those sales.

4.6 Target Setting

Target setting process starts eight moths before the beginning of the season with a brainstorming by the General Manager, the Retail Manager and the Authorised Products Manager on preliminary sales targets. This meeting not only considers marketing initiatives, the tournaments the Club expects to win or participate in, but also the possible impact of signing new players, and anticipated tourist flow. Even though *"(…) forecasting sales in our business is too complicated but it is necessary for placing purchase orders"* (Financial Manager), a similar procedure is used to set key performance measures objectives. No formal previous indications are received from the parent company on setting these targets.

These first targets from AU Merchandising are then discussed with the managers of the parent company, in *"(…) a bottom up process, taking four rounds of negotiations which review 'why a certain amount' or 'what impact this new player' or 'that initiative' will have on sales*" (General Manager).

Once the sales figures are agreed upon, they become the main input to plan the purchases of shirts, other textiles, and sport apparel, which must be ordered six months ahead of the beginning of the league competition to be available for sale.

4.7 Performance Evaluation

Evaluation of performance is a formal process at AU Merchandising *"(…) that attempts to have a low degree of subjectivity"* (General Manager). Employees hold quarterly Appraisal Meetings with their supervisor to evaluate performance based on the achievement of

budgetary objectives (sales, margins and profit) and key performance measures. In addition, non-financial ratings jointly determined in face to face meetings between each manager and their subordinates, based on proactive efforts, attitudes, and involvement in the company, are assessed by filling in the so-called Employee Coaching Form. This is a standard form from the parent company, although the dimensions evaluated vary depending on the position and responsibilities of the employee.

4.8 Reward Systems

AU Merchandising's incentive system is defined centrally by the parent company for all companies and stores worldwide and differentiated by the employee's position. Store employees (including managers) get a quarterly incentive with two components: the first based on achievement of budgeted sales and expenses of the store (2% of annual salary) and the second based on the quarterly qualitative coaching assessment of the employee (additional 2%). For all other managers the bonus ranges between 5% and 10% of the annual salary, one half based on the accomplishment of the company/stores budgeted quarterly profit, and the other half on the quarterly qualitative coaching assessment of their performance.

4.9 Information Flows, Systems and Networks

Three formal meetings are scheduled periodically. First, the Board of Directors[2] once-a-week meeting discusses the 'Board of Directors Weekly Report' that covers budgeted financial and performance measures. Estimates are reconsidered in view of unplanned up-coming events (e.g. important matches, new signing, or the progress of the Club in the competitions). Decisions such as acceptance of new licensees and new authorised products, investments in premises, and equipment, changes in store lay out are usually analyzed in this meeting, as well as ensuring compliance of the values of the Athletic United or the 'Store Style Book'.

The second meeting is the weekly Retail Committee.[3] Sales and performance measures per store and product line are compared to the budget and store managers are expected to explain any deviations and actions taken to reduce variances. Store managers present their news and initiatives (e.g. availability of products, stock outs or possible clearance sales). In order to ensure compliance with the established guidelines, the Retail Manager visits the stores without previous notice once every three or four months.

[2] Attended by the General Manager, the Financial Manager, the Retail Manager, the Stadium Shop Manager, the Inventory Planner, the Authorised Products Manager, and the External Legal Advisor of the company

[3] Attended by the Retail Manager and all Store Managers

Finally, every store manager holds a Daily Store Meeting, a fifteen-minute meeting with the entire store staff. This meeting is used to inform them about relevant events of the day and to reinforce guidelines regarding operation (e.g. theft prevention, application of discount policies or product display).

4.10 Performance Management System Use

The use made of feedback and feed-forward information flows and the various control mechanisms in place can be predominately diagnostic, interactive, or a combination of both [26]. Diagnostic management control systems are used to monitor goals; managers are expected to adjust inputs and processes so that future outputs will more closely match goals, without direct involvement of top management in subordinate decisions [30]. A diagnostic use of the key performance measures and budget figures took place at the Retail Committee and the Board of Directors where follow up was made by briefly highlighting the main variances from forecast.

"Store income statements are compared to budget and we need to explain deviations to the Retail Committee, when there are no deviations the process is fast" (Store Manager).

Interactive management control systems are those that managers use to involve themselves regularly and personally in the decisions made by subordinates and to focus organizational attention on key strategic issues. The high dependence of the business on strong uncertainties, such as Club or player performance in competitions, or the strong media reaction to a managerial decision contradicting the historic values of Athletic United is significant enough to demand frequent and regular exchange of information between top management and operating managers at all levels of the organization, as well as with Athletic United managers. This information is interpreted and discussed in face-to-face meetings of superiors (Board of Directors), subordinates (Daily Store Meeting, Appraisal Meeting), and peers (Retail Committee) where data, assumptions, action plans and potential strategic risks are debated.

4.11 Performance Management System Change

Except for the incentive system of store staff, considered not to be motivational enough by the General Manager, he considered that other elements of the PMS were appropriate and no changes were planned in the near future.

4.12 Strength and Coherence

Following the order of the areas in the framework, the coherence of the PMS was reflected by the fact that the three key success factor mentioned by the managers interviewed

were clearly in line with the vision and mission defined by top management. Likewise, analysis of the organizational chart showed that there was at least one manager accountable for each one of the key success factor (Table 1), and the plans and actions that were thought likely to help achieve the key success factor had been identified and responsibility for fulfilment allocated to specific managers (Table 2).

Despite the consistency between mission, vision and key success factor, only one key success factor (Store traffic) was directly evaluated through a measures while the other five performance measures in place were sales related, and consequently, oriented to measure the outcome, but not the processes that were presumed to lead to those sales (Check-out speed and Product availability).

The performance evaluation was based on a combination of financial measures (budget variances and key performance measures), and formal qualitative coaching oriented to reinforce the values of Athletic United and key success factors. The reward system, while aligned with the performance evaluation, becomes ineffective as motivational tool due to the small amounts in Euros that the percentages represent on store staff salaries. Both the General Manager and the Retail Manager expressed his dissatisfaction with the current system, *"(…) they* [store staff] *don't value the quarterly bonus, the system was designed for managers (…) the incentive system is not working well in the stores"* (Retail Manager). This is because of the specificities of the store staff, students with high rotation.

Finally, the unpredictability of Athletic United's performance in competitions rendered plans and forecasts so unreliable that a permanent flow of information was required to maintain flexibility and respond to the circumstances. The meetings were a fundamental connexion that held the entire system together and the tool top management used to interactively involve themselves, on a regular and personal basis, in the decisions of subordinates, they focus the attention of managers, and comply with the mentioned need for information flow and flexibility.

5. CONCLUSION

A review of literature in the area of performance management and control systems shows that research is based on simplified and partial settings [31] and we argued the need to adopt a more comprehensive approach to the study of performance management by taking research beyond specific tools. The findings of the case study can be summarized in three points. First, the mission and vision of the organization, together with the values of Athletic United, were clearly know by managers at all levels, and this was accomplished despite the fact that they were not articulated in explicit statements or formalized in a document, and consequently were conveyed in less formal ways. These long term purposes and believes were

discussed and reinforced through regular and frequent meetings among mangers and with the rest of the staff. In a similar way, even though AU Merchandising's key success factors (Traffic, Product availability and Check-out speed) were not formalised in a document as such, they were repeatedly mentioned or acknowledged by all managers interviewed. In a business environment mediated by the results of sport competitions that made planning uncertain, sharing values and beliefs provides managers with an overarching perspective to all their decisions.

Secondly, the evidence suggests an explicit development of causal relationship among performance measures. These causal relationships are shown in Fig. 1.

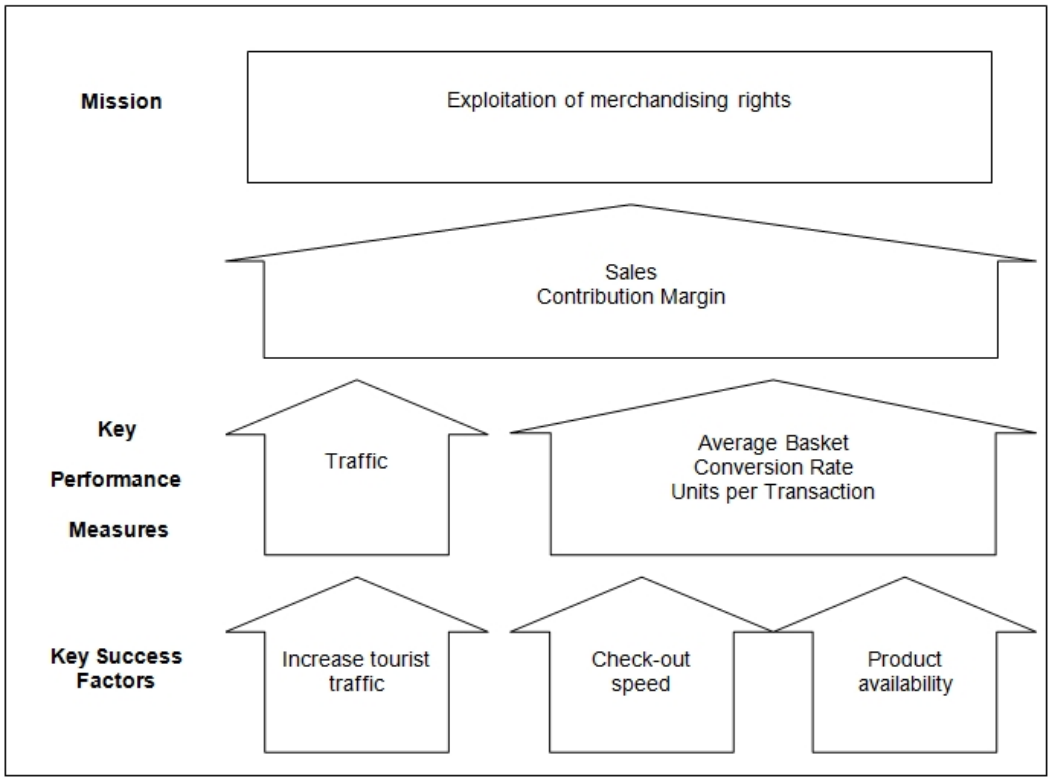


Fig. 1. Linkage of mission - key success factor - key performance measures

The measures related to two of the key success factor: Check-out speed and Product availability, were actually assessing Sales or Contribution Margin (the expected outcome) instead of measuring the critical factors in themselves (Speed and Availability) that were leading those financial results.[4] An organisation needs to have performance measures for all the key success factors linked to corporate strategy. Not having measures for these key success factor implies the risk of managers finding alternative ways of achieving sales

[4] Actual measures for the key success factors instead of the results could be: 'Average waiting time at the cashier' for Speed factor, or 'Number of stockouts per day' for Availability.

levels, while not focusing on the critical factors. When performance includes financial and non-financial measures, managers have fewer alternative ways to achieve performance because they have to perform within the dimensions specified by top management.

Finally, the study found a strong interactive use of information flows. Information generated by the PMS was an important and recurring item on the agenda of meetings addressed by the highest management levels, with pervasiveness of face-to-face challenges and debate.

Previous research investigated particular problems or mechanisms in isolation –ignoring the interdependency between different control mechanisms operating at the same time in the same organization– leading to fragmented conclusions [11]. A complete control system involves different elements, both separately and in combination, and it is important to note that successful PMSs are unlikely to result from the use of just one type of control tool alone. It is the main contribution to demonstrate how the strength and coherence of the links between the components of the performance management system of AU Merchandising were able to create the ex ante conditions to achieve organizational objectives. In AU Merchandising that was accomplished by (I) being able to transmit mission, vision and the values of Athletic United to the whole organization through the use of meetings as an interactive tool; (II) using performance measures to focus managers' attention on key success factors; (III) basing employee performance appraisal on key success factor and using it to reinforce the values of Athletic United; (IV) aligning rewards system to that employee appraisal; and finally, in the sport environment where AU Merchandising's managers make decisions, (V) interactive use of meetings was found more suitable than strictly following plans or budgets. This study also shows that the weaknesses in one area of the PMS can be, at least partly, compensated for by strengths in other areas. While key success factors were not formalized in any document, no formal budget was in place, and rewards were not significant, it was compensated by a strong interactive use of information flows and widespread organizational values. Only through the use of a comprehensive framework that allows the analysis of all areas of the PMS could these conclusions be reached.

A contribution to practice is that retail managers can benefit from the successful application of the framework in this environment by using it as guideline to follow in assessing the coherence of their PMSs, and to introduce improvements aimed to create the conditions for successful implementation of actions to reach the objectives and targets. It is the first time a complete description of the totality of a PMS is carried out in retail setting.

As with all other empirical studies, this one is also subject to potential limitations. The study used Ferreira & Otley's framework, which focuses on formal PMSs, while this was not necessarily a limitation, the authors recognise that organisation control also involves more

subtle ways of motivating and coordinating organisational behaviour–such as creating a sense of belonging, positive public recognition or be a business to be proud of– not included in the framework. Finally, the method chosen limited the general applicability of the findings; additional in-depth case studies would be required to asses whether the insights provided by this study have normative implications. Through an in-depth analysis of the PMS, this article has sought to stimulate and encourage further interest and debate among other researchers regarding PMSs.

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APPENDIXES

Appendix 1. Description of fieldwork

Date 2011	Fieldwork
January 14	Interview with General Manager
January 26	Interview with Retail Manager
January 26	Interview with Stadium Store Manager
February 6	Interview with Financial Manager
February 9	Interview with Retail Manager
February 9	Interview with Store Room Manager
February 9	Interview with Sales Floor Manager
March 5	Observation of Daily Store Meeting
March 5	Interview with Commercial Manager
March 17	Observation of Retail Committee weekly meeting
March 31	Observation of Retail Committee weekly meeting
April 8	Observation of Daily Store Meeting
May 11	Observation of Board of Directors weekly meeting
July 6	Interview with General Manager

Appendix 2. Internal documents analysed

Doc no.	Document
1	Athletic United Merchandising agreement
2	Board of Directors Weekly Report
3	Retail Meeting Weekly ReportHr'H8
4	Organizational Chart
5	Annual Report to Athletic United
6	Employee Coaching Form
7	Store Style Book

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The system of social services in Bulgaria and the process of deinstitutionalisation of children

Abstract. Development of social services in Bulgaria is predetermined by the policies of last decades of the last century and is characterized by a number of features arising from the difficult transition to a market economy and modern challenges of dynamic social and economic environment. Social services are activities targeted at supporting assisted persons to conduct a complete way of life and full inclusion in society. Social services are aimed mainly at social integration of people, giving them the opportunity to lead an independent life and not to be dependent on the service or the institution. Development of social services in community is the key to effective social inclusion, poverty alleviation and participation in society of all vulnerable groups. In recent years, policy in the sphere of social services in Bulgaria is directed to development of services in community and home to replace the institutional model of care. Planning and implementation of national policy of reforms in child care is directly related to children at risk and better recognition of their problems and needs. Purposeful activities are carried out and programs are being implemented to achieve one of the main objectives of this policy - deinstitutionalization of children. Based on European practices and models activities and methods of child care are successfully realized. Presented study on the development of social services for children, with a special emphasis on deinstitutionalization, makes analyses of the system of social services for children as set in main strategic documents and statistical data. The aim is to identify key processes, trends and issues and to make recommendations for policy improvements. Main results emphasize that in order to achieve the desired effects new approaches and measures are needed in application of running strategies. Main

recommendations are defined for implementation of social policies for children and a conceptual framework of child care is proposed. It is important and necessary to develop a policy that will not only offer appropriate care for children at risk in the short term, but will also to prevent possible problems in the future.

Key words: social services, children, institutional care, deinstitutionalization.

INTRODUCTION

In many countries, institutionalization is seen as a countermeasure of poverty and of the partial measures to support the family. This leads to unnecessary placements, often when biological parents are alive and able to care for their children if they are properly supported. Therefore, policies should focus on the prevention of child abandonment and on greater placement of children without parental care by caregivers. This should be accompanied by national monitoring systems and standardized indicators. However, there is little willingness to initiate political reform, either because of weak evidence base, inertia of the existing system of allocating resources, lack of a clear strategic planning and implementation, and also the often expressed fear of increased costs.

The cost of institutional care look different than the cost of foster care and placement with friends and relatives. Resident care in the community is more expensive than foster and institutional; however, as start-up costs are amortized once, they can be smaller than the current expenditure of large institutions, while offering better quality of care. In many cases, it is proposed to be redirected resources to community services by changing the financial flows to support families at risk.

Institutional care is leading in most Eastern European countries. There are differences in the availability of foster care and residential care in the community as an alternative to institutional care; some countries did not have foster care, while others use mainly these approaches to children at risk.

All cases demonstrate the absolute advantage of the results of community-based services over institutional. The advantage is evident in all aspects (physical, mental, social, educational, etc.) and can not be challenged even by the best institutional services. Indeed, institutional care is often described as self-serving and thus difficult to support the principle of protecting the best interests of the child.

SYSTEM OF SOCIAL SERVICES FOR CHILDREN

The social services in Bulgaria are divided into two types depending on the environment they are provided - social services provided in community and social services in specialized institutions.

Social services in the community are: personal assistant, social assistant, home helper, home care; Day Care Center, Center for Social Rehabilitation and Integration, Center for temporary placement, Foster Care, Crisis Center, Center for family-type placement, group homes, soup kitchens;

Specialized institutions are: homes for children or young people with disabilities, homes for adults with disabilities, social educational professional establishments, retirement homes, shelters, homes for temporary placement.

In Bulgaria there are the following types of child care [3]:

- Institutional Care (132 institutions with 6 254 children according to data for the end of 2010): institutions are part of the socialist legacy dominated by the understanding that the state is able to care for children better than their families. The institutional system is characterized by long-established structures and powerful momentum that understands "reform" and "restructuring" as repairing existing infrastructure without significant change in the way of childcare.
- Foster care and placement with friends and relatives (12 664 children since the beginning of the reform by the end of 2010): foster care and placement with relatives is understood as a child in the home of a certified by the state party (professional or voluntary foster care) or by members of the biological family other than parents (placement with friends and relatives). The placement with friends and relatives is well developed - for the period 2000-2010 are housed 12 105 children. Foster care is also evolving, as it is expected to become a major element, especially in the process of reintegration of institutionalized children in their biological families. The total number of children in foster care since the beginning of the reform by the end of 2010 is 559 of which 221 were accommodated in 2010.
- Residential care in the community (72 centers with a capacity of 831 children up to mid-2011): residential care in the community can be seen as an intermediate body between the institutional and foster care and placement with relatives. In residential

care children live in "family-like" environment, even in larger, spatially separated communities with high staff-child ratio. In Bulgaria the longest working provider of social services in the community residential care is "SOS Kinderdorf". Yet recently a number of new social services of residential type began operating. Significant efforts have been made by all stakeholders to ensure efficient and effective process of deinstitutionalization. The resources of the Bulgarian government and European funds are used to support this process.

In 2008 Bulgaria adopted a National Strategy for Children 2008-2018 [4], and in 2010 adopted the National Strategy "Vision for deinstitutionalization of children in Bulgaria" [3] according to which deinstitutionalization is a process of replacing institutional care for children care in the community in a family or family-like environment. It is a process of prevention of placement of children in institutions by creating new opportunities for children and families to receive support in the community [5].

One of the main challenges in the process is diverting resources from the old system of institutional care to community-based services on the principle "money follows the child", ie resources are directed to services to meet the specific needs of children and families.

CHALLENGES TO THE SYSTEM OF SOCIAL SERVICES FOR CHILDREN

Deinstitutionalization is the basis of the National Strategy for Children and National Strategy "Vision for deinstitutionalization of children in Bulgaria" and is the process of replacing institutional care for children with care in a family or family-like environment in the community, not limited to the children leaving institutions. This is the process of preventing the placement of children in institutions, creating new opportunities for children and families to receive support in the community [3].

One purpose of this type of services is aimed at teaching children to build skills for independent living and promoting social inclusion. Another goal is specialized work with children who are returning to the family environment; prevention of abandonment and counseling of parents. Over the years stability has been ensured, all social services are financed by the state budget as specialized ones.

Institutions for children are part of the legacy left by the totalitarian state in which the approved policy is based on the idea that the state is able to care better for the upbringing of children than their families. This policy, continued for more than 40 years, has leaved lasting traces on public attitudes and mentality of people in the country. The institutionalization of child care in Bulgaria continues to be an unresolved issue that can not be explained only with the totalitarian past. The lack of a clear political will to close the homes lead to their "reform" and "restructuring" that are often perceived as a repair of the buildings and did not lead to a significant change in the way of care and children's lives.

Economic, political and social changes that accompany the transition, give rise to new challenges and exacerbate existing problems. Some of the key factors that influence the institutionalization are:

- Insufficient number of services for children and families that should meet complex needs and uneven distribution throughout the country.
- Lack of financial resources, which often results in the exclusion of families and placement of children in institutions.
- Lack of a developed system of alternatives to community-based institutional care.
- A prevailing medical model to a child's disability, according to which the institution offers the best care for children.
- Lack of inclusive social and architectural environment.
- Changed patterns of family behavior that lead to an increase in illegitimate births and parents who provide care for children on their own.

Placement of children in institutions violates their rights guaranteed by international conventions to which Bulgaria is a party (UN Convention on the Rights of the Child [6], Convention on the Rights of People with Disabilities [2]) and leads to establishment of discriminatory patterns in education and access to quality care and services.

Regardless of the input resources, the lives of institutionalized children of boarding type are not becoming better and services of higher quality. The institutional life does not imply the existence of a trust relationship with one constant adult, individual care, attention and personal space for the child. It can not satisfy the basic needs of

children and adversely affects their development and behavior. This in turn leads to further economic and social cost to society.

In this regard, implementation of an effective policy for deinstitutionalisation requires a change in the philosophy of child care with an emphasis on:

- Prevention of risks;
- Early Intervention;
- Support to the families and assurance of family or family-like environment.

These actions are based on a policy in the best interests of the child aimed at supporting families, and create the best conditions for development of children and realize their full potential. This policy is also based on respect for child rights norms, standards and principles of universality, indivisibility and non-discrimination, while characterized by a high sensitivity, flexibility and preparedness to meet the challenges.

MAIN FEATURES OF THE POLICY OF DEINSTITUTIONALIZATION OF CHILDREN

Deinstitutionalization is the process of replacing institutional care for children with care in a family or family-like environment in the community, not limited to the children leaving institutions. This is the process of preventing the placement of children in institutions, creating new opportunities for children and families receive support in the community and takes place on many levels:

- working with families and professionals from social and close to it areas on prevention of abandonment and institutionalization of children with a view to limiting and gradually cease placing of children in institutions and to support the reintegration of children in their native families;
- reform and work in the social welfare system for the implementation of programs for social support and protection to support the home and extended family for the prevention of abandonment and raising children in a family environment;
- opening alternative forms of services and care to create an opportunity for the children to get out of institutions or prevent their placement;
- promote the development of adoption and foster care with a focus on development of services for children of 0-3 years;

- engaging the public in support of children leaving institutions for their social inclusion;
- putting children and families at the center of the work of all those working with children.

The basic principles are related to:

- Actions to protect the best interests of the child according to the UN Convention on the Rights of the Child is the guiding principle that the interests of the child should be placed above the interests of all others, including parents, potential adoptive parents, foster parents or staff of the institution.
- The family is the best environment for child development - all working in the field of deinstitutionalization should have a common understanding about the negative impact that institutional care has on children and how is important a child to grow in a family environment.
- The social inclusion of children is of paramount importance - it must be achieved by providing opportunities for all children to participate in all aspects of community life, including attending local kindergartens and schools and use local health, transport and other public services.

The approaches in the process of deinstitutionalization should be:

- Each child should be a subject of a needs assessment that includes an evaluation of parental capacity and the opportunity the child to be grown up in his/her family.
- No child should be get out of an institution without a plan of action and care co-developed with the people who now and in the future will take care of him/her, and with the participation of the birth family when possible.
- Maintaining contact and emotional connection between the biological family and the child, whenever possible, should be a key element of providing constant care for each child, whether or not there is an opportunity for future reintegration.
- For all children from institutions under closure placement should be provided in a family or family-like environment, no child should be omitted.
- Institutions are not closed by moving children from one institution to another.
- Providing an advantage to placement in a family environment - in service demand alternative to stay in an institution, first to make every effort to reintegrate the

child into his/her family when it is appropriate and does not endanger the child's life. When this is not possible, to seek for an opportunity for long-term solution in the best interest of the child - first seek for placement in a family of friends or relatives, then in foster or adoptive parents.

- Children are placed in residential care services for small children only when it is not possible family placement, the demand for family form of care in the system of protection does not stop with the placement.
- The search for a permanent solution for the child is a key part of the action plan to minimize his/her transfer from one form of care to another.
- Children should be included as much as possible in making decisions about the form of care that will be selected.
- Siblings must be collected and kept together, unless it is appropriate and possible.
- After getting out of children from institutions, their capacity must be reduced to final closure.
- Institutions for children with disabilities will be closed with a priority in parallel with homes for medical and social care of 0-3 years as the stay of children in institutions of this kind and at this age is the most detrimental to their development.
- Active involvement of the staff of the institutions in the process of deinstitutionalization, development and implementation of programs for retraining and directing staff to alternative social services in order to use the existing capacity and human resources.

The main goal is ensuring children's right to family environment and access to quality care and services according to their individual needs.

Specific targets are related to:

1. statutory regulations, funding and staffing of a wide range of services for children and families in the community, based on best practices and attracting innovative approaches;

2. increasing the capacity in the system of child protection by clearly defined and efficient allocation of powers and responsibilities of child protection, service providers and the provision of adequate professional capacity for the effective operation of the system;

3. closure of 137 institutions for children within 15 years;

4. preventing placement and raising children of 0 to 3 years in residential care of any type after the reform.

Achieving these goals requires an integrated comprehensive policy on children and families, and changes in the folowing sectoral policies:

- Adopting a broader concept of welfare of all children and guaranteeing their rights.
- Services to support parents to fulfill their responsibilities to children, not the state to assume these responsibilities, and improving the quality and effectiveness of alternative forms of care and services.
- Modern approach to health care which supports mothers before, during and after the birth of their children, and does not allows ill children and children with special needs to be separated from their parents for long periods of time.
- An educational system that has the capacity and resources to support different needs of all children.
- System for child protection which is clearly differentiated from the social assistance system.
- Favorable and approapriate for child justice system where any child who appears in court - whether as a victim of crime or accused of involvement in crime - should be treated first and foremost as a child.
- Introducing a new approach to financing of services for children in which resources are directed to services to meet the specific needs of children and families and their effectiveness, not the buildings where they are provided. The financial resources intended to meet the needs of children to follow users who have successfully got out of institutions, accordingly reducing capacity and funding of the institution.

CONCEPTUAL FRAMEWORK OF CHILD CARE

Looking at the whole process and the differentiation of types of care the following generalizations and conclusions are made in a comparative analyses on the costs and benefits of the child care system in Bulgaria [1].

- In terms of investments:

Resident care in the community is evaluated based on leaving SOS children's villages. However, it is expected that most of the results to be applicable to all relevant services. They have the highest, but clear and understandable operating expenses on the ratio "placement of a child for per year".

Foster care is the cheapest in terms of the ratio " placement of a child for per year" when into account only the cost of the state budget is taken and it is comparable to the cost of institutional care that takes into account the total cost. Placement with friends and relatives is currently the most promising in terms of cost. However, given the decentralized approach, quality assurance and standards of service are significant.

Institutional care demonstrates a relatively low cost in relation to the ratio "placement of a child for per year". Although the cost structure of state institutions does not reflect the overall costs, it can be argued that institutional care for a child can be significantly more expensive, when economies of size are not taken into account.

With regard to the modernization of services, resident care in the community and foster care are equally good, while institutional care is lagging behind.

- In terms of results:

The leaving residential care in the community have relatively high educational achievement - mostly secondary specialized education. They usually find jobs after graduation and do not continue with further education. They have an independent lifestyle, skillfully cope with everyday tasks, refrain from abuse of drugs and alcohol or risky behavior. They have relatively the most stable working conditions and communicate in an expanded social network. They see themselves at the level of their peers and are generally satisfied with their lives.

Leaving foster care / placement with friends and relatives behave in a similar way to leaving residential care in the community. However, they reach higher educational level and continue their education after school, adhere to the educational model of the majority of the population and follow the line with the accepted careers. This may be due to the higher level of education, the larger number of social contacts, availability of employees as models in their surroundings and relative ease of use of channels for employment. In some cases, care leavers demonstrate the immature behavior of leaving residential care in the community and institutional care.

The leaving institutional care have reached the lowest educational level and work in unstable conditions. As a result, generally they earn less than the other two groups and rely on social assistance. They have less developed social networks and often socialize primarily with other leaving the institutional care. Their lifestyle is unhealthy, on the other hand, they express the opinion that they are in better health, which is likely due to the need to adapt to worse health services ("survival"), low susceptibility to health problems and difficulties in accessing health services. There is a trend older leaving institutional care to demonstrate better adaptation to independent life in terms of housing, work, income, mature behavior, compared with younger ones. At the same time, they represent less on issues related to mental health and smoking. Ultimately, the price for the aim of successful integration in life is the higher health risk. This finding needs further study in terms of estimated costs of mental and physical problems.

For the quality of the "results" of the leaving residential care in the community and foster care are the higher benefits for society in terms of income, employment, health and criminal record.

In terms of the ratio of costs and benefits foster care / placement with friends and relatives is undisputed. Resident care in the community gives such good results, although it is hampered by the high costs per child.

Institutional care provides low-quality results with low cost per child and in some cases outperformes only the residential care in the community.

Based on the analyzes proposals can be defined (Table 1) and a common conceptual framework for child care can be presented (Table 2) [1].

Table 1. Recommendations

Issue	Time dimension	Адресати
Research		
Actively disseminate the results of the research to inform public opinion about the benefits and costs of each system for the care of children who can be helpful in the process of political decision-making	Short to medium term	State institutions
Introduction of the new paradigm in the analysis of the needs of children and overall development in their response	Short to medium term	Service providers, academic and research institutions

Establishing a system for long-term collection and analysis of data on progress in the development of children in the process of care and long-term effects of different types of care for children / youth in their lives as adults	Medium term	State institutions, service providers, academic and research institutions
Introducing the methodology of the analysis of costs and benefits / opportunity for ex-ante and ex-post evaluation of the current and the reformed system of care for children	Medium to long term	State institutions, service providers, academic and research institutions
Policy		
Develop a policy promoting priority support to the biological family over foster family and residential care to community	Short to medium term	State institutions
Conceptualization of a wide range of services related to family support and substitute care	Short to medium term	State institutions, service providers
Raising awareness and improving the participation of the leaving, care recipients and care providers in the process of political decision-making	Medium to long term	National and local institutions, research NGO in community
Increasing funding for foster care / placement with relatives and resident care in the community	Permanently	State institutions
Services		
Definition of quality standards, funding and accountability, taking into account the fulfillment of the needs of children	Short term	State institutions, service providers
Definition of the specifications for "smart placement", ie appropriate placement of children in accordance with their needs in the logic of "priority support to the biological family, foster family and residential care in the community"	Short to medium term	State institutions, service providers
Developing a monitoring system to monitor the path of every child in an appropriate care system	Short to medium term	Service providers
Improving the qualifications and training of carers with the aim of adopting new working methods	Medium term	Service providers

Table 2. Common conceptual framework of child care

1. NEEDS	2. SERVICES	3. INPUTS	4. RESULTS	5. IMPACT
1.1. Physical needs	2.1. "Physical services" услуги	3.1. Financial resources; 3.2. Material resources; 3.3. Human resources; 3.4. Additional resources	4.1. Results related to personal sustainability; 4.2. Results related to sociability; 4.3 Results of the personality / maturity;	5.1. "Direct" benefits: 5.1.1. Sources of revenues; 5.1.2. History of employment; 5.1.3. Economic
Food, shelter, sleep and rest, health, sexual education, personal space	Food provision, hygiene, shelter, medical care, dental care, providing autonomy			

1.2. Emotional needs	2.2. "Emotional" services	(donations); 3.5. Hidden costs (investments related to the "social" services)	4.4 Horizontal results. Life skills.	activity; 5.1.4. Criminal offenses; 5.1.5. State transfers; 5.1.6. Tax contribution; 5.1.7. Health status. 5.2. Additional impacts (complementary direct benefits): 5.2.1. Educational attainment; 5.2.2. Risky behavior; 5.2.3. Family status; 5.3. Impacts in the context of: 5.3.1. Housing conditions; 5.3.2. Social activities in leisure time; 5.3.3 Quality of life.
Pleasure, security, emotional development, personal belongings, personal success, to love and to be loved	Sport, games, entertainment, relationship with the most important person, providing personal belongings, personal communication			
1.3. Cognitive needs	2.3. "Cognitive" services			
Cognitive development, confidence, a variety of stimulation, learning, independence, to be important to someone.	Training, access to various forms of experience, language development, access to books, internet, movies			
1.4. Social needs	2.4. "Social" services			
Identity, knowledge of the rules, sense of values, autonomy, self-esteem, self-sufficiency, spiritual development, relations	Academic education, access to peers, freedom of choice and opinion, sexual education, sccess to authoritative figure, sevelopment of social skills, professional training, religious / cultural services			
	2.5. Administration	3.5.1. Other costs that can not be allocated		

CONCLUSION

Construction and development of a qualitatively new system of providing social services in Bulgaria is a process that can be completed with the adoption of a set of strategies, programs and projects. The normative definition of this process does not lead to automatically getting better and sharper results. The reasons for the difficulty of this process are many and of different nature, but in any case they are related to previously existing activities and services, the capacity of the Bulgarian social services, and - not least - of public attitudes. Public opinion, as a corrective to social interests, accepts always uniquely specific actions of social public services, gives high public significance of certain phenomena and specific cases. The lack of a detailed permanent analysis of processes for providing various social services hinders their effective control and management of risk situations. Undoubtedly this is a complex process and sizing it only by quantitative indicators, which most often uses the National agency for social assistance and the Ministry of Labour and Social Policy, appears as an insufficient information resource for making the right decisions in this direction. The statistics provide a good basis for primary analysis, but not for the consideration of these processes in depth.

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Analysis of the development of restaurant business in Ukraine

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Аналіз розвитку ресторанного господарства України

Сучасна індустрія ресторанного бізнесу постійно поширюється та видозмінюється під впливом різних факторів внутрішнього і зовнішнього середовища. Ринок послуг харчування України є достатньо динамічним, оскільки безпосередньо залежить від коливань попиту споживачів, їх платоспроможності та від загальних змін в економіці країни [1].

Таблиця 1.1

Кількість підприємств ресторанного господарства за період 2006-2015 р.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Ресторани	726	823	998	1215	1408	1460	1553	1540	1408	1422
Кафе, закусочні та буфети	6722	7928	8034	8868	9452	9049	9108	7434	5327	5415
Бари	682	725	814	754	2453	2448	2466	2146	2017	2030
Їдальні	4488	4585	4642	6455	9990	9891	9695	9441	9157	9039
Всього	8618	9961	14488	16292	22803	22848	22822	20578	19640	1 9662

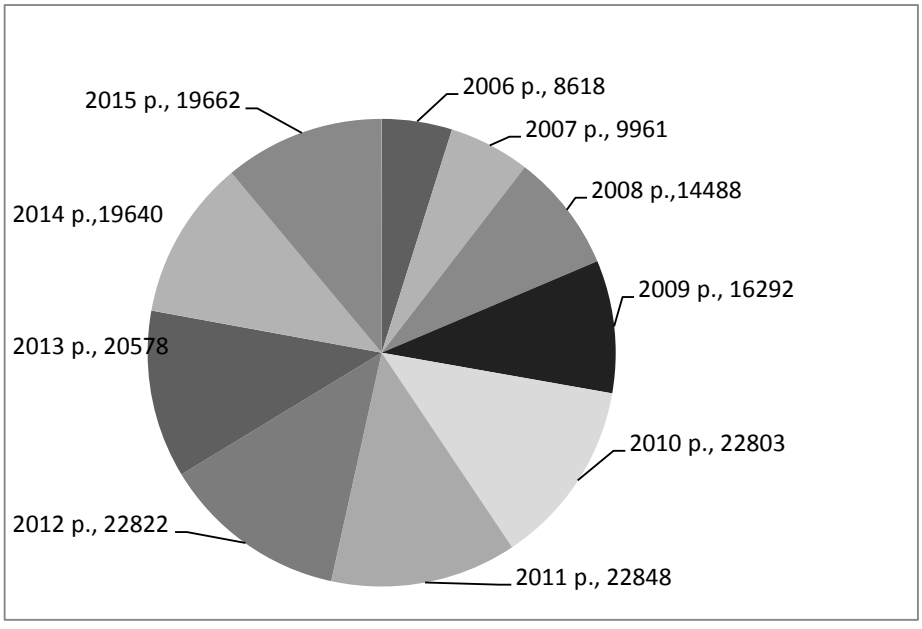
У 2006-2010 роках спостерігалось стрімке збільшення кількості закладів ресторанного господарства. Ресторани зросли майже у 2 рази (у 2006 р. ресторанів – 726, в 2010 вже 1408); кафе, закусочні та буфети- більш ніж на 40% (у 2006р. їх 6722, у 2010р. вже 9452) ;їдальні – більш ніж в 2 рази (у 2006р.-4488, у 2010р.-9990); бари – у 3,5 рази (у 2006р.-682, у 2010р-2453). У цілому кількість закладів ресторанного господарства збільшилась більш ніж у 2,5 рази [2].

Стан ринку ресторанного бізнесу є досить нестабільним в останні п'ять років (з 2011-2016), за крутим підйомом спостерігається не менше круте падіння кожні рік-півтора. Каталізатором бурхливого зростання в 2011 і 2012 роках було Євро-2012. За цей період в Україні збільшилась кількість ресторанів, кафе, закусочних на 6% (у 2011 р.-10509, у 2012р.-10641), кількість барів збільшилась на 7,3% (у 2011 р. їх 2448, у 2012 вже 2466), а кількість їдалень зменшилися на 3% (у 2011 р. їх 9891, у 2012 вже 9695); в цілому кількість закладів зменшилась менше ніж на 1% (у 2011 р. - 22848, у 2012 р. – 22822) [3]. В українській столиці, наприклад, за ці два роки стало на 100 ресторанів більше, за інерцією відкриття тривали і до початку 2013-го. Ситуація погіршилась всередині 2013 року через революцію, війну на сході, падіння гривні. Станом на кінець 2013 року, порівнявши з минулим роком, відбулося стрімке зменшення кількості закладів ресторанного господарства: ресторанів – на 1% (у 2012 р. їх 1553, у 2013 вже 1540), кафе, закусочних, буфетів – на майже 18% (у 2012 р. їх 9108, у 2013р вже 7434), їдалень – на 3% (у 2012 р. – 9695, у 2013 р. – 9441), барів – на 13% (у 2012 р. – 2466, у 2013 р. – 2146); в цілому кількість закладів зменшилась на 10% у 2012 р. – 22822, у 2013 р. – 20578) [4].

Згідно з даними компанії "Ресторанний консалтинг", в цілому за 2014 рік в Україні припинили роботу близько 5 тис. ресторанів і кафе (у 2013 р. їх було - 20578, у 2014 р. - 19640), 6% барів (у 2013 р. було 2146, у 2014 р. - 2017), 3% їдалень (у 2013 р. було 9441, у 2014р – 9157); усього кількість закладів ресторанного господарства зменшилася на 5% (у 2013 р. було 20578, у 2014 р. – 19640). Причиною цього стала анексія Криму, тоді Україна втратила 1700 закладів, а після початку бойових дій на Донбасі закрилися або заморозили роботу близько 3 тис. ресторанів. Тоді через кризу почали закриватися ресторани по всій країні. Лідером по закриттю закладів (крім Криму та Донбасу) став Київ, де припинили роботу понад 100 ресторанів. Лідером Київ став переважно через найбільшу кількість закладів, у порівнянні з іншими містами. В зв’язку з перерахованими подіями, ресторатори поступово почали пристосовуватися та шукати нові можливості для збереження бізнесу, оптимізувати витрати. Оскільки середній чек відвідувачів ресторанів упав, більшість рестораторів прибрали з меню дорогі страви та почали економити на тому, що дороге в закупівлі, а з іншого боку - через зменшення попиту [5].

Ситуація ринку ресторанного бізнесу в 2015 році була трохи кращою, ніж в 2014. За минулий рік, за даними Ресторанного консалтингу, закрилося 143 ресторану, тоді як відкрилося 58 нових закладів. Також припинилося падіння відвідуваності. Тоді в Україні сформувався певний прошарок населення, яке харчується поза межами будинку і їх кількість перестала скорочуватися. Набрали популярність концептуальні заклади з авторською кухнею, в той час як заклади, які зробили акцент на національній кухні, в стравах якої використовувалися імпортні продукти, почали нести збитки. Наприкінці 2015 року ситуація покращилася: в Україні відкрилося близько 100 нових закладів ресторанного господарства, що дало змогу вважати, що ресторатори все ж вчаться пристосовуватися до кризи та проходити її з найменшими втратами. Загалом за період 2015 року кількість ресторанів збільшилась на 1% (у 2014 р. було 1408, у 2015 р. стало 1422), кафе, закусочних, буфетів збільшилось на 2% (у 2014 р. було 5327, у 2015 р. стало 5415), бари збільшились менше ніж на 1% (у 2014 р. було 2017, у 2015 р. стало 2030) та їдалень стало менше майже на 2% (у 2014 р. було 9157, у 2015р. - 9039); всього кількість закладів ресторанного господарства збільшилась на 2% (у 2014 р. було 19640 , у 2015 р. стало 19662) [6].

Більш наочно зміна кількості ресторанного господарства за період 2006-2015 р представлена на діаграмі 1.1.



Діаграма 1.1 - Кількість підприємств ресторанного господарства за період 2006-2015 р.

Товарообіг є одним із головних показників результативності господарської діяльності підприємств ресторанного господарства і важливим чинником забезпечення сталого економічного зростання галузі в цілому [7], табл.. 1.2.

Таблиця 1.2

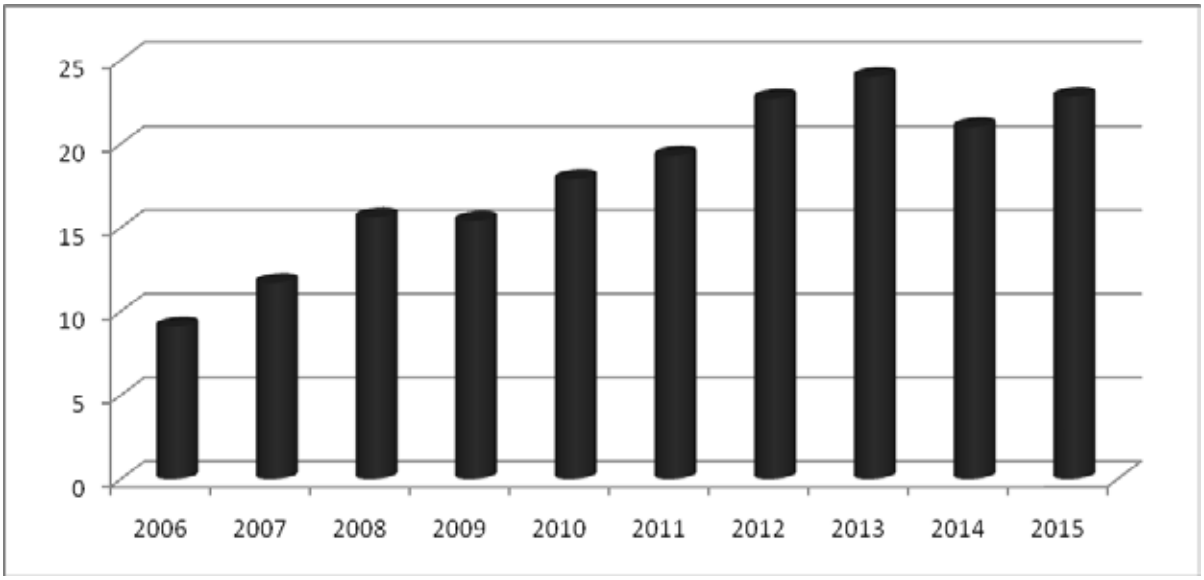
Товарообіг підприємств ресторанного господарства за період 2006-2015 р, млрд. грн

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Підприємства ресторанного господарства (ресторани, кафе,закусочні, буфети,бари, їдальні)	9,1	11,7	15,6	15,4	17,9	19,3	22,7	24	21	22,8

Товарообіг підприємств ресторанного господарства упродовж 2006- 2010 років зріс більш ніж на 50 % (у 2006 р. – 9,1 млрд. грн., у 2010 р. вже 17,9 млрд. грн.). На період 2011-2012 р. також спостерігалося зростання товарообігу на 15 % (у 2011 р. – 19,3 млрд. грн., у 2012 р. вже 22,7 млрд. грн.). Обіг ресторанного господарства за 2014р. проти попереднього року (на кінець 2013 року обсяг товарообігу становив 24 млрд. грн.) зменшився на 14,3% і становив 21 млрд.грн. Та вже на 2015 рік спостерігалося зростання обсягу товарообігу підприємств ресторанного господарства на 8 %.

Згідно з даними державної статистики, можна побачити, що товарообіг ресторанного господарства зростає з року в рік, лише у 2009 та 2014 роках був незначний спад.

Прослідкувати динаміку зміни товарообігу підприємств ресторанного господарства більш наочно можна за допомогою гістограми 1.3.



Гістограма 1.3 – Товарообіг підприємств ресторанного господарства (млрд. грн) за період 2006-2015 р.

Аналіз загального обсягу товарообігу проводиться одночасно з аналізом обігу по продукції власного виробництва і обсягу випуску страв. Згідно з даними статистики на даний момент в Україні спостерігається позитивна динаміка товарообігу ресторанного господарства [8].

Таким чином, результати досліджень дозволили виявити позитивні тенденції розвитку ресторанного господарства в Україні. Незважаючи на загальну тенденцію зниження кількості підприємств ресторанного господарства, що обумовлена, перш за все, загальною економічною кризою в країні та загостреним станом галузі ресторанних послуг, який можна пояснити активним входженням на ринок ресторанного бізнесу України міжнародних корпоративних мереж, слід відзначити великі перспективи розвитку для національних ресторанних мереж за рахунок неповної насиченості ринку а також поглинання індивідуальних закладів ресторанного бізнесу.

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Strategic tasks of government enterprises

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Стратегические задачи государственного предпринимательства

Новые условия экономического развития с возрастающими кризисными явлениями и турбулентной внешней средой обусловили трансформационные процессы в деятельности организаций государственного сектора. Сегодня они переоценивают свою деятельность по созданию общественной и экономической ценности, а внешние условия развития экономики — динамизм экономических процессов, усложнение и возрастание требований потребителей товаров и услуг, увеличение скорости передачи информации и получения новых знаний, обострение конкуренции — стимулируют государственные организации мыслить стратегически, адаптируя рутинную деятельность к новым ожиданиям внешней среды [8].

В этой связи внедрение предпринимательских принципов становится приоритетной траекторией развития субъектов госсектора на пути к построению гибкой, динамичной и эффективной структуры вне зависимости от формы собственности (нерыночные или коммерческие) [10, с. 37].

Реализация особой формы бизнес-активности в государственном секторе, направленной на достижение инновационности, прибыльности и динамичности его хозяйствующих субъектов, обусловила развитие феномена государственного предпринимательства.

Эволюция сущности государственного предпринимательства и его форм привела к распространению данного феномена на разные уровни управления в госсекторе: уровень местного и регионального управления [3, с. 114], в которых функционируют политические лидеры — управленцы (policy entrepreneurs); сектор оказания государственных услуг[5, с. 793], в котором функционируют госменеджеры–инноваторы и государственные агентства и учреждения; государственные бизнес-структуры (корпорации), выделившиеся сегодня в самостоятельные коммерциализированные хозяйствующие субъекты госсектора [6, с. 16-17]; и, наконец, национальный управленческий уровень [7,с.224-225] (концепция предпринимательского государства [9, с. 181, 193]).

Одним из преимуществ государственного предпринимательства является то, что оно становится мощным стимулом для развития отраслей экономики, поскольку является источником решения провалов рынка и стимулирования значимых проектов. Государственное предпринимательство – инструмент локального распределения взаимозаменяемых ресурсов, поддержки высоких экстерналий и координации промышленных взаимосвязей. Вместе с тем усиление бизнес-активности государства помогает развить скрытые возможности организаций посредством финансирования прибыльных проектов с высокой концентрацией нового знания (в силу высоких затрат на поисковые работы (discovery costs) частные компании часто не идут на рисковые проекты). Внутренние способности государственных организаций порождают ряд преимуществ для развития их инновационного потенциала. Так, из-за преобладания динамического аспекта эффективности в

деятельности субъектов государственного предпринимательства развитие инноваций становится достижимой долгосрочной инвестиционной стратегией. Компании с государственным участием могут финансировать долгосрочные рисковые проекты, и, соответственно, больше ориентированы на условия неопределенности. Создание госкомпаниями устойчивых сетей знаний и межфирменных взаимодействий (patentsharing, cross-licensing) ведет к повышению их глобальной конкурентоспособности.

Несмотря на многоуровневость, задачи государственного предпринимательства остаются универсальными. Оно всегда предполагает генерирование новой экономической активности. Государственное предпринимательство проявляется через уникальную природу активности (экономическое поведение) его субъектов, приобретающую черты предпринимательского действия, что отличает данную концепцию от модели «нового государственного управления» и административного типа экономического поведения (public manager). Трансформационные явления наблюдаются в увеличении способностей государственных субъектов к предпринимательскому типу поведения: сегодня они занимаются активным поиском прибыльных возможностей, развивают открытую инновационную культуру и гибкость внутренних процессов. Многие авторы склоняются к раскрытию сущности государственного предпринимательства через универсальный механизм предпринимательского действия со стороны его субъектов, то есть деятельности или процесса в госсекторе, результатом которого становится развитие существующих и создание новых услуг, инноваций и технологий, новых стратегий, а также фокус на исполнение предпринимательских функций: бдительности к поиску прибыльных возможностей в условиях рыночного дисбаланса, создание инновационных товаров и услуг и адаптация новых бизнес-практик, инвестирование в ресурсы в условиях неопределенности, способность адаптироваться к внешним изменениям, поиск прибыльных возможностей [4, с.304].

Для реализации эффективной предпринимательской модели в государственном бизнесе важно обеспечить необходимые условия для ее

внедрения и успешного функционирования. Задачами, стоящими перед субъектами государственного предпринимательства сегодня, становятся:

- Обеспечение баланса между коммерческой стабильностью (доходностью) и осуществлением непрерывного вклада в развитие экономики, а также критический анализ целей государственного предпринимательства, четкое определение некоммерческих целей и их соотношения с коммерческими. Ясно сформулированные обязательства и цели субъекта государственного предпринимательства, подтверждающие уникальность их создания и функционирования, включаются в корпоративные планы государственных компаний и должны отвечать долгосрочной стратегии.
- Усиление управленческой автономии от излишнего политического вмешательства. Политика правительства не отличается долгосрочными стратегическими планами, сменяемость курсов, зависимость от манипуляций законодательных властей и групп интересов накладывают свои ограничения и временные рамки (чаще всего краткосрочные горизонты планирования) на бизнес-операции госкомпаний.
- Усиление долгосрочного механизма стимулирования сотрудников, внедрение рыночно-ориентированной системы вознаграждения по результатам и воспитание работников знания (knowledge workers). Для современных субъектов государственного бизнеса необходимо разработать систему четких и эффективных стимулов для вознаграждения руководства (в частности государственных представителей) и сотрудников.
- Развитие смешанных структур собственности и сокращение административной монополии в стратегических отраслях. Развитие смешанных структур собственности должно распространяться на стратегические и конкурентные отрасли путем сокращения административной монополии в стратегических отраслях и

уменьшения долевого участия государства в конкурентных отраслях.

- Повышение качества информации о результатах деятельности госпредприятий и ее обработки госучреждением, контролирующим деятельность госкомпаний, для принятия соответствующих решений. В противном случае имеет место излишнее внешнее микрорегулирование.
- Разработка стратегии управления, ориентированной на получение прибыли в долгосрочной перспективе с учетом некоммерческих целей, то есть усиление стратегического планирования. Важную роль здесь играют долгосрочные инвестиции в наращивание материального и интеллектуального потенциала госкомпании. (Для этого необходимо освоить новейшие технологии путем инвестирования ресурсов в укрепление технологического потенциала).

Также велико социальное значение государственного предпринимательства. Поддержка менее прибыльных потребительских сегментов, минимизация безработицы, развития социальной ответственности и пр. Однако все это приводит к двойному статусу субъектов государственного предпринимательства, которые вовлечены в выполнение социальных обязательств. Мультипликативность социальных и финансовых целей затрудняет заключение контрактов (pay-for- performance) с менеджерами и приводит к мягким бюджетным ограничениям.

Тем не менее, в силу предпринимательского механизма, основные модели эффективности применимы к субъектам государственного бизнеса. Современные субъекты государственного предпринимательства должны сочетать в своем поведении (оптимизировать) механизмы достижения динамического и статического аспектов эффективности для принятия стратегических решений в изменяющейся внешней среде.

Итак, можно с уверенностью констатировать, что современные субъекты государственного предпринимательства обладают сильным потенциалом решения задач госбизнеса для достижения динамической эффективности,

направленной на получение устойчивых конкурентных преимуществ за счет гибкого использования ресурсов и изменения технологий в долгосрочном периоде.

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Analysis methods for the determination of resistant characteristics of the instrument

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Анализ методов определения стойкостных характеристик инструмента

Совершенствование конструкций пневмоударников является актуальной задачей горного машиностроения на современном этапе развития. Применение погружных пневмоударников малого диаметра при одновременном сгущении сетки взрывных скважин дает возможность резко уменьшить выход негабарита и повысить производительность труда на выпуске руды из блоков. Возможными путями решения проблемы повышения производительности и ударной мощности малогабаритных пневмоударников является совершенствование их конструктивных схем. При одномассовой системе применение двух или нескольких рабочих камер позволяет увеличить энергию удара. Однако этот путь ограничивается прочностью самого ударника.

Существует несколько запатентованных конструкций двух или многомассовых ударников. Они позволяют увеличить ударную мощность за счет роста частоты ударов. При этом энергия ударников может теоретически передаваться как через другой ударник, так и через корпус. В первом случае один из ударников выполняет роль буферного устройства. Во втором случае каждый ударник кроме первого наносит удары по корпусу, а он уже передает энергию буровому долоту.

Представляется интересным изучение оптимальных значений стойкостных свойств высокопрочных вольфрамо-кобальтовых сплавов, используемых для изготовления инструмента. В основу плана изменения температурного диапазона эксперимента могут быть положены технологические условия спекания данного вида сплава.

Сотрудниками Северо-Кавказского горно-металлургического института разработана конструкция малогабаритного пневмоударника [1], суть которого заключается в следующем: в корпусе находится ударник, который оснащен в торцевой части оголовником. Ударник наносит удары по долоту, взаимодействующему с породным забоем скважины. Оголовник выполняется из высокопрочного материала, который обладает высоким уровнем предельной объемной энергии упругих деформаций $\omega_{пр}$. Таким материалом может быть вольфрамо-кобальтовый сплав ВК25, обладающий высоким уровнем ударной вязкости, пределом прочности $\sigma_в$=3500 МПа и модулем упругости E=4320 МПа [2].

Предельная энергия упругих деформаций составит

$$\omega_{пр} = \frac{\sigma_B^2}{2E} = \frac{3500^2 \cdot 10^{12}}{2 \cdot 4320 \cdot 10^6} = 14178 \cdot 10^5 \frac{Дж}{м^3}$$

Принимая к расчету $\omega_{пр}$=140·10^5 Дж/м^3 из-за неизученности предела усталости вольфрамо-кобальтовых сплавов, получаем возможность значительно уменьшить массу ударника и его размеры, так как плотность сплава ВК 25 в два раза выше, чем плотность стали при сохранении энергии единичного удара.

Еще более высоким уровнем временного сопротивления сжатию обладает сплав ВК8. У него $\omega_в$=5860 МПа, что удваивает значение $\omega_{пр}$ по сравнению со сплавом ВК25.

Использование предлагаемого пневмоударника позволит при малых габаритах оголовника и уменьшении массы ударника повысить предельно допустимую энергию единичного удара или увеличить частотность процесса, что в конечном результате позволит повысить ударную мощность пневмоударника.

Полученный результат в равной мере относится и к буровым коронкам, корпуса которых также работают в условиях предельных нагрузок.

Решение задачи повышения прочности инструмента начинается, как правило, с исследования его прочностных характеристик [3]. В качестве опытного инструмента использовался твердый сплав на основе карбида вольфрама.

Экспериментальная установка была выполнена в соответствии с требованиями теории подобия, что в дальнейшем позволило использовать полученные результаты без дополнительных расчетов. Методика эксперимента была составлена таким образом, что бы получаемый результат имел минимальную методическую ошибку. Для этого из одной партии вольфрам-кобальтовой смеси были отпрессованы образцы прямоугольной формы. Спекание проводилось в водородной среде.

Для определения искомых характеристик образец прогревался до заданной температуры в течении 60 минут до 1450^{9}C. Контроль за значениями параметров проводился каждые через 15 минут. Усадка, или плотность, образца определялась по действующим методикам, как разность между образцами до и после спекания. Опыт проводился с 5 образцами. Через каждые 15 минут один образец убирался для определения промежуточных характеристик сплава. Контроль образцов проводился через каждые 100^{0}C. Температурный диапазон эксперимента определялся из технологических условий спекания данной марки сплава.

По полученным данным были построены статические характеристики – зависимость между температурой и свойствами сплава. Анализируя полученные результаты, можно видеть, плотность сплава возрастает неравномерно. На интервале температур 400^{0}C – 500^{0}C происходит резкое увеличение усадки и удельного веса. Это явление объясняется началом упорядочения пор, сближением частиц друг к другу. Происходит полное удаление пластификатора. Переход в жидкое состояние пластификатора способствует переходу его с поверхности сплава и освобождению внутренних пор. Освободившееся поры стремятся принять сферическую форму, что способствует уменьшению объема и плотности упаковки изделий.

При температурах 500 – 600^{0}C наблюдается не только прекращение объемной усадки и плотности, но даже некоторое уменьшение этих параметров.

Это объясняется тем, что при данных температурах изделию сообщается необходимое количества энергии для восстановления деформированных при прессовании кристаллических решеток.

В интервале 700 – 1200^{0}C наблюдается равномерный рост плотности и усадки. Скорость роста усадки составляет 0,075 г/см^3 на 100^{0}C. Это объясняется процессами, проходящими за счет твердосплавного спекания. Повышение температуры способствует сближению частиц за счет уменьшения объема пор. Происходит упорядочение кристаллических решеток и устранение дефектов.

Свыше 1200^{0}C наблюдается резкое увеличение объемной усадки и плотности сплавов. Это объясняется появлением жидкой фазы и процессами, проходящими в присутствии жидкой фазы.

При достижении температур 1450^{0}C наблюдается прекращение роста объемной усадки и плотности. Это совпадает со временем прекращения процессов перекристаллизации через жидкую фазу и все межчастичные пространства (поры) заполнились легкоплавким компонентом.

Здесь происходит дополнительный рост крупных частиц за счет присоединения более мелких. Происходит выравнивание поверхностной площади частиц за счет стремления системы к выравниванию поверхностной энергии. Между частицами устанавливаются минимальные расстояния, наблюдаются стремления к дальнейшему роту частиц. Однако дальнейший рост частиц требует внутренней энергии, что невозможно при этих температурах. Дальнейшее увеличение температуры не сообщает системе необходимое количество энергии, следовательно, роста частиц не происходит.

Следовательно, можно сделать вывод, что при температуре 1450^{0}C процесс спекания будет закончен и изделие достигнет максимальной плотности. Выше приведенные выкладки напрямую относятся к прочностным характеристикам инструмента, так как именно технология изготовления определяет твердость или прочность инструмента. Использование данного материала в качестве оголовника для пневмоударника также позволит увеличить частотность процесса и его ударную мощность.

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Azerbaijan and the World Trade Organization: the prospect of membership

The independence of Azerbaijan and its competent participation in international economic relations foresaw both political rapprochement with other countries, and active inculcation into the international trade and economic space, and as a result, strengthening the country's position in the international trade. One of the main factors contributing to the above processes is a membership in the World Trade Organization (WTO). Nowadays the members of this organization are the overwhelming majority of the world countries. At present, the WTO agreements regulate about 97% of the world trade in goods and services.

The majority of the former republics of the post-Soviet area are the members of the WTO, a number of states, including Azerbaijan, are observers at the WTO.

It is important to note that in connection with the transition to market economy the formation of bilateral and multilateral foreign economic relations, the integration of national economy into the global economy became necessary in Azerbaijan. In compliance with changes in the structure of foreign economic relations, the staff of market partners also changes. So, if the number of the country's market partners was equal to 121 in 1999, today, the number of countries having trade relations with Azerbaijan is over 150. If the CIS countries were Azerbaijan's market partners in the first years of independence, now the ratio has changed in favor of the EU countries. In recent decades, the role of the EU countries in Azerbaijan's foreign trade has significantly increased especially after foreign oil companies large investments in the oil sector of the Azerbaijani economy and the subsequent implementation of oil contracts.

Thus, if we consider the dynamics of foreign trade, we can see that according to the data of the State Statistics Committee of Azerbaijan, in 2001 the foreign trade turnover of Azerbaijan amounted to 3.74 billion USD, at a surplus of 884,4 million. The export volume was 2.3, and the import volume was 1.4 billion USD. 91% of Azerbaijan's export came to oil and oil products. It should be noted that the trade operations were carried out with 123 world countries, the largest trade partners of Azerbaijan in specific weight of trade turnover were Italy (43.8%), Russia (34.5%), on the third place - the US (9%). Turkey (7%), Israel (5.5%), Spain (3.4%), and others occupied the fourth and following places, correspondingly.

In 2014, the volume of foreign trade turnover made up 31016.3 million USD, of which 21828.6 million USD fell to the share of export, and 9187.7 million USD - of import. At the same time, in 2014, the share of the CIS countries was 2,921.3 million USD, the share of the EU countries was 14671.2 million USD, and the share of Eastern European countries was 3625.0 million USD from the total foreign trade turnover of the country. The main trade partners of Azerbaijan are still Italy (16.4%), Germany (8.5%), Russia (6.3%), Turkey (5.8%) and a number of other countries.

Today, Azerbaijan claims to be the main strategic partner of the world community in the Caucasus, in particular with regard to cooperation in the energy and a number of other sectors. In the future, there are long-term plans for the country's transformation into a regional transport hub between the East and the West. Therefore, Azerbaijan has objective necessity to integrate the national economy into the global trading space. As of today, over 75% of commodity resources in retail trade of the country are provided by imports, and in some items - such as industrial and industrial goods, this number reaches 90%. As was mentioned above, most of Azerbaijan's export is raw materials. Despite increasing from year to year volumes of export-import operations, raw directivity of export and orientation of import on industrial and consumer goods and raw materials speaks about the fact of having problems in this area. Nowadays, Azerbaijan has focused its efforts on the development of non-oil sector, particularly on the development of manufacturing industrial sectors. It will help to reduce the dependence of the national economy on oil prices. Together, if Azerbaijan wants to expand trade relations with the world countries all its efforts should promote the achievement of competent participation in the international trade and economic organizations, and first in the WTO as it's a

central institution implementing regulation of trade flows in the world economy. Thereupon, the question of joining the WTO has been on the agenda of Azerbaijan's foreign economic strategy for many years.

There is no doubt that Azerbaijan entry into the WTO may be an important step in the further development of the national economy and creating a competitive environment in all its branches, improving the legal basis and its unification with the legislative practice of other countries, as well as the country's participation as a full member in the international economic exchange, facilitating the effective solution of international trade disputes.

The WTO lays certain claims to Azerbaijan which include the following: change of the legislative basis and its adaptation, in accordance with the requirements of the WTO Agreements; decrease of customs tariffs; the state's refusal from exemption to all economic players; refusal from preferential taxation of agricultural producers; the necessity of following the liberalization policy in the services market and access to that market for non-Azerbaijani residents, etc.

Proclaiming the openness of the economy, Azerbaijan may face a number of problems arising in the foreign policy orientations on the development of export branches and export of goods. It requires hard work to settle the legislative aspects in accordance with civilized legal norms practiced in the modern world trade.

There is no doubt that Azerbaijan's joining the WTO will make certain imbalances in the development of industries and can aggravate the unevenness of country's regional development. An important step in the preparation of enterprises to competition with foreign companies is the certification of the final products and production processes in concordance with the international quality standards. The task of government is to facilitate the opening of CA and encourage an early transition of organizations to international standards of production quality. It should also be noted that access to foreign markets of Azerbaijani enterprises is complicated by the fact that there are few experts in the sphere of international marketing and business in the country. A major obstacle hindering Azerbaijan's entry into the WTO is support to agriculture. The World Trade Organization opposes protectionist government measures in respect of agriculture, i.e. the State, joining the WTO, must cut down agricultural subsidies, reject export subsidies and reduce customs tariffs on foreign products. These demands run

counter to the policy of the Azerbaijani economic development. After the accession to the WTO we can undoubtedly include as the positive progress of the domestic agro-industrial complex of the country, the development of an export potential of the sector, increase in foreign investments; experience of developed foreign countries shows the positive impact of agricultural liberalization on the inflow of foreign investments in the sector, which favorably affects the efficiency of agricultural production and the influx of technology. Dividends from the country's joining the WTO and the opening of the domestic market of agricultural products should be expected in the long term future, when the increase of production competitiveness and export of processed products due to it will help to compensate the negative influence. Definitely, after the country's joining the WTO a cut in prices on goods and services is expected, i.e., first of all the positive effect of WTO joining will feel the ordinary Azerbaijani consumer. A number of Azerbaijani economists predict serious problems to national producers, others believe that the WTO membership will enhance the growth of competitiveness and quality of Azerbaijani products, and some expect reducing of state budget revenues.

Azerbaijan has been negotiating to join the WTO since 1997, but despite this, there is still no agreement. Azerbaijan does not hurry to join the WTO, explaining its position that it should carefully think over all the pros and cons of this action. If we examine the experience of post-Soviet countries, which are members of the WTO, we see that the effect of the entry into this structure is very ambiguous. In particular, according to some economists, for some countries, for example Georgia, Armenia, Kyrgyzstan, Russia it is a matter of prestige and there is no real effect of the WTO membership for economies of these countries. However, everyone knows that these countries became part of the globalization process of the world economy. The WTO supporters and its opponents make an agreement in one point: there is no alternative to Azerbaijan's membership in the WTO.

According to the introductory concept of Azerbaijan entry into the WTO, adopted by the Commission, it is assumed that the Azerbaijani government's position will be based on the following principles:

- To receive appropriate concessions granted to other countries, taking into account that Azerbaijan is a developing country with transition economy;

- To achieve the maximum long term of the transition period up to full inculcation of the WTO rules;
- To achieve increase in import duty charges on goods having strategic importance for the economy of Azerbaijan;
- In case of duty charges reduction to reach equilibrium in the balance of their level with regard to product groups;
- To promote the allotment to Azerbaijan the same special and differential concessions which were granted to developing countries during the negotiations, as well as to prevent the liberalization of the rules on the employment of foreign experts;
- During the negotiations about subsidies in agriculture to get subsidies in the amount of 10% of annual agricultural production.

As you know, today Azerbaijan is in the process of bilateral negotiations with a number of countries. Within the framework of the negotiations, Azerbaijan works on bringing the domestic legal base in accordance with the requirements of the WTO, and contributes to the improvement of the trade regime. The main aim of the negotiations is to find the balance of rights, obligations and interests of Azerbaijan, the basic principles of the WTO and the interests of the countries - members.

Thus, the main “pluses” of Azerbaijan's membership in the WTO are: open access of Azerbaijani goods to foreign markets; creating favorable investment climate; involvement of countries into the international process for resolving trade disputes; improving the quality and range of local products as a result of competition with imported foreign goods; participation in the formulation of international trade rules, taking into consideration national interests.

The "minuses" of accession to the WTO are the following: the threat of local producers’ bankruptcy due to competition with low-cost high-quality imported goods; negative consequences awaiting agricultural sector because of limiting the subsidies volume in agriculture; a threat to the national banking system because of the arrival of large foreign banks, etc.

However, without taking into account the skeptics’ words, we can say that Azerbaijan's joining the WTO is an irreversible process, improving the efficiency of

foreign trade relations of Azerbaijan with other countries and its intensive inculcation into the world economy.

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Factor analysis of the Russian online lending market

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Факторный анализ российского рынка онлайн кредитования

Актуальность исследования. На фоне растущего разнообразия банковских услуг кредитование населения остается одним из основных направлений банковской деятельности. В рамках реализации данной услуги банки выполняют важную функцию в экономике – служат посредниками между потенциальными кредиторами и потенциальными заемщиками. Транзакционные издержки, с которыми пришлось бы столкнуться участникам данного рынка без участия банков, до недавнего времени делали существование рынка прямого кредитования невозможным.

Информационные технологии, в первую очередь – интернет, частично решают проблему транзакционных издержек на рынке прямого кредитования. Медийная модель ведения бизнеса позволяет владельцам специальных сайтов, созданных для регистрации потенциальных кредиторов и заемщиков на рынке прямого кредитования, извлекать прибыль, не взимая плату за пользование сайтом с посетителей. При этом владельцам выгодно вкладывать ресурсы в удобный интерфейс, в рекламу ресурса – во все, что позволяет участникам рынка быстро находить контрагентов.

Рынок прямого кредитования, или рынок P2P онлайн кредитования, начал свое развитие в марте 2005 г. в Великобритании; в России данный продукт появился в 2010 г. На сегодняшний день одной из актуальных проблем прямого кредитования в России является недостаточная изученность самого процесса и рисков, которым подвергается как заемщик, так и кредитор. Процесс кредитования происходит между физическими лицами, что мультиплицирует риск недобросовестного поведения (например, создание финансовых пирамид и других мошеннических схем). В России все кредитные сервисы позиционируют себя как информационную площадку, что не требует специального лицензирования; сервис выступает агентом, т.е. выполняет поручения пользователей в сделках и не несет ответственности в случае невозврата займов. *Цель исследования* - оценка факторов функционирования российского рынка онлайн кредитования; *задачи*: провести сравнительный анализ ключевых факторов развития рынка прямого кредитования в развитых странах и России; сегментировать российский рынок прямого кредитования.

Степень разработанности проблемы. В обзоре Alexndar Bechmann и Alexander Becker [1] были отмечены 43 работы, которые были опубликованы с 2006 по 2010 гг. Одной из первых научных публикаций в области P2P кредитования можно считать работу Hulme и Wright [2] «Internet Based Social Lending: Past, Present and Future» (Hulme, Wright, 2006); к одной из последних публикаций в данное сфере можно отнести «Determinants of Defaultin P2P Lending» [3] (Serrano-Cinca et. al., 2015). Sebastian Moenninghoff и Axel Wieandt [4] рассматривают не только P2P кредитование, но и все возможности площадки P2P, позволяющие пользователю обходиться без посредника.

Исследователи из разных стран рассматривают регулирование рынка P2P кредитования (Verstein, 2011)[5], (Chafee, Rapp, 2012)[6], (Zeng, 2013)[7] и (Slattery, 2013)[8]. Эмпирические исследования поведения экономических агентов на рынке прямого кредитования направлены, в первую очередь, на изучение двух основных вопросов: риск и доходность. Исследование риска дефолта заемщика, связанного с вложением средств на рынке прямого кредитования, чаще всего основано на эконометрической логит-модели, модели бинарного или множественного выбора (Serrano-Cinca et. al., 2015) [3], (Emekter et. al., 2015)[9], (Мальцев А.И., 2014) [10].

Применение моделей бинарного выбора в данном случае позволяет определить вклад каждого фактора в общий риск, причем риск измеряется в форме вероятности дефолта по каждому конкретному кредиту.

Второе направление эмпирических исследований рынка прямого кредитования состоит из набора публикаций, в которых построены модели, объясняющие прямо или косвенно, формирование процентной ставки по займу (Herzenstein, Andrews, et. al., 2008) [11], (Gonzalez, Loureiro, 2012) [13], (Wang et. al., 2015) [13].

«P2P lending» кредитование является результатом применения Web 2.0 в финансовой индустрии; под P2P кредитованием подразумевается процесс кредитования заемщиков - физических лиц кредиторами - финансовыми институтами и (или) физическими лицами через электронную площадку, в результате замены традиционного финансового посредника на электронную площадку, которая получает комиссионное вознаграждение за выдачу кредита напрямую.

За счет снижения расходов и совершенствования инфраструктуры по сравнению с традиционными банками, платформы P2P кредитования предлагают более низкие процентные ставки для заемщика, более высокие ставки доходности для инвесторов и генерируют большой трафик в течение короткого периода времени, однако основной риск - это риск дефолта заемщика для кредитора.

Как известно, мировыми центрами развития прямого кредитования являются Великобритания, США и Китай, но спектр данных услуг стремительно распространяется и в других странах. К ключевым факторам развития рынка прямого кредитования в развитых странах, позволяющим эффективно конкурировать с традиционными финансовыми институтами, можно отнести следующие:

- устойчивое развитие онлайн банкинга и адаптация мобильного банкинга;
- высокий уровень проникновения кредитных карт и большие объёмы необеспеченных кредитов;
- нормативно-правовая база для P2P кредитования или для кредитования через электронную площадку;

- относительно низкий уровень удовлетворенности клиентов услугами, предоставляемыми традиционными финансовыми институтами;
- наличие кредитной информации о заемщиках, единое кредитное агентство (рост источников информации о заемщиках и улучшение технологий помогает P2P разрабатывать модели андеррайтинга);
- институциональные инвесторы являются ключевыми игроками в P2P кредитовании и играют определяющую роль при расширении целевого рынка.

В настоящее время функционируют две ключевые модели рынка: *западная* (законодательное регулирование, фиксированные ставки, онлайн взаимодействие, эффективный кредитный скоринг, финансовые технологии, оцениваемые риски, умеренные суммы кредита, срок кредитования – 0,5 до 5 лет, диапазон процентных ставок от 5% до 36%) и *восточная* (несовершенное законодательство, экзогенные ставки, онлайн и офлайн взаимодействие, слабый кредитный скоринг, возможная сумма кредита более $1 миллиона, цель кредита – от покупки средств производства до кредитования малого бизнеса, срок кредитования – от 3 месяцев до 4 лет, диапазон процентных ставок от 8% до 18%); данная бизнес-модель находится под влиянием сформировавшейся бизнес – среды.

В результате проведенного анализа нами выявлено два ключевых фактора, которые негативно влияют на формирование и развитие российского рынка прямого кредитования: *кредитная история* (рынок кредитных историй довольно молод) и *процентная ставка по банковским депозитам* (существенно выше относительно западного рынка депозитных счетов).

Как известно, основным преимуществом P2P кредитования является процентная ставка; она должна быть ниже, чем по кредитам и выше, чем по депозитам. Вместе с тем условия, на которых предлагаются кредиты с помощью P2P платформ (небольшая сумма займа, короткий срок кредитования, высокая процентная ставка) не соответствуют данному критерию. Критерии рынка МФО (микрофинансовые организации) наиболее соответствуют займам, которые выдаются через платформы P2P кредитования на российском рынке как займы «до зарплаты». Из рассмотренных P2P платформ, функционирующих в РФ,

только Вдолг.ру и Loanberry можно охарактеризовать как максимально «приближенные» к модели видения бизнеса западных P2P компаний. Платформа Вдолг.ру стремится поменять модель видения бизнеса, уйти с рынка МФО, минимизировав процентные ставки по займам, самостоятельно определяет процентные ставки по кредитам в зависимости от кредитного рейтинга. Платформа Loanberry предлагает наиболее привлекательные процентные ставки относительно других платформ P2P кредитования и предлагает опцию «гарант», которая снижает кредитные риски для инвесторов. Платформы Город денег и Альфа Поток предлагают наименьшие процентные ставки, но также предоставляют займы для бизнеса и используют не только интернет в своей бизнес - модели, поэтому не подходят под критерии прямого кредитования.

По нашему мнению, развитие российского рынка прямого кредитования можно подразделить на два сегмента: первый будет предоставлять займы по критериям МФО (займы «до зарплаты»), а второй сегмент будет развиваться по критериям западных P2P платформ. Так, платформы БезБанка и Fingooroo работают по критериям первого сегмента; платформа MoneyMan также является представителем первого сегмента по критериям предоставления займов, однако модель P2P кредитования здесь была нарушена.

В соответствии с Федеральным законом Российской Федерации от 21.12.2013 г. № 353-ФЗ «О потребительском кредите (займе)» Банк России в установленном им порядке ежеквартально рассчитывает и публикует среднерыночное значение полной стоимости потребительского кредита (займа) по категориям потребительских кредитов (займов) отдельно для кредитных организаций, микрофинансовых организаций и т.д. С 29 марта 2016 г. вступил в силу Федеральный закон от 29.12.2015 г. № 407-ФЗ «О внесении изменений в отдельные законодательные акты Российской Федерации и признании утратившими силу отдельных положений законодательных актов Российской Федерации», который внес изменения в Федеральный закон от 02.07.2010 г. № 151-ФЗ «О микрофинансовой деятельности и микрофинансовых организациях» [14]. Согласно нововведениям, микрофинансовые организации подразделяются на два вида: микрофинансовые компании (МФК) и микрокредитные компании (МКК). По новым правилам только микрофинансовые

компании (МФК) могут выдать займы удаленно через интернет. Для получения статуса МФК, согласно новым требованиям, микрофинансовая организация должна иметь минимальный размер собственных средств (капитал) 70 млн. руб. и соблюсти ряд других требований. Максимально возможная сумма займа, которую можно выдавать через интернет, составляет 15 тыс. рублей. Для идентификации клиентов МФК должны привлекать банки, которые имеют генеральную лицензию и удовлетворяют другим довольно жестким требованиям. Кроме того, добавлено общее ограничение для всех займов: совокупный размер процента не может более чем в четыре раза превышать сумму основного долга займа.

Выводы. На российском рынке у модели P2P кредитования в сегменте микрозаймов «до зарплаты», по нашему мнению, нет конкурентных преимуществ и драйверов развития, поступательное развитие в данном сегменте по объективным причинам в настоящее время затруднено. Развитие российских платформ P2P кредитования по модели западных аналогов предполагает, что платформы должны привлекать наиболее благонадежных заемщиков и выдавать займы в сегменте потребительского кредитования. Для достижения данной цели необходимо, чтобы процентная ставка для них была привлекательна, т.е. ниже ставки банковского кредитования. Передовые компьютерные технологии и высокотехнологичные инструменты могут обеспечить низкие комиссионные сборы, комфортные варианты получения и оплаты займа. С позиции конкурентоспособности скорость принятия решения и время от подачи заявления до выдачи денег, должно быть сопоставимо с аналогичным банковским сервисом. Для этого необходимо развивать технологическую базу, обеспечивающую безопасность технологии веб-сайта P2P и совершенствование механизмов идентификации пользователей, а отлаженная нормативно-правовая система будет способствовать зрелому развитию рынка прямого кредитования в РФ. Кроме того, выход на рынок прямого кредитования институциональных инвесторов, прежде всего в лице коммерческих банков, станет сигналом о том, что P2P кредитование является полноправным участником данного рынка.

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Digitalisation and Personalism

Abstract. In the article is presented an issue to transformation of research and system as a core for information and knowledge management by new challenges of information identity, search, personality, personalism and philosophy of digital society, economy and culture. Basic and applied research of digitalisation, economy identity, personality and personalism are determinants of insights, thinking, models, innovations and management for growth and wealth of personality, social-economical living and society.

***Keywords*:** digitalisation, research, information management, digital economy, personalism, philosophy of society and culture.

There is unbelievable space and prospect for research and development of information, computerization and communication systems, technology and knowledge by cybernetic principle. Like field of emerging research, novelty and innovation changes positively personality, industry and management by robots, mechatronics and bionics in engineering, techno-economical system (TES) and socio-economical system (SES). [2, 5] But how will they carry essence and meaning of life by researcher, creator, user and manager of them? The issue has a sense, when limited opportunities of the human being determine occurring and reproducing of unavoidable digital unit to practical problems and new scale for next steps to research, growth and development.

Contemporary digitalization expands practical solutions for social applications of scientific research, knowledge and innovation by nanosystem and nanotechnology in the economy, society and global world. For example it grows by Clouds, Big Data, Internet, cybernetics, robotics, research and economization of information. But digitalization creates many challenges to inclusive power of connectivity, digital scale

and scope of signal design, process and substance, as well as to digital research and achievement within nanosystem and nanotechnology for mastery of subject and people to fuller use-value of digital resource in social and economic work, professional and personal life, education and culture as strategic priority of digital society and digital economy. [3, 4]

Information details on different types of many studies, ideas, knowledge and experience change characteristics of themselves both technically and in accordance with human nature and people. Unprecedented clarity and change are digital scale and design of information unit in research, innovation and management. But incredibly difficulty is search for the most correct answer to issue: what type of restricted information and universal parallelism, sequence of description and handling is original by status and position of data and knowledge in thinking and communication. It is difficult to research and profess it. Because it is a reflection by dialectical thought of contradictions that contradict not only to themselves but also to any contradiction by origin. Like real difficulty is complicated somebody to explore and spread uniquely it in three and more dimensions, even if only as information unit. Much more complicated is to present duality, ambiguity and polysemy as status of interchangeable description and transfer of different concept types in reality and field of conventionality or absoluteness of study.

However, the digital personal and social sense, and digital personal and social interest are a new smart phenomenon and challenge for achieving economy identity, personal and social innovation and wealth as well. Personality is important factor of substance in search and overcoming risk, crisy and survival in market, competition, social and political conflict. Meaning of objectivity and evolution of personal involvement and importance of performance depend on digital social sense across entire spectrum of individual characteristics, skills and sustainable universality of competency for employment and inclusion in social phenomena, digital event and facts of reality, virtual design and environment.

Paradigmatic problem of digital transformation is that information remains remote by origin of thinking and recognition, communication, work and application of value and use-value of property and personality. Furthermore, digital change is inevitable by increasing of information sensitivity as human research, discovery, innovation and

communication into TES and SES. It is always growth of emotional and cognitive intelligence of individual and people, where speed and thinking of transformation are extremely important. It requires self-knowledge, communication and building of skill for presentation of skills by economic identity, search, paradigmatic thinking and paradigmatic recognition.

Research and creative thinking and ontology of sign-symbol and communication by information unit improve substance and design of electronic digital signal and light digital signal. In this context importance of scientific discovery and research expands, as well as relevance of them in history, industry, market, scientific community and society. However, there is a gap of relativistic indicators for differences between study, research and creation in optimization of knowledge and social resource, as well as for solution of essential contradictions in the information and knowledge management. Similar indicators are necessary to determine differences between basic and applied knowledge as a research operational design, model-pattern and paradigm of research system, innovation indicators and management, as well as in creation of policy for managing innovations, research projects and scientific projects. For example relativistic indicators for reliability of information are needful for evaluation of scientific basic research and scientific applied research as a specific important value and worth of research expert, consumption and effect of information and knowledge benefit to science, education and socio-economic life. Because data and code of them creation bear varied sense of self-determination, value and meaning of presence that is involved in model or paradigm for management of knowledge, cost, organization and society. [5]

Relativistic information indicator of methodical corelation of data, analitics and value need to new aproach by realiability, evaluation and prospect of data and knowledge. But preservation of information and self-preservation of scientific information by reliability and evaluation of knowledge take more information reserves than it needs. It is so, because information unit is a kind of universal code that reveals potential for creating another source of input, study and release a variety of variations. Its universality works as a special live digit in dimensions and scale of thinking, knowledge and action. It is a kind of framework for use-value for information identity and building of economy identity of personality.

Information identity and value of it are property that determines search and

identification of information objects and creating new elements, structure and function of device, system and network for storage, maintenance and reproduction of different physical forms of data as electronic information signal and light information signal. But this is only one way of using digital identity in technical device, system, platform and network.

Information identity is a key for writing code in programming, modeling and simulation software product and service. In applied meaning and concept, it has specific place of property, criteria and rules of information unit that determines limits of definition, application and benefit of research and use of it. Information identity is universal sensor within substance to touch data as information object by code, research and cognitive design to relevant concept and live tool for improvement. It helps to encompass research and actions to search data and digital transformation of efficient synchronization of personality, public and market sector. It requires smart digital culture.

Variety of seeking and research involves multiple process to create quality and complete product information, the core of which, among other things, standing code that builds it. Basic principles and best practices of writing successful code require research and explanations, because even the smallest detail is crucial to final outcome, goal and desired success between human limitation and potential of TES and SES.

Digitilization is impossible without management, which overcomes crises of individual, organization, economic and social life. Assessment of systemic risk of crisis management resource is an important part of critical research, innovation and investment. Modern systematic risk is a type of digital risk of sharing connectivity design and management. It becomes more wide range of descriptive statistics and specific scale code, which makes many digitally thoughtful reflections. There is observed increasing of basic and applied research with various software analytics for market and economic analyses, forecast and strategic solution. [3, 4, 5]

Difference between evaluation and research item is a point of determination and use information as basic and applied issue. Digital assessment is relative by use-value and benefit of research product and service because it is ratio of performance and transfer of universal model-pattern on purpose and value. Its essence of determination is activated by objective and subjective condition of acceptance, resistance or neglect of personality. Direct and indirect measurement of variables and measurable indicator for

digital descriptive, correlation, causal-comparative, experimental and personal research, and social study lead to new community and society of view, operational search and substance by innovation and creative cognitive design of personality and organization.

Socio-Economic rationality, reliability of information and evaluation of knowledge are new area for digital scale to promotion of it by quality of information and knowledge management. Large database and analytical approach to modeling and application model, concept and strategy bring to balance of contradictional assumption and algoritm of requirements that are based on virtual model, experiment and simulation. Problem is what kind of personality, smart growth and sustainability of economic growth are established and improved. Do systems, personality and personalism become more open or more closed to share and save energy as presence, assertion and value?

Storage, processing, dissemination and use of information conquered civilian and society, and substitute personal life in deep gradations. It needs new cybernetic principle for management of information unit as property of knowledge and value in TES and SES. Challenge for digital personalism (personalism in digital society) is to facilitate and support growth of economic identity without losing personal meaning of life by system urge.

Cost factor has human and technical sides. Ideal machine prospect is impossible without data and information identity of it. In the virtual environment subject becomes a target and a target of himself. Why? It is because subject loses completely or at least some extent digital view of reality. Caution is needed for adequate monitoring, operation research and self-control that is not just feedback information link.

A few of prospect cause interest for development of knowledge and culture about digital resources and management:

- improvement of ontology, paradigmatic thinking and research by digital unit and management for innovation, technology and engineering; smart digital reflective tool decisions to express comfortably human emotion, desire, purpose and search;
- creation and development of new type of digital identificator and system for easier and wider access of subject and people in virtual environment, as well as unifying type of sensor and identification in order to mobility and security; broadening and deepening scale and scope of the design of digital system and technology, for example in bionics, robotics, and others;

- improvement of variety of digital code and management regarding ownership of information; protection of privacy in electronic communications and opening new unified opportunities for digital business and economy; increasing quality and scale of digital system and virtual market, as well as smart digital culture;
- development of smart reliability of information and security from unauthorized access to systems and networks; providing of more individualised digitised research and services of personality, organization and personalism of them;
- creating of models and approach to multidisciplinary research, development of scientific and educational cooperation and integration in strategic national and international fields; enhancing scale of multidisciplinary research for digital market, economy and cultural heritage, and others.

Person and digital personalization is a special kind micro physical-chemical-biological-spiritual laboratory and people are macro similar laboratory that requires use-value of research, identification and communication of personality and personalism.

Information is a type of medicine as research and using for soul and mind that needs management. In the absence of culture storage, use-value and management of data, it often remains abandoned, forgotten and lost. Should civilian think personally about information when data speak only to subject and work for wealth?

Digital system and technology are tools of precision and accuracy in the research and management. Smart growth of research, personality and society is provided by digitization of TES and SES. Social life is in front of new technical achievements and highs, intelligent sensuality, intuition and rationality on basis of tthinking of data, knowledge and experience. It's about awakening and perfection of mind and soul that use channels of different frequencies and energies of communication skills for vision of micro- and macrodesign by reflections and model, traditional and untraditional logic, knowledge, use-value and philosophy.

The new digital sense and view is unique for personality as human limitation and potential. It is outset for research to access, transfer and management of data and knowledge, work and welfare. Active pursuit of digital excellence, creative self-determination, study and social importance of digital identity and economy are economic asset and issue for emergence of new personal and social idea, smart code and ideal.

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To the question of assessing the tax potential of the region using representative tax system

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К вопросу оценки налогового потенциала региона методом репрезентативной налоговой системы

В условиях нестабильности российской экономики и высокой степени дотационности региональных бюджетов особую актуальность приобретают вопросы, связанные с увеличением уровня собираемости налоговых платежей.

Однако для грамотной организации данного процесса необходимо обладать полной и достоверной информацией о максимальном объеме налоговых доходов, который может генерировать тот или иной регион в определенных макро-экономических условиях, то есть о величине его налогового потенциала.

Само понятие налогового потенциала на сегодняшний день не закреплено в налоговом законодательстве и, соответственно, не имеет общепринятой формулировки (в Бюджетном кодексе РФ налоговый потенциал употребляется лишь в

контексте распределения дотаций на выравнивание бюджетной обеспеченности субъектов РФ и муниципальных образований)[1].

Так, одни авторы под налоговым потенциалом понимают «совокупный объем налогооблагаемых ресурсов территории, являющихся базой для исчисления всей совокупности налогов и обязательных платежей на территории субъекта» [1], [2].

Другие рассматривают налоговый потенциал как «максимально возможную сумму поступлений налогов и сборов, исчисленных в соответствии с действующим законодательством» [3], [4].

На наш взгляд, определение налогового потенциала как величины налогооблагаемых ресурсов не дает полной информации о возможном уровне собираемости налоговых платежей в бюджет, так как не учитывает установленных в рассматриваемый период особенностей их налогообложения.

В связи с этим, в данном исследовании налоговый потенциал понимается как максимальная *величина налоговых доходов, которые могут быть получены бюджетной системой за определенный период времени исходя из уровня развития и структуры экономики.*

Точность и обоснованность оценок налогового потенциала региона во многом зависят от используемых для этого методик.

Так одни субъекты РФ (Владимирская, Ярославская, Ленинградская области, Чувашская Республика), используя фактический метод, рассчитывают налоговый потенциал как сумму налоговых платежей, поступивших в бюджет за определенный период, прироста задолженности за отчетный период, а также суммы налога, которая приходится на региональные и местные льготы [5].

В Тюменской[2] и Иркутской [3] областях в качестве относительного показателя меры налогового потенциала используют среднедушевые доходы населения.

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[1] ст. 131, 138, 142.1 Бюджетного кодекса Российской Федерации от 31.07.1998 N 145-ФЗ (ред. от 28.12.2016 г.). URK: http://www.consultant.ru/document/cons_doc_LAW_19702/

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Применяются и иные методы, такие как, например, метод прямого счета, метод репрезентативной налоговой системы, метод регрессионного анализа, а также оценка налогового потенциала с помощью показателя валового регионального продукта [5].

Существенным недостатком представленных методик, на наш взгляд, является то, что при их использовании налоговый потенциал определяется на основании фактических поступлений налоговых платежей в бюджет по данным официальных источников [6]. Соответственно, не берется во внимание величина скрытого потенциала, под которым подразумеваются те налоги, которые не поступают в бюджет региона вследствие существования теневого сектора экономики. В связи с чем возникает актуальная проблема неполноты измерения налогового потенциала, что оставляет нерешенной проблему увеличения собираемости налоговых платежей.

Исходя из сказанного, нами предложена методика оценки налогового потенциала субъекта, базирующаяся на методе репрезентативной налоговой системы (РНС), который применяется в большинстве российских регионов [5].

Сущность данной методики заключается в определении налогового потенциала региона, как суммы налогового потенциала официальной экономики (фактических объемов налоговых поступлений в бюджет по данным официальных источников) и налоговых потерь бюджета от теневой экономики.

Исходя из сказанного, совокупный налоговый потенциал региона представим в виде формулы:

$$RTP = \sum_{n}^{i} (RTPo_i + RTPs_i), \quad (1)$$

где RTP – совокупная величина налогового потенциала региона, $RTPo_i$ – налоговый потенциал *i*-го налога в официальной экономике, $RTPs_i$ – величина *i*-го налога, скрытого в теневом секторе экономики.

При этом, налоговый потенциал *i*-го налога в официальной экономике региона определим как:

$$RTPo_i = RTc_i \times Kc_i, \quad (2)$$

где RTc_i – сумма исчисленных налогов по *i*-му налогу, $Кс_i$ – коэффициент собираемости *i*-го налога, который рассчитывается в соответствии с формулой:

$$Кс_i = \frac{RTf_i}{RTc_i}, \quad (3)$$

где RTf_i - сумма *i*-го налога, фактически уплаченная в бюджет региона, RTc_i – сумма исчисленных налогов по *i*-му налогу за тот же период.

Величину налоговых потерь бюджета от теневой экономики определим как разницу между теоретической (расчетной) суммой налоговых доходов по *i*-му налогу (RTt_i) с величиной *i*-о налога, фактически поступившего в региональный бюджет (RTf_i):

$$RTPs_i = RTt_i - RTf_i. \quad (4)$$

Расчет теоретической суммы (то есть величины налоговых поступлений в бюджет при условии отсутствия влияния теневой экономики) по каждому налогу имеет свою специфику.

Так, например, расчет теоретической суммы налога на доходы физических лиц (НДФЛ), который является основным бюджетообразующим налогом для большинства субъектов РФ, произведем по формуле:

$$RTt_{IT} = (In - St - Td) \times Tr, \quad (5)$$

где RTt_{IT} – теоретическая (расчетная) сумма НДФЛ, In – величина доходов населения, St – сумма социальных трансфертов, Td – налоговые вычеты по НДФЛ, Tr – налоговая ставка по НДФЛ.

Результаты апробации данной методики на примере Амурской области представлены в таблице 1.

Выбор в качестве объекта исследования данного региона обусловлен тем, что в большинстве исследований, посвященных пространственному распространению теневой экономики в России, именно Амурская область выделяется как территория с большой долей теневого сектора. Это во многом объясняется высокой степенью депрессивности региона, приграничным с Китаем расположением, значительной долей торговых операций, а также аграрной специализацией [7].

Таблица 1

Оценка налогового потенциала Амурской области с учетом полного взимания НДФЛ

Показатель	Период					
	2009	2010	2011	2012	2013	2014
$RTPo_{IT}$, млн. руб.	9517,8	10536,6	11900,7	13403,1	14640,0	15169,9
$RTPs_{IT}$, млн. руб.	2892,3	1801,0	3642,1	5747,0	7667,6	9378,4
RTP_{IT}, млн. руб.	12410,1	12337,6	15542,8	19150,1	22307,6	24548,3

Из табл. 1 видно, что на протяжении рассматриваемого периода значительная часть налогового потенциала Амурской области сосредоточена в теневом секторе, что свидетельствует о том, что у региона имеется значительный объем резервов, не задействованных в официальной экономике.

При этом с 2010 г. наметилась четкая тенденция снижения уровня использования совокупного налогового потенциала (рис. 1), что, с одной стороны, может быть обусловлено общеэкономическими тенденциями (в период с 2011 по 2014 гг. темпы роста российской экономики снизились с 4,3 % до 0,6 %), а с другой – ростом налоговой нагрузки на регион вследствие увеличения в 2011 г. ставки процента на страховые взносы с 26 до 34 %.



Рис.1. Доля используемого налогового потенциала в общем объеме совокупного налогового потенциала Амурской области

Считается, что увеличение налоговой нагрузки заставляет предпринимателей ускорять свою деловую активность для сохранения сложившегося уровня рентабельности в условиях новых количественных параметров налоговой системы. Однако существует предел колебаний налоговой нагрузки, который способны выдержать хозяйствующие субъекты без особого ущерба для своей деятельности [8]. Превышение данного предела может стать, с одной стороны, причиной банкротства предприятий, а с другой – создать дополнительные стимулы для роста масштабов налоговых уклонений вследствие увеличения издержек на рабочую силу в официальной экономике [9].

Таким образом, применение представленной методики не просто дает возможность решить проблему неполноты оценки налогового потенциала, но и позволяет выявить скрытые резервы, которые при правильном подходе могут стать хорошим источником для увеличения собираемости налоговых поступлений в бюджет региона.

Кроме того, проведение систематического анализа динамики налогового потенциала теневого сектора позволит оценивать эффективность управленческих решений, принимаемых в процессе разработки и реализации региональной бюджетно-налоговой политики.

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Central banks different strategies in official gold reserves management

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Различные стратегии центральных банков в области управления государственным золотым запасом

Замечено, что институциональные инвесторы формируют спрос на золото в периоды экономической нестабильности и неопределенности. Тем не менее 2016 г. был седьмым по счету годом, когда объем покупок золота официальным сектором в лице центральных банков и других институтов превысил объем его продаж. Вместе с тем следует отметить, что достигнутый объем является наименьшим с 2010 г.

Сравнивая показатели объема покупок золота официальным сектором за 2015 (576,5 т) и 2016 (383,6 т) гг. [1], мы видим, что последний снизился на 33%.

Что касается поквартальной отчетности, то наибольший объем покупок золота пришелся на четвертый квартал 2016 г.: центральные банки увеличили его долю в своих резервах более чем на 114 т (это на 32% ниже того же периода 2015 г.) даже несмотря на укрепление доллара США.

Основными покупателями золота в 2016 г. выступили центральные банки России, Китая и Казахстана. На их долю пришлось 80% всех покупок официального сектора.

При этом согласно ЦБ РФ, объем запасов монетарного золота в структуре международных резервов РФ по состоянию на 1 января 2017 г. составил 1614 т. Следует заметить, что с 1 декабря 2016 г. данный показатель не изменялся, следовательно в декабре Банк России не осуществлял закупки драгоценного металла.

Между тем стоимость золота, находящегося в международных резервах РФ, за декабрь 2016 г. сократилась на 2,4% за счет колебаний цены драгоценного металла до 60 млрд долл. США. Доля монетарного золота в структуре международных резервов РФ составляет 15,2%.

Всего за 2016 г. ЦБ РФ закупил 200 т золота, увеличив таким образом его объем в составе международных резервов РФ на 14,1%. Денежная оценка золота в резервах возросла на 24%.

Сравним данные показатели с показателями 2014 и 2015 гг. В 2015 г. российские официальные запасы золота были увеличены на 209 т. - это на 4,7% больше чем в 2016 г. В 2014 г. также были проведены значительные закупки драгоценного металла: его прирост составил 172 т, что на 14% меньше показателя 2016 г. [2]

В последние годы Россия стабильно находится среди стран-лидеров по объемам официальных запасов золота. Смещение с 5-го на 6-е место произошло в 2015 г. после обнародования Национальным Банком Китая (НБК) размера своих золотых резервов.

Официальный золотой запас Китая, по данным МВФ, в 2016 г. составил 1838 т. По данному показателю КНР занимает пятое место в мире после США, Германии, Италии и Франции. Следует отметить, что НБК в июле 2015 г. объявил, что его золотые резервы составили 1658 т, увеличившись более чем на 50% с 2009 г. (6 лет он не раскрывал информацию об объеме накопленного монетарного золота). [3] В период с июля 2015 г. до конца 2016 г. они возросли на 180 т, включая 76 т в 2016 году. [4]

Доля монетарного золота в структуре международных резервов Китая составляет 2,2%. По данному показателю КНР отстает от многих стран, в т.ч. России, в связи с чем НБК активно наращивает объем драгоценного металла.

Указанные действия центральных банков России и Китая направлены также на уменьшение доли американской валюты в структуре международных резервов на случай ее потенциального провала в качестве резервной.

Поскольку НБК производит закупку золота в больших объемах, способных резко обрушить цену металла, то он действует посредством многочисленных национальных и международных каналов. Данная стратегия оказалась успешной, следовательно регулятор будет применять ее и далее для улучшения структуры, ликвидности и стоимости своих международных резервов. [5]

Увеличение монетарного золота в резервах НБК также укрепляет доверие к китайскому юаню, который с 1 октября 2015 г. был включен Международным валютным фондом в корзину мировых резервных валют, способствуя его более широкому распространению в международных сделках.

Политики увеличения своих золотых запасов в 2016 г. придерживались и другие центральные банки. Среди них следует выделить Центральный банк Катара, осуществившего покупку 6,8 т драгоценного металла с января по октябрь, а также Национальный Банк Беларуси, нарастившего объем золотых резервов за 2016 г. с 42,9 т до 46,2 т. [6]

Золото продолжает занимать значительную и даже постепенно увеличивающуюся долю в международных резервах центральных банков, в целом составляя в настоящее время более 13%. [7]

Центральные банки Венесуэлы (в государстве наблюдается серьезный экономический кризис), Азербайджана, Аргентины и Иордании заявили в 2016 г. о снижении доли золота в международных резервах.

Замедление темпов наращивания официальных золотых запасов наряду с ростом их продаж объясняется тем, что управление международными резервами в последнее время становится непростой задачей. В данном контексте заслуживает внимания пример Китая, международные резервы которого в течение 2016 г. снизились более чем на 300 млрд долл. США или на 10%. Отметим, что нынешний объем является минимальным для КНР за последние 5

лет. Тенденция сокращения международных резервов проявилась в ноябре 2015 г. на фоне озабоченности ослаблением юаня и оттоком капитала из страны. Однако рост резервов возобновился в марте 2016 г. по мере появления признаков стабилизации экономического роста в Китае. Затем динамика показателя была неровной, но в целом не в пользу золотовалютных запасов. [8]

Согласно данным опроса, проведенного Международным советом по золоту (World Gold Council) в 2016 г., большинство глав центральных банков (56%) настроены на увеличение доли золота в структуре международных резервов в ближайшие три года, 33% предпочитают оставить ее без изменений и 11% планируют ее снижение. [7]

Аккумулирование золотых запасов центральные банки начали с 2008 г., т.е. после мирового финансового кризиса. В предшествующий период (с 90-хх гг. XX в.) официальный сектор многих стран проводил постепенную продажу монетарного золота.

Анализируя статистические данные десяти стран-лидеров по объему золотых резервов с 2010 г., можно заметить, что большинство из них пока его не изменили: США (8 133,5 т), Германия (3 377,9 т), Италия (2 451,8 т), Франция (2 435,8 т), Швейцария (1 040т), Япония (765,2 т), Нидерланды (612,5 т) и Индия (557,7 т) [9,10].

Несмотря на то, что объем золотых запасов представленных стран за последнее десятилетие не менялся, начиная с мирового финансового кризиса 2008 г., официальные золотые запасы некоторых европейских стран, хранящиеся в США, были возвращены на родину. Данная тенденция особенно прослеживается в период 2007-2009 гг. и с 2013 г. по настоящее время. Например, в 2015 г. Центральный банк Нидерландов репатриировал из США 120 т драгоценного металла с целью хранения 31% золотых резервов в своей стране (ранее эта доля составляла 11%).

Диверсификация немецких золотых резервов по странам в 2015 г. выглядела следующим образом: 31% - в Германии, 45% - в Федеральной резервной системе в Нью-Йорке,13% - в Лондоне и 11% - в Париже. В 2015 г. в Германию из США было возвращено 111 т и еще 105 т из Франции. Процедура возврата золота была начата по инициативе Центрального банка ФРГ в 2013 г. и к

концу 2016 г. из хранилища Федеральной резервного банка Нью-Йорка было репатриировано 300 т драгоценного металла. В результате этого в настоящее время 47,9% золотых запасов Германии находятся на родине; 36,6% - в США; 12,8% - в Великобритании; 2,7 – во Франции [11].

На основании вышеизложенного следует, что центральные банки ведут различную политику по управлению своими золотыми запасами: некоторые регуляторы намеренно не меняют объем своего золотого запаса на протяжении ряда лет (США, Италия, Франция, Швейцария), другие, не влияя на объем, концентрируют большую его долю в своей стране (Германия, Нидерланды), третьи снижают золотые резервы (Венесуэлы, Азербайджана, Аргентины и Иордании), четвертые, наоборот, увеличивают (Россия, КНР, Катар, Беларусь). Каждая из приведенных стратегий отвечает нуждам государства, которое ее использует. Золотые резервы служат укреплению доверия к национальной валюте, способствуют диверсификации международных резервов, уменьшают степень зависимости от американской валюты, используются для проведения интервенций и покрытия внешнего или внутреннего долгов, снижают последствия экономического кризиса. В целом можно заключить, что монетарное золото в большинстве случаев является неотъемлемой частью международных резервов государства. Драгоценный металл выполняет роль своеобразной страховки в периоды экономической неустойчивости. Вместе с тем ценовые колебания золота помимо доходов могут приносить и значительные расходы для государства, поэтому перед любым центральным банком стоит серьезная задача правильного управления данным активом.

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Modern conditions of human resources turnover for industrial enterprises of Azerbaijan

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Современное состоянние текучести кадров на промышленных предприятиях Азербайджана

В современных условиях рыночной экономики в повышении эффективности промышленного производства большую роль играет стабильность кадров предприятий и их рациональное использование. Поэтому, повышение уровня стабильности кадров и сокращение до минимума уровня его текучести является одним из основных задач промышленных предприятий.

Следует иметь в виду, что текучесть - многоплановый процесс, являющийся следствием действия различных факторов, лежащих и на стороне предприятия, и

на стороне работника. С точки зрения интересов конкретного предприятия всякая текучесть наносит ему ущерб, за исключением тех случаев, когда предприятие освобождается от неугодных ему работников. Если же рассматривать текучесть с точки зрения интересов конкретного работника, то возникает необходимость учитывать ее последствия для него. Благодаря перемене места работы человек чаще всего попадает в лучшие для себя условия работы (конечно, в том случае, если он находит желаемое рабочее место): он получает возможность быстрее повысить свою заработную плату, или работать по более привлекательной для него профессии, или быстрее повышать уровень своей квалификации и т.д. Из этого следует, что текучесть кадров, как порождение стремлений кадров к реализации своих интересов, теснейшим образом связана с интересами предприятий.

Поэтому, и с точки зрения интересов предприятия, и с точки зрения интересов конкретного работника, необходимо создать такие условия на предприятии, которые способствовали бы закреплению кадров на нем. Для создания таких условий, прежде всего, следует проанализировать состояние и причины фактической текучести кадров.

В таблице 1 приведены современное состояние и динамика фактической текучести кадров на промышленных предприятиях Азербайджана. Численность уволенных работников по республике, из-за нарушения трудовой дисциплины, очень мала. По этой причине, в официальной статистике Азербайджана их число не приводится. Исходя из этого, при исчислении уровня текучести кадров в промышленности республики, за основы взята численность уволенных работников по собственному желанию.

Анализ показывает, что в 2010-м году всего 7,1%, в 2011-2012-м годах и в 2014-м году-7,0%, в 2013-м году-7,2%, в 2015-м году-6,9% всех занятых в народном хозяйстве Азербайджана приходилось на долю промышленности [1, с.101]. Это очень мало по сравнению с имеющимся потенциалом для развития промышленности в республике. Вместе с тем, как в целом в промышленности республики, так и в отдельных ее отраслях, уровень текучести кадров очень высокий и в последние годы имеет тенденцию к увеличению. Так, в 2010 - м году уровень текучести кадров в целом в промышленности Азербай-

джана составил 10,1%, в 2011-м году-9,2%, в 2012-м году-6,4%, в 2013-м году-7,0%, в 2014-м году-9,0% и в 2015-м году-11,0%.

Таблица 1

Современное состояние и динамика фактической текучести кадров на промышленных предприятиях Азербайджана [1,2,3,4, 5,6].

	Ед. изм.	Г о д ы					
		2010	2011	2012	2013	2014	2015
Количествр занятых в целом по республике, всего:	т.чел	4329.1	4375.2	4445.3	4521.2	4602.9	4671.6
В том числе:							
Численность занятых на промышленных предприятиях, всего:	«-»	306.2	306.9	313.3	324.4	324.2	321.4
Количество уволенных работников по собственному желанию	«-»	31.0	28.37	19.98	22.57	29.1	35,4
Уровень текучести кадров	%	10.1	9.2	6.4	7.0	9.0	11,0
Промыслодобывающая промышленность:							
Численность занятых работников	т.чел	41.5	41.2	41.8	42.3	41.5	39,1
Количество уволенных работников по собственному желанию	«-»	4.21	3.49	1.89	3.22	6.47	8,3
Уровень текучести кадров	%	10.1	8.5	4.5	7.6	15.6	21,2
Перерабатывающая промышленность:							
Численность занятых работников	т.чел	208.9	210.3	215.6	224.1	227.1	229,8
Количество уволенных работников по собственному желанию	«-»	17.91	16.48	14.14	13.61	17.55	19,8
Уровень текучести кадров	%	8.6	7.8	6.6	6.1	7.7	8,6
Электрическая энергия, производство, распределение и обеспечение газом и паром							
Численность занятых работников	т.чел	30.6	30.8	31.2	32.3	29.8	27,1
Количество уволенных работников по собственному желанию	«-»	6.06	3.57	1.91	2.08	2.55	3,5
Уровень текучести кадров	%	19.8	11.6	6.1	6.4	8.6	12,9
Водоснабжение, очистка и переработка выбросов							
Численность занятых работников	т.чел	25.2	24.6	24.7	25.7	25.8	25,4
Количество уволенных работников по собственному желанию	«-»	2.82	4.83	2.04	3.67	2.52	3,8
Уровень текучести кадров	%	11.2	19.6	8.3	14.3	9.7	15,0

Аналогичное состояние наблюдается и в одной из развитых отраслей промышленности республики - в промыслодобывающей: в 2010-м году уровень текучести кадров в этой отрасли промышленности составила 10,1%, в 2011-м году - 8,5%, в 2012-м году - 4,5%, в 2013-м году - 7,6%, в 2014-м году - 15,6% и в 2015-м году - 21,2%. Это самый высокий показатель среди всех отраслей промышленности Азербайджана.

В 2010 -2013-м годах - уровень текучести кадров в перерабатывающей промышленности имел тенденцию к уменьшению, а в 2014- 2015-м годах – к увеличению. Так, в 2010-м году уровень текучести кадров в этой отрасли промышленности составил 8,6%, 2011-м году- 7,8%, в 2012-м году- 6,6%, в 2013-м году-6,1%, в 2014-м году-7,7% и в 2015-м году-8,6%.

В 2010-м году уровень текучести кадров в отраслях электрической энергии, распределения и обеспечения газом и паром составил 19,8%, в 2011-м году-11,6%, в 2012-м году- 6,1%, в 2013-м году-6,4%, в 2014-м году- 8,6%, в 2015-м году-12,9%.

В отрасли водоснабжения, очистки и переработки выбросов уровень текучести кадров также очень высокий: в 2010-м году уровень этого показателя составил 11,2%, в 2011-м году- 19,6%, в 2012-м году-8,3%, в 2013-м году-14,3%, в 2014-м году- 9,7%, в 2015-м году-15,0%.

Проведенные исследования показали, что основными причинами фактической текучести кадров на промышленных предприятиях Азербайджана являются следующие: условия, которые не отвечают санитарно-гигиеническим нормам; чрезмерно высокий уровень шума и вибрации; высокий уровень ручного труда; чрезмерное загрязнение воздуха пылью и газом; низкий уровень заработной платы (особенно в перерабатывающей промышленности; в электрической энергии производстве, распределении и обеспечении газом и паром и в водоснабжении, очистке и переработке выбросов).

В таблице 2 приведен уровень среднемесячной номинальной заработной платы в промышленности Азербайджана. Как видно из этой таблицы, уровень рассматриваемого показателя в 2015-м году в перерабатывающей промышленности составил 514,5 манатов (примерно 282 $ США по текущему курсу), в электрической энергии, производстве, распределении и обеспечении

газом и паром-512,8 манатов (281 $ США), в водоснабжении, очистке и переработке выбросов-333,1 манатов (183 $ США).

Таблица 2

Среднемесячная номинальная заработная плата в промышленности Азербайджана (в манатах) [4, с.62-64;]

	Г о д ы					
	2010	2011	2012	2013	2014	2015
По промышленности, всего	451,8	518,6	590,1	630,8	694,8	809,3
Промыслодобывающая промышленность	1001	1177	1398	1503	1741	2165
Перерабатывающая промышленность	312,9	345,7	388,1	421,8	473.4	514,5
Электрическая энергия, производство, распределение и обеспечение газом и паром	349.3	413.2	443.5	466.8	488.9	512,8
Водоснабжение, очистка и переработка выбросов	197.7	231.8	274.6	324.9	331.5	333,1

Следует отметить, что исследуя только фактическую текучесть, анализируя только сам факт увольнения по собственному желанию и его мотивировку увольняющим, можно прийти к неправильным выводам. И дело здесь не только в сознательном искажении фактов. Сам уходящий с работы работник может искренне заблуждаться при объяснении мотива увольнения. Довольно часто к принятию решения уйти по собственному желанию подталкивает какой-нибудь незначительный факт, «последняя капля». Чтобы разобраться во всех «помехах», которые искажают истинную причину, целесообразно анализировать не только сам факт принятия решения, но и всю его предысторию, т.е. с целью сокращения уровня текучести и повышения уровня стабильности кадров, наряду с изучением причин фактической текучести на промышленных предприятиях Азербайджана, следует выявить и причины потенциальной текучести.

При изучении потенциальной текучести на промышленных предприятиях Азербайджана нельзя ограничиться лишь выявлением лиц, желающих сменить

место работы и мотивов этого желания. Сама постановка задачи требует выяснения причин ее возникновения. А это предопределяет необходимость подробного изучения отношения работающих к важнейшим сторонам производственной жизни. Только на основании такого исследования, можно отделить в производственном коллективе устойчивых кадров от неустойчивых и определить масштабы потенциальной текучести, а также установить, что в наибольшей степени удовлетворяет и что не удовлетворяет кадров, какова связь между этими оценками и отношением кадров к данному месту работы вообще.

Таким образом, для выяснения полной картины процесса текучести на промышленных предприятиях Азербайджана, необходимо изучать не только группы кадров, покидающих место работы, но и группы, продолжающие работать на предприятии, т.е. весь производственный коллектив. Причем само исследование, должно ставить своей целью не только выявление отдельных групп кадров, по разному относящихся к перспективе работы на данном рабочем месте, но и их отношение к производственной обстановке. Практически это означает достаточно подробное исследование отношения работника к условиям труда и быта.

Исследования потенциальной текучести кадров, дадут руководителям промышленных предприятий республики важную информацию о направлениях возможного перехода и о возможностях самих предприятий в решении возникших конфликтных ситуаций. Необходимо отметить большое практическое значение этих исследований проблем текучести. Сам факт увольнения свидетельствует о том, что работник не надеется удовлетворить на данном предприятии свои требования. Однако это не значит, что предприятие не имеет таких возможностей. При разработке мер по сокращению текучести, руководители промышленных предприятий Азербайджана должны знать, каковы эти возможности и насколько они используются.

Информация, получаемая в процессе комплексного исследования, поможет руководителям промышленных предприятий республики определить наиболее сильные и слабые стороны производства, с точки зрения требований самих кадров, и разработать мероприятия по устранению слабых и закреплению сильных сторон производства своих предприятий.

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Section 10. Humanities & Social Sciences

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The Mediating Effects of School Reputation and School Image on the Relationship between Quality of Teaching Staff and Student Satisfaction in Higher Education in Hong Kong

1. INTRODUCTION

It is clear that as a result of Hong Kong's higher education sector rapidly expanding, the question of how students see their learning institutions is assuming an increasing significance for stakeholders. The aim of this research was to find out through student perception, the mediating effect of school reputation and image on the relationship between quality of teaching staff and student satisfaction in Hong Kong's higher education sector.

Accordingly, the research investigated the respective influences of quality of teaching staff, school reputation and school image on student satisfaction; and examined possible mediating effects of school reputation and image on the relationship between the quality of teaching staff and student satisfaction.

Full-time students of higher education institutions and universities in Hong Kong were selected as the targeted participants in this research because, according to [1,2] they are the primary customers of higher education in today's competitive consumerist society.

1.1 Background of the Study

Quality assurance (QA) in higher education is receiving an increasing attention in

many parts of the world as a result of the rapid expansion of this sector and subsequent to recent education reforms, incurring thereby a need for the sector to respond to these changes as well as to the trend of globalization, in order to meet the expectations of communities as they develop into knowledge-based societies. It is almost a universal consensus that, in the concept of quality in the context of higher education is multifaceted, value laden and stakeholder-relative [3]. The nature of quality and its assurance has been taken up recently in the academic and professional literature, and new interpretations proposed [4,5] with various approaches to QA, such as total quality management [6,7], external quality monitoring (EQM) [8] and performance indicator [9,10] even practiced. A recent review of these approaches conducted by [1] has indicated that as one moves from the higher levels towards the lower levels, quality indicators that are of importance change and have a tendency to get softer, signifying that they are much more subjective than the quality indicators at the higher levels, such as students' attrition rates, and are more related to student experience, such as the quality of teaching and learning and student satisfaction with their various experiences.

1.2 The Higher Education in Hong Kong

Like many other jurisdictions, Hong Kong has been undergoing various education reforms, especially in the past five years, to respond to the trend of internationalization and globalization [11]. With the launch of the Qualifications Framework (QF) in 2008 by the Education Bureau in Hong Kong, the concern about the quality of different qualifications in the vocational and academic sectors is becoming even more explicit. Furthermore, the number of self-financing degree-awarding tertiary institutions in Hong Kong has increased to six, providing a total of over 13,000 places. With the rapid expansion of post-secondary education in Hong Kong, it has become necessary to address the question of quality of the academic provisions concerned [12]. The volume and diversity of the student body inevitably imposes different challenges on educational institutions.

Hong Kong's higher education institutions, particularly the publicly funded ones, are increasingly under public pressure to demonstrate and account for their educational quality unambiguously and distinctly. However, the QA practices as

currently adopted are more included towards an accountability-led view rather than an improvement-led view. Therefore, resources and efforts in many institutions have typically been committed more to the institutional aspects of the quality issues. Consequently, insufficient attention is paid to the student aspects, in particular students' experiences of various facets of their academic lives, which should be of paramount concern in the recent education reform of most countries, notably for the post-secondary sector in which a substantial expansion of student participation has been taking place. In the course of debates over various quality issues for higher education, a major focus of this research is the centrality of the student perception. This research is therefore conducted with the aim of finding out the mediating effects of school reputation and image on the relationship between quality of teaching staff and student satisfaction from the students' perspectives.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The following provides an overview of the literature concerning the higher education sector in Hong Kong and investigates the roles of and relationships among different marketing concepts, in particular the concepts of quality, reputation, image and satisfaction in higher education provisions.

2.1 The Higher Education Market in Hong Kong

The Chief Executive of the Hong Kong Special Administrative Region (HKSAR) pledged in his 2009-2010 Policy Address to invest in "education services….to enhance Hong Kong's status as a regional education hub" [13].The objective was to strengthen the competitiveness of Hong Kong's education sector, enabling it to better capture the opportunities spawned by the enormous global demand for higher education [11].

To the existing institutions of higher learning, these initiatives hold both opportunities and challenges. Enrollment is expected to soar as lifelong learning and increased intake of non-local students allow the institutions to widen their net and at the same time to expand beyond their home market. However, the government's policy to encourage greater private sector involvement in higher education implies that the status quo will be destroyed and the existing institutions will be put into

direct competition with both new and established education providers from home and abroad [11].

Sitting on this cusp of tremendous change, it seems obvious that no institutions of higher learning can now extricate itself from participating in market competition. To operate as market competitors, higher education institutions have to do more than just produce glossy brochures and stage expensive advertising campaigns. They, like any marketers in a competitive market, are required to consider what their customers need and perceive as good [14]. Although a multitude of factors have been found to contribute to student satisfaction subject to the specific segments of the higher education market under study, quality of teaching staff, school image, and reputation are the three most prominent drivers [15,16].

2.2 Quality Assurance in the Higher Education in Hong Kong

From quality as a process emerges the concept of quality assurance (QA), which is a process-oriented system to ensure that the pre-defined standards of an organization are met and best practices or procedures are complied with [17,18,19]. It has become a trend in higher education provision across the world that QA initiatives be advocated and followed through to ensure quality of activities and continuous improvement [20]. In Hong Kong, QA is gaining prominence in the higher education sector due to, inter alia, the reform and rapid expansion of the education service in recent years, the urgent need to respond to the challenges of globalization, and the rising expectations of stakeholders [21,22].

The underlying principle for implementing QA in the education sector is to ensure that the main actors at the forefront of teaching and learning (school administration, teachers, students, parents and governing bodies) are committed to improving education performance and at the same time are given the means to see that the educational improvement objectives are implemented and fulfilled effectively [23,24].

2.3 Quality of Teaching Staff

Research reveals that students value good teaching and that teaching

quality is directly related to students' perception of the quality of the high order learning provided [25,26]. However, quality of teaching, like quality in general, is an elusive abstraction. Though different techniques and tools have been proposed to evaluate teaching quality, it remains challenging to identify all the traits of quality teaching, let alone assess the quality of an individual's teaching [25,26].

As [27] argued, to maintain or improve the quality of teaching, the teaching staff needs to develop and excel in these capabilities. [28] pointed out that there are four essential traits of good teaching: positive classroom climate, interest in learning, lesson organization, and clarity. The literature underlines the importance of knowledge, teaching skills, teacher sensitivity to student level and progress, clear teaching goals, fair assessment, and encouragement of independent thinking. And, in addition to pedagogical skills, good teachers need to have passion and demonstrate strong enthusiasm for their students, for the subject they teach and for teaching itself [29].

2.4 Student Satisfaction

One of the leading indicators of competitiveness in higher education provisions is the level of satisfaction of a student with regard to his/her experience from a particular institution [30]. Prior studies have given some slightly different definitions to the concept of student satisfaction. For example, [31] define student satisfaction as a "student's perceived value of his or her educational experiences at an educational institution". [32] define student satisfaction as "an evaluative summary of direct educational experience, based on the discrepancy between prior expectation and the performance perceived after passing through the educational cycle". [33] defined student satisfaction "as emotional or cognitive response or reaction to the learning experience". Although the definitions vary slightly from one to another, the common focus is on measuring a student's ex post evaluation of educational experiences. In this sense, these definitions can be regarded as rooted in the earlier definition of satisfaction developed by [34].

According to [35], student satisfaction is a perceived value. This perceived value is the outcome, the difference between expectation and perception, of the student's scrutiny of the value delivered by an educational institution. According to

the expectancy disconfirmation theory [34,36], feelings of satisfaction or dissatisfaction arise when one compares his or her expectations before a transaction with his or her perceptions after the transaction. In the context of higher education, if a student's perceptions exceed his or her expectations (a positive disconfirmation), student satisfaction may arise. On the contrary, if a student's perceptions fall short of meeting his or her expectations (a negative disconfirmation), student dissatisfaction may arise [34,37].

2.4.1 Quality of teaching staff on student satisfaction

In marketing, service quality and satisfaction are two discrete but highly interrelated concepts [38]. While a plethora of research has highlighted the importance of product/service quality in driving customer satisfaction [14,34,39], some scholars argue that satisfaction is the antecedent of quality [40]. Nevertheless, empirical findings conclude service quality causes satisfaction [41]. Service marketing tenets indicate the difficulties in delivering consistent quality of service in order to satisfy customers [42,43,44,45]. The inconsistency due to its innate characteristics of inseparability, heterogeneity, intangibility, and perishability are applicable in relation to the quality of teaching at educational institutions. The inseparability of the delivery from consumption of the service is apparent in teaching as more than just the teaching material provided to the students; the style of delivery and explanation of the content is essential to a student's understanding. It is evident that teaching style differs from teacher to teacher, as does the style, the material provided, the knowledge delivered, and even body language differs. Total satisfaction can be a challenge to achieve as the acceptance of delivery style by one student can differ from another. However, in examining the teaching quality and student satisfaction linkage in a Canadian university, [46] used two separate sets of student samples (70 undergraduate students and 94 MBA students) to investigate the influence of a six teaching quality dimensions on student satisfaction in terms of course offerings and instructors. The results indicate that teaching quality strongly influences student satisfaction by showing that the quality dimensions explained 74% of student satisfaction with the course and 67% of student satisfaction with the instructors. It is expected that a similar causality may exist in Hong Kong's higher education sector.

Therefore, it is hypothesized that:

Hypothesis 1. The quality of teaching staff as perceived by students positively affects student satisfaction.

2.5 School Reputation in Higher Education

In the higher education environment, students may form a perception about their institution and the specific course offerings. Similar to reputation in the business setting, an institution's reputation hinges on deeds done in the past. If the institution "repeatedly succeeds in fulfilling its promises, it should have a favourable reputation, and inversely its expressed intentions may create a negative reputation" [47]. A positive and long-standing school reputation is also a strong indication of its high levels of quality and competence. [47] posited that "Institutional reputation may be viewed as a mirror of the organization's history that serves to communicate to its target groups the quality of its products or services in comparison with those of its competitors". This quality may be reflected in the school's capacity in meeting the expectations of the students, including their expectations for teaching staff of high professional caliber and for teachers who demonstrate characteristics of good pedagogical practice.

In addition, in the business sector, a good corporate reputation reduces customers' uncertainty in making buying decisions, boosts demand and helps a reputable firm to sell more to achieve its ultimate goal of profit maximization [48]. In higher education, a good school reputation also enhances the prestige of an institution and mitigates students' uncertainty in making enrollment decisions. However, contrary to workings in the business world, high levels of school reputation often lead to minimal sales. College aspirants will flood the most prestigious institutions with applications, but the majority of them will likely be disappointed since the supply of programmes is highly inelastic. In business transactions, customer satisfaction may turn into dissatisfaction and hurt the reputation of an institution if student demands cannot be adequately met for a long time [49]. Consequently, education institutions have to work hard to maintain their reputation and credibility. However, in the educational setting, the stricter the admission criteria and the tougher the competition, the stronger will be students' desire to be admitted and the higher will be the school reputation [50].

2.5.1 Quality of teaching staff and school reputation

Though the link between quality of service and reputation of the service providers is well established in various sectors of the service industry [51,52,53], it is still unclear whether a similar positive association exists between quality of teaching staff and school reputation. In the higher education arena, there is a growing production of perceptional ratings or league table rankings of higher education institutions [54]. To gain a deeper understanding of the interplay between the constructs of teaching quality and reputation in higher education, the present research attempts to establish by empirical analysis whether there is a direct relationship between the two constructs in the higher education setting in Hong Kong. School reputation is measured by a 3-item scale developed by [47] to assess the perceived competence of an institution in delivering what it has promised, and the respondents' overall perception of school reputation and school competiveness. It is therefore hypothesized that:

Hypothesis 2. The quality of teaching staff as perceived by students positively affects their perception of school reputation.

2.6 School Image in Higher Education

Image and reputation are two closely intertwined concepts. There has been much debate in the literature about the relationship between the two. [55] pointed out that there is disagreement among scholars on how the two concepts be defined and distinguished from one another. Some scholars, for example, [56] suggested that image should be subsumed within reputation, arguing that image is just one of the many components of reputation [55]. Despite the different arguments, there appears to be a general agreement among scholars participating in the debate that image is distinguished from reputation in that the former is influenced by the everyday encounters between an organization and an outsider. It is concerned with the outsider's impression of an organization and is likely to be influenced by things such as the name, logo, building, or even the uniform or dressing styles of the staff members of a particular organization [57]. Reputation, on the contrary, is forged out of the more fundamental values of leadership, competitiveness, expertise, product and service philosophy, culture, and ethics which take a long time to cultivate and grow.

In the higher education setting, it is clear that school image is becoming increasingly important. To attract good students in the globalized higher education market and in order to maintain their profile and competitiveness, institutions across the world have taken a proactive attitude towards image building [58]. Despite this, school image remains an unclear concept and the definitional dispute is often resolved by drawing strength from the established conceptions and theories in business marketing [49]. Following this line of thinking, the present research defines school image as the ideal impression that a higher education institution would like others to see. The image of an institution is measured by a 3-item scale developed by [47] to assess the respondents' general perception, their estimation of the perception of their peers, and the perceived image of their own institution relative to other institutions.

2.6.1 Quality of teaching staff and school image

Prior studies on product or service marketing have confirmed the positive role that image plays on product/service advantage and competitiveness [59]. Moreover, the above-mentioned inherent characteristics of service present more challenges to build and sustain school image [42,43,44]. The intangibility, perishability, heterogeneity and inseparability of service make its image more vulnerable to variance in teaching quality, as image takes time to establish and consistency is one of image's most important requirements [43,60]. Research on corporate image has established that product/service quality is one of the key determinants of good image [61]. It is expected that a similar causality may also exist in the higher education sector as quality of teaching has a lot to do with building up a favourable impression in the minds of the students. Therefore, it is hypothesized that:

Hypothesis 3. The quality of teaching staff as perceived by students positively affects their perception of school image.

2.7 School Reputation and Student Satisfaction

Firm reputation, customer satisfaction and the link between these two constructs is a relatively well-researched domain in management studies [62,63]. There is an abundance of empirical research, primarily from the perspective of marketing, which demonstrates the casual link between the two concepts [64,65]. While prior studies on non-education service settings report a positive influence of

customer satisfaction on firm reputation [65], some other studies demonstrate that the casual relationship is reserved [64,66,67]. The contrary findings have led some scholars to conclude that the two concepts are in fact interrelated and mutually interdependent [63,68].

The relationship between school reputation and student satisfaction in the higher education market is a relatively understudied area of research, as treating students as customers is, after all, relatively new and controversial [69]. Besides, the student-institution relationship is growing in complexity due to massification and globalization of higher education [49]. Nevertheless, as more college aspirants are given access to more choices of institutions nowadays, school reputation is becoming an increasingly important factor in their enrollment decisions. For those who have made it to the best schools, the satisfaction is beyond words. Therefore, it is hypothesized that:

Hypothesis 4. The reputation of a higher education institution as perceived by students positively affects student satisfaction.

2.8 School Image and Student Satisfaction

Some prior studies have found that brand image exerts a positive influence on customer satisfaction [39,70]. Other studies, however, claim that no such link exists. For example, in their study of the image and satisfaction link in the banking industry, [71] found that there is no direct influence of brand image on customer satisfaction. [72]conducted a three-year longitudinal study on various service sectors and confirmed the positive influence of image on customer satisfaction. They found that the influence of image on customer satisfaction increased over the three-year time span. In other words, the lack of influence of image on customer satisfaction as revealed by previous studies might simply be due to time lag or the existence of other factors mediating the relationship.

Although prior research has given moderate support to the influence of image on customer satisfaction in various service settings, this research proposes to extend the research scope to explore whether there is any positive influence of school image on student satisfaction. Therefore, it is hypothesized that:

Hypothesis 5. The image of a higher education institution as perceived by students positively affects student satisfaction.

2.9 Mediating Roles of School Reputation and Image

School reputation and image are presented as mediators, as it is postulated that the direct relationship between QTS and student satisfaction is intervened by these variables. Mediation is the effect of an independent variable on a dependent variable that goes through one or more third variables [73,74,75,76]. The effect of mediation was recognized as early as 1928 but in recent years various tests have been introduced to identify the exact nature of the mediation impact [73,75,76,77].These interventions are recognized in the literature based on well-rooted theoretical and logical arguments. This research recognizes reputation and image as simple mediators that intervene the effect of OTS on SS separately [63,68,71,78].

Students' perception of school reputation is the first mediator proposed in the present research. As discussed above, quality of teaching staff is hypothesized to have a positive influence on student perception of school reputation as well as image, and student perception of school reputation and image positively influence student satisfaction. Therefore, it is hypothesizes that:

Hypothesis 6. Student perception of the reputation of a higher education institution mediates the relationship between quality of teaching staff and student satisfaction.

Student perception of school image is the second mediator proposed in the present research. As discussed above, quality of teaching staff is hypothesized to have a positive influence on student perception of school reputation, and student perception of school image is also hypothesized to have a positive influence on student satisfaction. Therefore, it is hypothesizes that:

Hypothesis 7. Student perception of the image of a higher education institution mediates the relationship between quality of teaching staff and student satisfaction.

2.10 Research Model

Seven hypotheses have been developed based on the literature on the marketing concepts of quality, satisfaction, reputation and image, and the corresponding concepts in the higher education market. Based upon the seven hypotheses developed, a research model (Fig. 1) was devised by adapting the following sets of constructs from prior studies.

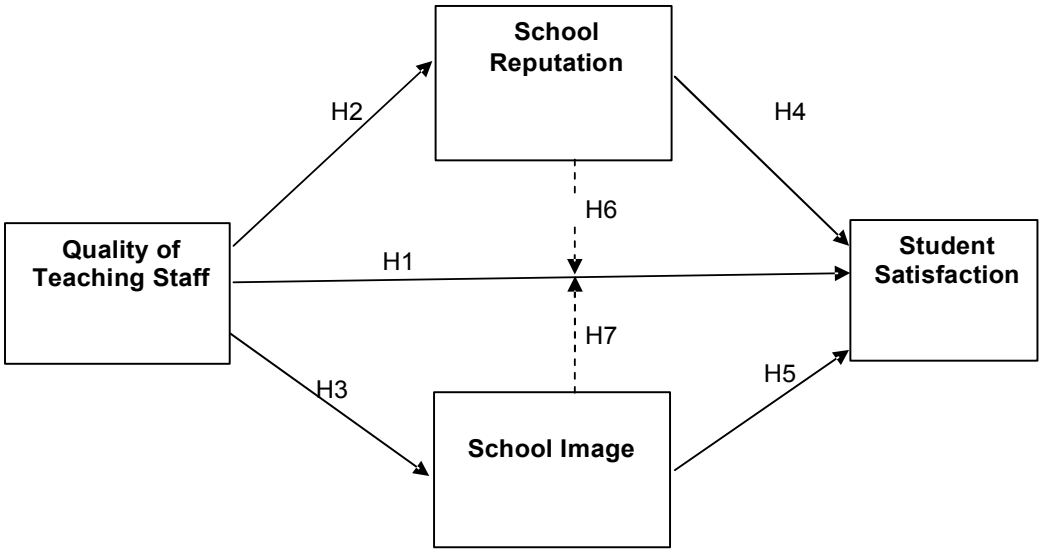


Fig. 1. Research model

The research framework shown above consists of four constructs, with one dependent variable named student satisfaction, two independent variables (which also act as two mediating variables) named school reputation and school image respectively and one independent variable named quality of teaching staff.

3. METHODOLOGY

3.1 Sample

Full-time students enrolling in diploma or degree programmes at various levels in all institutions offering post-secondary programmes in Hong Kong were selected as the target population. This population served the purpose of the research, which was to explore the perception of full-time students of higher education on the mediating effects of school reputation and school image on the relationship between quality of teaching staff and student satisfaction. This research adopted a probability sampling technique in which samples were acquired by random selection so that each individual within the population has an equal opportunity to be selected. In this research, the researcher drew sample data of a database extracted from two major public domain directories of higher education institutions in Hong Kong: The University Grants Committee and the Education Bureau, in which consist of the point of contact at every post-secondary institutes in Hong Kong. A

total of 2,000 copies of the questionnaire were sent to nine institutions of higher education in Hong Kong. By the end of the survey period, 1,170 responses had been received, representing a response rate of 58.5%. Of the 1,170 responses received, 32 were invalid due to missing data, giving a total of 1,138 valid responses.

3.2 Research Instruments

From the literature review, the following four constructs were identified for this research: Quality of Teaching Staff as the independent variable mediated by the constructs of School Reputation and School Image as mediating variables affecting the construct of Student Satisfaction as the dependent variable.

3.2.1 Quality of teaching staff

There is evidence that teaching quality of staff can be further enhanced through student feedback with additional consultation, interpretation guides on result and other relevant arrangement. This can also form part of the staff development for improvement [79,80,81].The following measuring items are used according to [34,82,83]. The measuring items for Quality of Teaching Staff are shown in Table 1.

3.2.2 School reputation and school image

According to [84], institutional reputation is a sum total of a single stakeholder's perception of how well organizational responses are meeting the demands and expectations of many organizational stakeholders. The reputation of an organization is built through its credible actions [85]. School reputation and school image were therefore intended to measure the reflection of quality and services by studying the following three constructs: (a) impression, (b) reputation, and (c) comparative advantage. The measuring items for School Reputation and School Image are shown in Table 2 and Table 3.

3.2.3 Student satisfaction

The measuring items for Student Satisfaction are adopted from Bennett and Rundle-Thiele, 2004; Oliver, 1980 and are listed in Table 4.

Table 1. Measuring items for quality of teaching staff (Adapted from [82])

ID	Questions (Constituent variables)
TS01	The teaching staff of my institution have appropriate academic credentials. (Academic Credentials)
TS02	The teaching staff of my institution are incorporating appropriate use of technology to teach. (Appropriate Use of Technology)
TS03	The teaching staff of my institution are effective communicators in the process of lecturing. (Aware of Learning Needs)
TS04	The teaching staff of my institution are aware of my learning needs and I can seek assistance from them. (Approachable and Friendly)
TS05	The teaching staff of my institution are approachable and display a friendly manner. (Approachable and Friendly)
TS06	The teaching staff of my institution treat students with respect. (Respect Students)
TS07	The teaching staff of my institution display positive attitudes to students and do their best to help. (Positive Attitude)
TS08	The teaching staff of my institution display empathy when I have difficulty in understanding a concept. (Display Empathy)

Table 2. Measuring Items for school reputation(Adapted from [47])

ID	Questions (Constituent variables)
SR1	In general, I believe that my institution always fulfils the promises it makes to its students. (Honouring Promise)
SR2	My institution has a good reputation. (Good Reputation)
SR3	I believe that the reputation of my institution is better than other institutions. (Better Reputation than Others)

Table 3. Measuring items for school image(Adapted from [47])

ID	Questions (Constituent variables
SI1	I have always had a good impression of my institution. (Good Impression)
SI2	In my opinion, my institution has a good image in the minds of its students. (Good Image)
SI3	I believe that my institution has a better image than other institutions. (Better Image than Others)

Table 4. Measuring items for student satisfaction(Adapted from [34,83])

ID	Questions (Constituent variables)
SS1	I am satisfied with my decision to attend this institution. (Satisfied with Decision)
SS2	If I had a chance to do it all over again, I would still enrol in this institution. (Convicted in Decision Made)
SS3	My choice to enrol in this institution was a wise one. (Wise Choice)
SS4	I am happy with my decision to enrol in this institution. (Happy with Decision)
SS5	I did this right decision when I decided to enrol in this institution. (Right Decision)
SS6	I am happy that I enrolled in this institution. (Happy on the Course)

3.3 Data Analysis

The collected data were analyzed by the following quantitative methods.

3.3.1 Measurement assessment

The validity and reliability tests were used to evaluate the quality of the data that collected for assessment of the constructs for further analysis. Cronbach's coefficient alpha (α) was adopted to assess the internal consistency reliability in order to determine if the homogeneity of the items in the instrument are highly correlated and support the construct. Cronbach's coefficient alpha (α) has a maximum value of 1.0. Therefore, the higher the coefficient approaches 1.0, the more reliable are the measures. [86] suggested that the minimum requirement of Cronbach's coefficient alpha (α) is 0.6.

3.3.2 Factor analysis

Exploratory Factor Analysis (EFA) is used in this research as the factor analysis technique to explore the underlying structure of a collection of observed variables. Although the constructs of this research adapted from previous studies with satisfactory level of reliability, EFA is conducted in order to ensure the appropriateness of the measurement constructs for the collected data.

3.3.3 Hypotheses testing

In this research, linear and multiple regression analysis were conducted to test both direct and indirect influences of the independent variable of quality of teaching staff, and the two mediators: school reputation and school image, on the dependent variable of student satisfaction. Linear regression was used to test the direct influence of quality of teaching staff, school reputation and school image on student satisfaction. Each of the eight quality of teaching staff dimensions was also tested independently using regression analysis to ascertain their respective influences on student satisfaction. A mediator influences the strength and direction of an independent variable on a dependent variable. The effects of the two mediators in this research, school reputation and school image, were tested with multiple

regression analysis and a mediating effect was considered existent if the multiplicative term, school reputation times quality of teaching staff or quality of teaching staff times school image, was statistically significant [76].

4. FINDINGS

4.1 Characteristics of the Sample

Table 5 below shows the characteristics of respondents in respect of gender, marital status, age, and education level. Each of these characteristics are benchmarked and compared with the characteristics of Hong Kong's adult population.

Table 5. Demographic profile of valid respondents (n = 1138)

		Respondents	
		Frequency	**Percentage (%)**
Gender	Male	431	37.9%
	Female	707	62.1%
Age	18 – 21	854	75.0%
	22 – 25	269	23.6%
	26 – 29	15	1.3%
Level of Study	Associate Degree	448	39.4%
	Higher Diploma	409	35.9%
	Undergraduate	262	23.0%
	Others	19	1.7%
Years of Study	1 year or less	377	33.1%
	2 years	394	34.6%
	3 years	280	24.6%
	4 years or above	87	7.6%

4.2 Validity and Reliability Test

Factor analysis and Cronbach's alpha are generally recognized as the most popular validity and reliability approaches to test the quality of the collected data [87,88]. In this research, exploratory factor analysis was used to extract the underlying variables [88,89] and Cronbach's alpha test was conducted to verify the internal consistency of the questionnaire items loaded into each underlying variable extracted [89,90]. In line with [89], questionnaire items of an underlying variable with a Cronbach's alpha value of 0.7 or higher suggest high reliability, while those with a Cronbach's alpha value not less than 0.6 are acceptable for statistical testing.

4.2.1 Exploratory factor analysis

As all the measuring scales for each of the hypothesized variables in this research were adapted from prior studies published in peer reviewed journals, it was considered reasonable to assume that the validity of the measuring scales were established by the researchers concerned and the reviewers prior to publication. However, given that the wording was fine-tuned to suit the special needs of this study, in order to ensure that the touch-up would not affect the quality of the measuring scales; exploratory factor analysis was performed to confirm the validity of the questionnaire [89,91].

Table 6 below shows KMO and that Bartlett's test outcome to ensure the data collected meets the assumptions for EFA. The KMO measure of sampling adequacy is 0.955 which is roughly the same of the minimum acceptable level of 0.96 [88,89], indicating excellent sampling adequacy. Meanwhile, Chi-square value of 15751.725, df=190 and p-value = 0.0001 ($p<0.05$), shows identity matrix does not exists in the data collected for this research. Finally, the number of items used in total is k = 20 and the sample size n=1,138, thus n/k = 1,138/20=57; which is greater than 5.

Table 6. KMO and bartlett's test

Kaiser-Meyer-Olkinmeasure of sampling adequacy		**.955**
Bartlett's Test of Sphericity	Approx. Chi-Square	15751.725
	Df	190
	Sig.	.000

Table 7 shows a pattern matrix that shows all the items are in their corresponding components. Thus, all items used to measure the constructs for this research were validated as satisfying the convergent and discriminant validity.

Table 7. Exploratory factor analysis on the constructs (n = 1138)

Questionnaire Items	**Component**	
	S	S2
Student Satisfaction	S	TS3
SS1	6	TS4
SS2	**Quality of**	TS5
SS3	**Teaching Staff**	TS6
SS4	TS1	TS7
SS5	T	TS8

School Image	**1 (SS)**	**2 (QTS)**	**3(SI)**	**4(SR)**
SI1				
SI2	0.924			
SI3	0.883			
School Reputation	0.882			
SR1	0.879			
SR2	0.843			
SR3	.731			
		0.826		
		0.818		
		0.810		
		0.799		
		0.795		
		0.704		
		0.685		
		0.675		
			0.859	
			0.853	
			0.687	
				0.863
				0.769
				0.684

Table 8 below shows a total of 71.08% of variance in responses to the items posted in the questionnaire. Amongst this, 47.32% of variance was explained by component 1 or student satisfaction, 13.34% explained by component 2 or quality of teaching staff, 6.70% explained by component 3 or school image, and 3.72% explained by school reputation. The balance of 28.92% of information that measures the constructs was lost during the data collection effort.

Table 8. Total variance explained by QTS, SS, SR and SI

Component	Initial Eigenvalues			Extraction sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
SS	9.465	47.323	47.323	9.465	47.323	47.323
QTS	2.667	13.336	60.660	2.667	13.336	60.660
SI	1.341	6.704	67.364	1.341	6.704	67.364
SR	.743	3.716	71.080	.743	3.716	71.080

4.2.2 Cronbach's alpha for reliability testing

Cronbach's alpha tests were conducted to measure the level of internal consistency among the items in each of the four variables of QTS, SS, SI and SR [89]. Table 9 below shows the Cronbach's alpha value for these constructs with range from 0.860 to 0.940, indicating that the measuring

scales are reliable and the data have good internal consistency for further analysis [89].

Table 9. Cronbach's alpha values of variables

Variable	Cronbach's alpha	Number of items
QTS	0.906	8
SS	0.940	6
SR	0.804	3
SI	0.860	3

The measurement scales in the questionnaire were reliable and the data collected from the nine institutions of higher education had sufficient reliability and validity for hypothesis testing and further investigation. Prior to hypotheses testing, the scores of the four underlying variables of QTS, SS, SR and SI, were summated [88,89].

4.3 Hypothesis testing

The seven hypotheses developed were tested using simple and multiple regression analysis.

4.3.1 Direct relationships

As hypotheses H1 to H5 are based on simple linear regression (SLR) analysis and are essential in determining the eligibility of mediating constructs, these were tested as follows.

H1: The quality of teaching staff as perceived by students positively affects student satisfaction.

Table 10. Coefficient table for the relationship SS – QTS

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	β	Std. error	Beta		
(Constant)	8.713	.962		9.057	.000
QTS	.486	.023	.524	20.751	.000

a. Dependent Variable: SS

Table 10 above shows t=20.75, p-value=0.0001 (p-value<0.05), indicating the significant influence of QTS on SS. The β=0.49, a positive value, specifying the direction of QTS and SS are the same. Thus, H1 is supported.

H2: The quality of teaching staff as perceived by students positively affects their perception of school reputation.

Table 11. Coefficient table for the relationship SR – QTS

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	β	Std. error	Beta		
(Constant)	5.022	.500		10.053	.000
QTS	.205	.012	.447	16.854	.000

a. Dependent variable: SR

Table 11 above shows t=16.85, p-value=0.0001 (p-value<0.05), indicating the significant influence of QTS on SR. The β=0.205, a positive value, specifying the direction of QTS and SR are the same. Thus, H2 is supported.

H3: The quality of teaching staff as perceived by students positively affects their perception of school image.

Table 12. Coefficient table for the relationship SI – QTS

Model	Unstandardized coefficients		Standardized coefficients		Sig.
	β	Std. error	Beta		
(Constant)	5.517	.516		10.702	.000
QTS	.197	.013	.421	15.663	.000

a. Dependent variable: SI

Table 12 above shows t=15.66, p-value=0.0001 (p-value<0.05), indicating the significant influence of QTS on SI. The β=0.197, a positive value, specifying the direction of QTS and SI are the same. Thus, H3 is supported.

H4: The reputation of a higher education institution as perceived by students positively affects student satisfaction.

Table 13. Coefficient table for the relationship SS - SR

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
		Std. error	Beta		
(Constant)	11.398	.637		17.886	.000
SR	1.276	.047	.631	27.401	.000

a. Dependent variable: SS

Table 13 above shows t=27.40, p-value 0.0001 (p-value<0.05), thus SR is a significant construct influencing SS, The β=1.276, a positive value, specifying the direction of SR and SS are the same. Thus, H4 is supported.

H5: The image of a higher education institution as perceived by students positively affects student satisfaction.

Table 14. Coefficient table for the relationship SS - SI

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	β	Std. error	Beta		
(Constant)	10.930	.619		17.656	.000
SI	1.296	.045	.652	28.993	.000

a. Dependent Variable: SS

Table 14 above shows t=28.99, p-value 0.0001 (p-value<0.05), thus SI is a significant construct influencing SS, The β = 1.296, a positive value, specifying the direction of SS and SI are the same. Thus, H5 is supported.

4.3.2 Mediating effects

Multiple linear regression was used to test the mediating effect of school reputation (SR)on the relationship between QTS on SS met, Hypothesis 6 was tested using the following equations.

H6: Students' perception of the reputation of a higher education institution mediates the relationship between quality of teaching staff and student satisfaction.

Table 17 shows t=20.751, p-value 0.0001 (p-value<0.05), thus QTS is a significant construct influencing SS; and Table 15 confirms the model fit as F = 430.59, df = 1, 1136, p-value = 0.0001 (p-value < 0.05).

In Table 16 indicates, F = 505.712, df = 2, 1135, p-value=0.0001 (p-value<0.05) whilst Table 18 shows that QTS: t = 12.54, p-value = 0.0001 (p-value<0.05), thus, QTS positively and significantly influences SS. SR: t=20.53, p-value=0.0001 (p-value<0.05), thus SR positively and significantly influences SS.

In testing H6, the following equations were compared:

$$SS = 8.71 + 0.49\ (QTS) + e_1$$

$$SS = 3.68 + 0.28\ (QTS) + 1.00\ (SR) + e_2$$

By using Baron and Kenny's interpretation for testing mediating effects, as in Table 18, β = 1.00 or SR is a significant variable, hence it is a mediator. In addition, β = 0.28 (Table 18) is smaller than β = 0.486 (Table 17), indicating the reduced effect of the independent construct (QTS). As Table 17 shows β = 0.28, so QTS is significant, the mediating effect of SR is deemed to be partial. Thus, H6 is partially supported.

H7: Students' perception of the image of a higher education institution mediates the relationship between quality of teaching staff and student satisfaction.

Table 19 indicates that F=569.62, df=2, 1135, p-value=0.0001 (p-value<0.05) whilst Table 20 shows that QTS: t=13.12, p-value=0.0001 (p-value<0.05), thus, QTS positively and significantly influences SS in this relationship. Table 20 also shows that SI: t = 22.675, p-value=0.0001 (p-value<0.05), thus SI positively and significantly influences SS in this relationship.

In testing H7, the following equations were compared:

$$SS = 8.71 + 0.49\ (QTS) + e_3$$

$$SS = 2.96 + 0.28\ (QTS) + 1.04\ (SR) + e_4$$

By using Baron and Kenny's interpretation, Table 20 shows that β= 1.042 or SI is a significant variable, hence it is a mediator. In addition, β=0.28 (Table 20) which is smaller than β=0.486 (Table 17), indicating the reduced effect of the independent construct (QTS). As Table 20 shows β= 0.28, so QTS is significant, the mediating effect of SI is deemed as partial mediator. Thus, H7 is partially supported.

Table 15. Model fit for relationship of SS – QTS

Model	Sum of squares	Df	Mean square	F	Sig.
Regression	12434.838	1	12434.838	430.588	.000[b]
Residual	32806.242	1136	28.879		
Total	45241.080	1137			

a. Dependent variable: SS, b. Predictors: (Constant), QTS

Table 16. Model fit for relationship of SS - SR – QTS

Model	Sum of squares	Df	Mean square	F	Sig.
Regression	21318.212	2	10659.106	505.712	.000
Residual	23922.867	1135	21.077		
Total	45241.080	1137			

a. Dependent variable: SS, b. Predictors: (Constant), SR, QTS

Table 17. Coefficient table for the relationship SS – QTS

	Unstandardized coefficients		Standardized coefficients		Sig.
	β	Std. error	Beta		
(Constant)	8.713	.962		9.057	.000
QTS Model	.486	.023	.524	20.751	.000

a. Dependent variable: SS

Table 18. Coefficient table for the relationship SS - SR – QTS

Model	Unstandardized coefficients		Standardized coefficients		Sig.	Collinearity statistics	
	β	Std. error	Beta			Tolerance	VIF
(Constant)	3.680	.858		4.291	.000		
QTS	.280	.022	.303	12.542	.000	.800	1.250
SR	1.002	.049	.495	20.530	.000	.800	1.250

a. Dependent variable: SS

Table 19. Model fit for relationship of SS - SI – QTS

Model	Sum of squares	Df	Mean square	F	Sig.
Regression	22662.682	2	11331.341	569.618	.000
Residual	22578.398	1135	19.893		
Total	45241.080	1137			

a. Dependent variable: SS, b. Predictors: (Constant), SI, QTS

Table 20. Coefficient table for the relationship SS - SI - QTS

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.	Collinearity statistics	
	β	Std. error	Beta			Tolerance	VIF
(Constant)	2.964	.838		3.538	.000		
QTS	.281	.021	.303	13.117	.000	.822	1.216
SI	1.042	.046	.524	22.675	.000	.822	1.216

a. Dependent variable: SS

5. DISCUSSION

This research has theoretical importance as it contributes to various features of quality with a research model that describes and predicts the effects of quality of teaching staff, school reputation and school image on student satisfaction. While preceding readings of quality have mainly emphasized on the direct influences of different magnitudes of quality of teaching staff on student satisfaction, this research investigated the complicated relationship among constructs. One of the major results is the different degrees of influence that the quality of teaching staff has on student satisfaction and the interface of these two with the hypothesized mediators. School reputation was found to have a mediating effect on the positive side of quality of staff but the effect was only partially significant. This suggests that institutions with a good reputation may not be solely due to the quality of teaching staff. However, institutions with a poor reputation can be expected to be due to the quality of its teaching staff.

This research also confirms that the quality of teaching staffinfluences student satisfaction. The impact of quality on some general business settings has been widely analyzed in the literature, but no particular research work has been put on how it can be applied in a pragmatic educational setting. This finding has practical significance for policy setters and administrators of higher education in Hong Kong, because for the last thirty years the higher education in Hong Kong has been dominated by government-funded universities leaving self-funded post-secondary institutions to struggle for their market share of quality students. One way is for self-funded post-secondary institutions to improve the quality of teaching staff so as to

attract more students to enrol in the school. Institutions should take heed that the path to successful education is to go back to the basics of good teaching, using this aspect to build better reputation and image.

The findings of this research confirmed the positive effects of school reputation and school image on student satisfaction. It is also a norm that the majority of secondary school graduates in Hong Kong choose universities or post-secondary institutions based on their brand name and reputation. Self-funded institutions that are less reputable try to attract potential candidates by emphasizing the quality of their teaching and attempt to satisfy students by other means. With this information, higher education administrators may wish to build up the reputation and image of their institution by analyzing potential students' needs and match those needs with programme development and resource capabilities.

Educators need to concern over the quality of the programme, quality of teaching staff, and learning resources caused by the over-enrolment were expressed by stakeholders, including students, staff and alumni in late 2012, which resulted in a University inquiry into the operation of the College and the Institute [92]. Since the incident had attracted public attention and received wide media coverage, the University's reputation and image were seriously affected. The Inquiry Panel made twenty-nine recommendations, eleven of which were related to students' perception of their teaching, learning and resources, seven to the University's governance and image, five to student admission and further studies, and five to the quality of teaching staff. According to the Inquiry Panel, the majority of the teaching staff was part-timers with insufficient experience or administrative support and with a heavy workload. This could have been avoided if management had taken timely action in staff recruitment and had provided adequate administrative support.

The Lingnan incident also lends support to the findings of this research that the quality of teaching staff significantly affects student satisfaction, and that in turn student satisfaction has a highly significant effect on school reputation and school image. Just as [85] opined, while a positive reputation leads to perceived credibility a tarnished reputation suggests a lack of credibility. As a consequence of the incident, Lingnan University had to change its senior management, including the Dean of the College, in order to re-establish its brand name and regain credibility in the eyes of the public.

The measurement scales for this research met the reliability and validity tests and were borrowed and modified to empirically substantiate the influence of school reputation and school image on quality of teaching staff and student satisfaction by using linear regression techniques. The constructs were based on deeply rooted theory and Cronbach's alpha tests on all constructs met the minimum level of 0.7 as recommended by [89] for highly reliable academic research. Furthermore KMO analysis showed that the samples were more than adequate for this study. Validity tests were based on factor loadings of 0.6167 to 0.791 for most constructs, except for student satisfaction that loaded at 0.700 to 0.828. The latter could be due to the large variances amongst the six questionnaire items on student satisfaction and the fact that it was the only dependent variable of the research.

There are situations in Hong Kong that some universities have to accept less capable students when there are many universities offering undergraduate places to high-school leavers. It will be a challenge to maintain the quality of student intake and some schools need to deploy extra resources to help less capable students reach an acceptable post-secondary education standard. These findings should prompt educators in management roles to give thoughtful considerations to ways in which they can enable students to achieve satisfaction in their post-secondary studies, as the quality of graduating students may be another way of gaining a good reputation and image for post-secondary institutions.

6. LIMITATIONS AND FUTURE RESEARCH

The first limitation of this research is the quantitative research methodology and tools used to examine the relationships among the study's four constructs: school reputation, school image, quality of teaching staff, and student satisfaction. It is highly likely some other constructs may exist that influence or mediate the hypothesized relationships. The relationship of influences displayed by different variables may shed further light on the mediating effects.

The second limitation of the research is that its findings may not be generalizable. Although data were collected from 1,170 respondents, a number that undoubtedly enhanced the quality of the study, the findings were substantially based on the perceptions of students studying sub-degree programmes in Hong

Kong. The sub-degree sample may affect the applicability of the findings to other senior year students in undergraduate studies. Future studies could be conducted to determine how generalizable the findings of this research are to students studying other post-secondary programmes in Hong Kong or in other educational jurisdictions.

The third limitation of the research is associated to the finding that the two mediators, school reputation and school image partially influence the relationship between quality of teaching staff and student satisfaction.This finding suggests that the correlations concerned might be more complex than originally hypothesized. It is therefore suggested that a qualitative case study could be used as a primary tool to see how the different issues relate in a dynamic situation.

Based on the findings of this research, a number of recommendations are made for further related research. Firstly, as this research was applied to full-time higher education students in general, it may be useful for future research to concentrate on students of a specific discipline or on part-time students since the majority of post-secondary full time programmes are also offered in a part-time mode. In addition, the research findings revealed that a positive relationship exists between the quality of teaching staff and student satisfaction and confirmed the mediating effect of school reputation and school image. And, since results of the exploratory factor analysis found that school reputation and school image form an underlying 'school branding' superordinate variable, more research is needed to fully explore this new variable and its relationship to the independent and dependent variables.

7. CONCLUSION

In order to attract high quality students in the globalized higher education market and remain competitive, educational institutions across the world are taking a proactive attitude towards image building [58]. This research supports the findings of a longitudinal study by [72] confirming the positive influence of image on customer satisfaction, which increased over the three-year time span of their research It arrived at a similar finding of image with respect to student satisfaction but over a much shorter duration. This research also provides empirical evidence to show educators and administrators of higher education how important it is to enhance

reputation and image through student satisfaction with teaching and learning. Under such circumstances, it is extremely important to cultivate an image-culture based on quality of teaching and not totally on branding parallel with organizational vision and structure, technical infrastructure, collaborative environment, and appropriate training [93].This research provides help with building an image by having studied the constructs of impression, reputation, and comparative advantage, and confirming the causal relationship between satisfaction and reputation and that the two concepts are interrelated and mutually interdependent. This research also confirmed that satisfaction is the antecedent of quality [40] and that a long-standing and positive school reputation is also a strong indicator of its high levels of quality and competence [47].

The findings provide help with building an image by having studied the constructs of impression, reputation, and comparative advantage, and confirming the causal relationship between satisfaction and reputation and that the two concepts are interrelated and mutually interdependent. However, since this research was carried out exclusively in Hong Kong, further research is required in other jurisdictions to verify the adaptability of the findings.

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Elementary Teachers Educational Beliefs and Their Instructional Approaches: In Search of a Meaningful Relationship

1. INTRODUCTION

The general quality of science instruction in schools has suffered almost constant criticism from as far back as the early 20th century. At that time, John Dewey proclaimed his displeasure at the way science as a school subject was being portrayed as simply a body of knowledge rather than a process of inquiry [1]. Dewey s assertion actually highlights the dichotomy which formed the basis of arguments concerning appropriate strategies of science instruction up to the present day. This dichotomy stems from whether science should be regarded as the body of knowledge that has accumulated over the centuries, or as the process of scientific inquiry that resulted in that body of knowledge, or indeed as a combination of both.

Researchers are in general agreement that science has, up to the present day, been taught in schools as predominantly a body of knowledge [2,3,4,5,6]. That this continues in the modern era could be regarded as surprising considering the focus of teacher education science curricula as well as the science curricula of both elementary and secondary schools on the teaching of science as a process of inquiry. This is inquiry-based instruction (IBI) and has been articulated as the recommended approach for science instruction by reputable researchers and organizations for over half a century.

It is important to now consider the possible reasons why teachers, despite receiving training in the use of IBI during their period of teacher education, would generally fall back on the use of the traditional, content focused instructional strategies. One area of research over the last 30 years is in teachers thought processes and its influence on their day to day instructional decisions.

Since the 1980s, there have been several studies investigating the role of individuals beliefs in their actions and decision making. Pajares [7] did a synthesis of such studies and indicated that they were generally based on the assumption that beliefs are the best indicators of the decisions individuals make throughout their lives (e.g.

Bandura, 1986; Dewey, 1933; Nisbett and Ross, 1980; Rokeach, 1968). Pajares therefore concluded that research into teachers beliefs is important since it may inform educational practice in ways that had previously not been accomplished by the educational research of the time. Irez [8] also noted Dewey s interpretation of the crucial importance of beliefs in that it: " covers all matters of which we have no sure knowledge and yet, which we are sufficiently confident of to act upon (p. 17).

Sigel (1985) provided a definition which took into consideration the importance of individual s experiences in the development of beliefs. According to Pajares [7], he defined beliefs as "Mental constructions of experience, often condensed and integrated into schemata or concepts are held to be true and that guide behavior (p. 313). This definition also highlights the view that beliefs do not necessarily require a condition of truth. Irez [8] synthesized the definitions of a number of researchers (e.g. Clark and Peterson, 1986; Nespor, 1987; Pajares, 1992; Richardson, 1996) and provided the general definition that:

"Beliefs are psychological constructs that (a) includes understandings, assumptions, images or propositions considered to be true, (b) drive a person s actions and support decisions and judgments, (c) have highly variable and uncertain linkages to personal, episodic and emotional experiences, (d) although undeniably related to knowledge, differs from knowledge in that beliefs do not require a condition of truth (p. 17).

The assumption can therefore be made that, teachers instructional decisions in their science lessons may be a function of a number of factors, one of which is the educational beliefs that they hold. The question that now arises is how do teachers beliefs that affect their instructional practice originate? Even more importantly, what is the nature of the beliefs which would cause trained teachers to move away from the teaching approaches and strategies learnt and practiced at teachers college and instead use strategies deemed inappropriate by the education literature? To answer these questions one needs to understand the nature of the recommended inquiry-based approaches compared to the traditional content-focused approaches. In addition, what is the possibility that particular educational beliefs may favour one approach or the other?

1.1 Instructional Approaches to Science Instruction

In the context of the classroom, an approach to instruction can be considered to be the way in which a teacher conceptualizes instruction and how it should be conducted

to best facilitate student learning. This is related to teachers pedagogical content knowledge (PCK) which was described by Shulman [9] as teachers representation of how their content knowledge and general pedagogical knowledge of a subject discipline interact to produce understandings of how particular topics and issues could be organized and represented in instruction to cater for the diverse needs and interests of learners. This combines with teachers knowledge of context to form what Grossman [10] refers to as the four general areas of teachers knowledge. However, he also claimed that PCK probably had the greatest impact on teachers instructional practices.

Magnusson, Kracjik and Borko [11] linked teachers PCK to their instructional approaches in science when they identified various orientations to science teaching as components of PCK. They, in effect, defined these orientations as the general way in which teachers viewed science teaching within particular grade levels. Nine orientations to science teaching were proposed which were later categorized by Friedrichson [12] into two groups:

a. Teacher centered orientations: Didactic and academic rigor.

b. Orientations based on the reform initiatives and curriculum projects of the 1960s and continuing: Process, activity driven, discovery, conceptual change, project-based science, inquiry and guided inquiry.

The first category is taken to represent the traditional approaches to science instruction, while the second represents IBI approaches.

Anderson and Smith described teachers orientations as the combination between teachers thought processes and their actions [13]. These thought processes include the knowledge structures identified by Grossman (1990) and also teachers educational beliefs related to that knowledge. The actions represent the instructional strategies used by a teacher related to these thought processes. The determination of a teacher s approach to instruction can therefore best be determined by using a 'conceptual yardstick that would allow some kind of measurement to be made along a continuum of 'teaching practice identified earlier as ranging from teacher-centered traditional approaches to student-centered inquiry-based approaches, with the latter being identified as the preferred approach for effective science instruction.

1.2 Traditional, Content Focused Instructional Approaches

Chiapetta and Koballa characterized much of the science teaching that presently occurs at all levels of the education system as teaching the 'products of science [4]. This assertion is targeted at the widely held view that generally the teaching of the science is

focused on the content found in textbooks and other curriculum documents with comparatively less attention placed on the methods of scientific inquiry used to generate that knowledge.

The teaching of science as a 'body of knowledge has arguably remained the primary approach to science instruction at all levels of the education system up to the present day. Hence the references to this approach as 'traditional. It is a teacher-centered approach where the teacher is, as described by Ibrahim, primarily focused on content coverage and sees the students as knowledge reservoirs [5]. Damnjanovic also described the students as regarding their teachers as expert knowledge sources and responsible for their learning [14]. The OECD [14] goes further and describes this approach as direct transmission, with the teachers role being to: " communicate knowledge in a clear and structured way, to explain correct solutions, to give students clear resolvable problems, and to ensure calm and concentration in the classroom (p. 92).

Referring to the orientations to science teaching, traditional science instruction is represented by the didactic and academic rigor orientations. Magnusson et al. [11] described the teacher with a didactic orientation as one whose goal is to "transmit the facts of science (p. 100). The goal of one with an academic rigor orientation is to "represent a particular body of knowledge (p 100). For science instruction this would include rigid verification exercises like laboratory work and demonstrations.

Recent developments in the U.S. give compelling evidence of the resilience of these traditional approaches to science instruction. In 2011, the National Research Council (NRC) published their 'Framework for k-12 Science Education which gives clear indication of teachers reluctance to move away from traditional approaches. For example, there is the claim that k-12 science instruction still focuses on breadth rather than depth of content and students generally are not made to experience how science is actually done [16].

That research evidence suggests that this approach is still the most popular one used by teachers is an indication that, for a number of reasons, teachers are making the decision to stick with it despite their assumed knowledge of the preferred inquiry based approaches. The research literature actually provides some of these reasons, a few of which appear quite compelling. For example, there is the argument that teachers 'experiences during their many years as students results in attitudes and beliefs about teaching and learning that far outweigh their teacher education experiences [6, 7, 15, 17, 18] With regards to science instruction, these attitudes and beliefs may cause teachers to generally be more comfortable using the instructional strategies they were used to as students.

Another argument is related to the emphasis of many schools on student success at examinations. Duffy and Raymer linked this to a general tendency of teachers to use traditional instructional strategies which are more aligned to content coverage [19]. They also linked this to students superficial learning of content since they tended to be more focused on identifying what will be on a test than developing a deep understanding of the subject matter.

Jones and Carter also raised the argument that some teachers may actually believe that traditional approaches are most effective for science teaching [6]. Reasons given for this included teachers actually experiencing success as students being taught science by a 'favourite teacher using traditional approaches, teachers themselves continually being appraised as effective teachers using traditional approaches, and, as expounded by Jones and Carter, teachers who either, lack content knowledge or student-centered pedagogical skills, and are therefore more comfortable using traditional didactic approaches [6].

Despite these possible reasons for the predominance of traditional approaches to science instruction, most modern researchers are of the view that, as indicated by Levitt, passive instruction is an ineffective tool for learning science concepts [11], and, according to Chiappetta and Koballa, encourages poor learning strategies such as memorization of poorly understood facts [4].

1.3 Inquiry Based Instruction

In the early 20th century, Dewey criticized the content-focused science instruction of the time, arguing instead for IBI where the focus was on the development of the thinking and reasoning skills as well as the methodological skills of scientific inquiry [1]. These views actually formed the basis for the curriculum initiatives that started in the U.S. in the 1960s and spread to countries worldwide. This curriculum reform movement focused on primary and secondary school curricula and emphasized student centered instruction, development of scientific attitudes and process skills, the use of practical experience for students, and a focus on breadth rather than depth of content [21]. The process, activity, and discovery orientations to science teaching outlined by Magnusson et al. stemmed from these curriculum initiatives [11]. They described the goal of teachers with a process orientation as helping students develop process skills. Those with an activity orientation have the goal to involve students in hands-on activities, while those

with a discovery orientation have the goal of providing opportunities for students to discover science concepts through their own activities.

These curriculum reform initiatives, however, did not have the expected improvement in science instruction in the U.S. This was revealed by a series of publications in the 1980s including Project Synthesis supported by the National Science Foundation, and 'A nation at risk by the National Council on Excellence in Education. These reports resulted in renewed emphasis on curriculum reform but, according to Bybee, Powell and Trowbridge [1], it was through a series of benchmarks and standards for IBI published by the American Association for the Advancement of Science [22] and the National Research Council [23]. These benchmarks and standards were adopted by curriculum developers internationally, and formed the basis for their curriculum development initiatives.

Although many definitions of IBI were since put forward by researchers and organizations, the one originally put forward by the NRG [23] encompasses most of them: "a multifaceted activity that involves making observations, posing questions, examining books and other sources of information, planning investigations, reviewing what is already known in light of experimental evidence, using tools to gather, analyze and interpret data, proposing the results, use of critical and logical thinking, and consideration of alternative explanations (p. 23).

This definition illustrates the project-based science as well as inquiry orientations to science teaching put forward by Magnusson et al [11]. They indicated that the goal of the teacher with a project-based science orientation is to "involve students in the investigation of authentic problems (centered on) driving questions (p 100). The goal of a teacher with an inquiry orientation is to represent science as inquiry using investigation-centered instruction.

The NRG definition also highlights particular differences between IBI and traditional instruction that may actually influence teachers decisions as to their day to day instructional strategies. For example, the activity oriented nature of IBI may not appeal to teachers who are primarily focused on content coverage. Teachers may also question whether they can actually access all the required resources for IBI. Also of importance is whether teachers consider that they are confident enough, or possess the necessary science content knowledge to have the level of classroom discourse that would stimulate the critical and logical thinking required by IBI.

Justice, Rice, Roy, Hudspith and Jenkins outlined Dewey s ideas of IBI as a belief that students need to develop critical thinking skills rather than memorization skills [24]. They therefore defined IBI as: " instructional practices designed to promote the development of higher order intellectual and academic skills through student-driven and instructor-guided investigations of student generated questions (p. 843).

This definition focuses attention on inquiry as an intellectual process. It brings out the important point that student experiments and other manipulative activities cannot on their own be considered to be following an inquiry process. There must be some critical examination and production of ideas, problems, experimental results, conclusions etc. Another key element of this definition is the student-driven, instructor-guided investigations of student-generated questions. This illustrates a most basic aspect of inquiry: the curiosity of human beings. Teachers are expected to stimulate student curiosity relevant to the topics being covered, which will lead to student investigations of their own questions. The instructor acting as a guide through this process illustrates the guided inquiry orientation to science teaching, the goal of which is to form a "community of learners whose members share responsibility for understanding the physical world [11].

Also of relevance to IBI is the conceptual change model of learning which stemmed directly from constructivist ideology and is based on the view that by the time learners encounter the formalized science instruction in the classroom, they have already constructed a multitude of pre-conceptions about the natural world. These pre-conceptions have been given names such as misconceptions, alternative conceptions, and natve theories since they often do not correspond well with the scientific knowledge that is taught [4]. Wandersee, Mintzes and Novak described these conceptions as tenacious and resistant to change by conventional teaching strategies [25]. So in the science classroom, teaching strategies must, in effect, facilitate a process of conceptual change in students.

Magnusson et al [11] described the conceptual change orientation to science instruction where the teachers goal is to "facilitate the development of scientific knowledge by confronting students with contexts that challenge their natve conceptions (p.100). Liang and Gabel [26] identified a number of conceptual change teaching approaches that have been developed and have been shown to promote students conceptual understanding of science as well as improving their attitudes towards science teaching and learning (e.g. Driver, 1988; Gabel, 1998; Hand and Treagust, 1991; Heuson

and Heuson, 1983; Stofflette and Stoddert, 1994). Chiappetta and Koballa [4] gave a general description of these approaches indicating that students prior knowledge is elicited and they are made to reflect on and confront their pre-conceptions of phenomena. Opportunities are also provided for students to find personal meaning with the new concepts from their interactions with objects, events and people.

Elementary teachers have themselves been on the receiving end of these instructional approaches due to their experiences as students. In addition, it is in the years of teacher education that they are formally exposed to the science instructional strategies that fall under the umbrella of either traditional approaches or IBI approaches. These experiences would most likely have resulted in the development of particular educational beliefs which may actually be instrumental in influencing their preferred instructional approaches. It is therefore pertinent to understand the nature of the educational beliefs that may occur in teachers as a result of their experiences with the aim of determining the appropriate interventions needed that would lead to a more effective implementation of IBI.

2. ELEMENTARY TEACHERS EDUCATIONAL BELIEFS

2.1 Importance of Studying Teachers Thinking Processes

Clark and Peterson [27] actually classified the process of teaching into two major domains: (1) teachers thought processes, and (2) teachers actions and their observable effects. They were clearly alluding to a strong influence of these thinking processes on the actions of teachers. This was further discussed by Fang [28] when he identified two underlying assumptions of research on teachers thinking as:

1. Teachers are professionals who make reasonable judgments and decisions within a complex and uncertain community.
2. Teachers thoughts, judgments and decisions guide their classroom behaviours.

2.2 Resiliency of Teachers Beliefs

An important reason cited in the literature for attention given to teachers beliefs is the resiliency of beliefs, even in the face of compelling factors contrary to these beliefs.

Pajares [7], in his synthesis of belief research, alluded to the difficulty of belief change even under circumstances when it is logical or necessary for them to. This raises an important question. Are all beliefs of the same intensity, and hence equally resistant to change? Rokeach [29] was of the view that beliefs do differ in intensity and power. He posited that beliefs vary along a central-peripheral dimension, and the more central the belief, the more it will resist change Rokeach s ideas bear important implications for teachers beliefs and practices. It can be reasonably concluded that the more central teachers beliefs are those that have withstood the test of time since, as indicated by Rokeach [29], these beliefs have obviously resisted change. Pajares [7] agreed when he asserted that the earlier beliefs developed by individuals are the ones most difficult it is to alter. Therefore, if teachers developed beliefs about teaching and learning as far back as when they were students in primary and secondary schools, and these beliefs persisted in them as teachers, it can be argued that these are central beliefs that may resist change even in the period of teacher education. Pajares [7] also asserted that beliefs that are newly acquired are the most vulnerable and, hence, subject to change. Therefore, any beliefs that teachers may acquire as a result of teacher education, may be peripheral beliefs, and these may quickly change when teachers enter schools. This will especially be the case if these peripheral beliefs are contrary to the longer established central beliefs.

2.3 Teachers Personal Experiences and the Development of Beliefs

Rokeach [29] described beliefs as having a cognitive component which is most likely the result of personal experiences of individuals that are associated with the development of particular beliefs. With regards to teachers, various researchers have described beliefs related to the teaching-learning process as evolving over time due to a variety of factors including cultural influences and teachers experiences of schooling and instruction (e.g. [17], [30]). Researchers, however, have provided different interpretations as to exactly how personal experiences contribute to the development of beliefs. Eraut (1985) for example, postulated that any significant experience of an individual remains in the long term memory as a photographic image that continually contributes to the creation and recreation of knowledge, and hence beliefs (Cited in [7]). Nespor [31] argues instead that these previous episodes or events actually colour the comprehension of subsequent events.

Since teachers previous experiences influence the development of beliefs about the teaching-learning process, then it should also influence their behaviours as teachers. Meyer, Tabachnik, Hewson, Lamberger and Park [32] expressed the view that these beliefs act as filters for the new ideas learnt during teacher education. Fang [28] argued that these beliefs can be embodied in a teachers expectation of his or her students performance, or the teacher s theories about a particular subject area s learning and teaching. This is of particular relevance to science teaching, which has historically been delivered using traditional didactic modes. Strong beliefs about the effectiveness of traditional modes of instruction may have been developed which would influence, not only how a teacher reacts to IBI, but ultimately how he or she interacts with students during science instruction.

2.4 Teachers Beliefs and Their Classroom Practices

The proposed influence of teachers beliefs on their classroom practices is based on the assumption that beliefs generally are very effective in predicting behaviours of the individuals possessing them [7,29,33,34]. Every day, teachers are expected to make a variety of classroom decisions. In addition, a number of planning decisions are made by teachers on a daily, weekly, termly and yearly basis. These decisions can be made individually or in conjunction with other teachers, and should be reflected in the classroom practices of individual teachers. The question which arises is: to what extent are the educational beliefs of individual teachers reflected in firstly, the planning decisions made, and secondly, their classroom practices?

Jones and Carter [6], commenting on the complex belief systems held by teachers, indicated that these beliefs influence teachers instructional discourse, instructional strategies, classroom management, selection of topics, and their assessment practices. It can also be argued that these belief systems also influence how teachers interact with other teachers during the instructional planning process. For example, new teachers may have low teaching efficacy beliefs, and hence, may continually give way to the ideas of more experienced teachers, whose teaching approaches and strategies may be different from that of the new teachers. Hence, the classroom practices of these new teachers may be more in line with the ideas of their more experienced colleagues than a reflection of their own beliefs.

If, however, the assumption is made that teachers classroom practices are generally the result of their own cognition rather than influenced by other teachers, then educational beliefs developed by teachers during their periods of schooling as well as teacher education, may be an important contributing factor to the nature of these practices. Levitt [20] cited Peterman (1993) who found that the main way in which teachers express their educational beliefs is through their behavior in the classroom. These beliefs were indicated by Nespor [31] as influencing teachers perceptions and judgments in the classroom, which in turn affect their behavior.

More recent studies on teachers beliefs and practices have indicated that the relationship may not be as straightforward as beliefs influencing practice. Smagorinsky, Cook, Moore, Jackson, and Fry [35] noted that new experiences may actually lead to changes in and/or additions to beliefs. This was supported by the research of Jones and Carter [6] which suggested that once instructional behaviours are enacted, responses to teachers actions affect their beliefs just as beliefs affect actions. They, however, pointed out that any alterations to teachers beliefs based on, say, student responses would depend on the strength of the students responses, as well as the strength of the teachers beliefs. If, as earlier discussed, the newly acquired beliefs from teacher education are weaker than the longer established beliefs from teachers experiences as students; then it is these weaker beliefs that would be the ones which would more likely change as a result of inadequate student responses. Beliefs about IBI may be an aspect of these newly acquired beliefs. It should also be noted that inadequate responses may not only be from students. It could also be from other teachers, the school administration, and even parents.

Jones and Carter [6] pointed to research showing a conflict between teachers beliefs and their practices (e.g. King, Shumow and Lietz, 2001). Reasons given for this conflict include weak content background, and weak instructional skills of teachers. A contrary argument to these findings is that they may not necessarily be indicating a conflict between teachers beliefs and practice. It may be that the conflict is between practices and weakly held beliefs originating from teacher education experiences. Despite these experiences, stronger held beliefs from the many years of schooling may be still present, and teachers resort to them in the face of practical constraints to the beliefs originating from teacher education.

What then are the particular educational beliefs that can influence teachers instructional practices? Pajares [7] indicated that the construct of educational beliefs

can be classified into teacher efficacy beliefs and epistemological beliefs. Levitt [20] also identified teachers beliefs about teaching and learning as important in that they "underlie the processing of a multitude of information a teacher is presented with in the classroom (p.4). Enochs and Riggs [36] identified science teaching efficacy beliefs which, in effect, combined teacher efficacy, self efficacy and self esteem. In order to improve elementary teachers science instructional practices, it is important to consider how these beliefs may develop in teachers, how they could be measured in teachers, and also how they may be reflected in teachers instructional practices.

2.5 Measurement of Beliefs

If educational beliefs are so important in determining teachers instructional practices, then it is vitally important that researchers are able to, as accurately as possible, measure these beliefs. This is easier said than done since beliefs can be said to be individuals construction of the reality they have been exposed to and so cannot be directly observed. It must be inferred from what individual s say or do. According to Rokeach [29], any inference drawn from individuals with a view of determining their beliefs, must take into account ways in which individuals give evidence of these beliefs. He added that this could include belief statements, statements about intentions to behave in a pre-disposed manner, or the actual behaviour related to the belief in question.

Many researchers have adopted qualitative methodologies for the determination of individuals beliefs (e.g. [20,37,38]). Strategies range from structured and semi-structured interviews to lesson observations. The argument is that these methodologies are most appropriate for the study of beliefs since, as expressed by Pajares [7], effective probes and strategies must be used to uncover deeply held beliefs. While this is a fair argument, the debilitating drawback is that qualitative methodologies limit the size of the population that can be investigated.

Despite the appropriateness of qualitative methodologies, a number of researchers (e.g. [5, 36, 39]) adopted quantitative methodologies for the measurement of teachers beliefs. One argument for this is that although beliefs are constructed realities, and therefore individualized, it is felt that these beliefs can be measured relative to enabling or inhibiting certain behaviours. This is similar to what has repeatedly occurred in research on attitudes over the last few decades. In this regard, the views expressed in Onwuegbuzie [40] that the relationship between quantitative and qualitative paradigms is

one of isolated events lying on a continuum of scientific inquiry, are pertinent. Therefore, as asserted by Munby [38], the choice of whether to use quantitative or qualitative methodologies (or both), would depend on the type of data that is to be collected, as well as the use which is to be made of that data.

2.6 Categories of Teachers Educational Beliefs

2.6.1 Teachers personal epistemological beliefs

Yilmaz-Tuzan and Topcu [41] cites a definition of epistemology by Hofer (2002) as the "origin, nature, limits, methods and justification of human knowledge (p.65). So personal epistemological beliefs can simply be defined as an individual s beliefs about the nature of knowledge and how we come to know. Jones and Carter [6] went further and described these beliefs as playing a mediating role in an individual s processing of new information. Yilmaz-Tuzan and Topcu [41] described the possibility of an individual holding several epistemological beliefs at the same time, and that these beliefs shape a person s epistemology.

Personal epistemological beliefs are of particular relevance to science education, particularly the teaching-learning process, since on one hand, individual s personal epistemologies may most likely have been strongly influenced by their experiences as students in schools. On the other hand, teachers personal epistemologies would most likely influence the way they conceptualize the teaching-learning process and hence, what learning is like for individual students. Jones and Carter [6] also expressed the view that teachers personal epistemologies may serve as mental exemplars for "constructing and evaluating their own teaching practices (p.1072). It is therefore also likely that teachers personal epistemologies may also be reflected in their classroom behavior.

Researchers have provided different interpretations as to what generally constitutes personal epistemologies, and how these epistemologies develop in individuals. According to Yilmaz-Tuzan and Topcu [41], some researchers are of the view that personal epistemologies develop in stages similar to Piagetian cognitive development (e.g. Kegan, 1982; King and Kitchener, 2004; Perry, 1970). Two key stages in that development were identified by Yilmaz-Tuzan and Topcu [6] as:

1. Dualist: Knowledge seen as certain and authoritative.

2. Relativist: Knowledge seen as "cumulative constructions of observations but subject to judgment by different individuals (p.66).

Ofer and Pintrich [42] went further and identified the more advanced stage of evaluativistic epistemologies where knowledge is seen as individuals construction of observations but with evaluation based on argument and empirical evidence. Yilmaz-Tuzan and Topcu [41] identified other researchers as having described personal epistemologies as a collection of beliefs (e.g. Schommer, 1988; Schommer and Walker, 1997). They adopted a multi- dimensional perspective which was explained by Yilmaz-Tuzan and Sami Topcu [41] as individuals having a multiplicity of beliefs about the certainty of knowledge, source of knowledge, justification of knowledge, acquisition of knowledge and the structure of knowledge. Using this multi-dimensional perspective, Schommer [39] hypothesized five epistemological beliefs:

1. Certain knowledge — beliefs about the stability of knowledge ranging from unchanging to tentative.

2. Simple knowledge — beliefs about the structure of knowledge ranging from isolated bits and pieces to integrated concepts.

3. Omniescent authority — beliefs about the source of knowledge ranging from omniescent authority to reason and empirical evidence.

4. Quick learning — beliefs about the speed of learning ranging from quick or not at all to gradual.

5. Innate ability — beliefs about ability to learn ranging from fixed at birth to improvable.

Both views of the development of epistemological beliefs recognize that there is a gradual continuum of which knowledge could be perceived by individuals. This continuum ranges from a view of knowledge as certain and authoritative to knowledge that is tentative, uncertain, and based on human reasoning and empirical evidence. The relevance to science teaching and learning can be clearly seen. Teachers whose epistemological beliefs are more dualist in nature, and hence, sees knowledge as certain and authoritative, may be more inclined to use the traditional, teacher-centered approaches to instruction than student- centered IBI. On the other hand, teachers with more relativist beliefs, who see knowledge as tentative and based on human reasoning and empirical evidence, may be more inclined to use IBI rather than the traditional approaches.

When the other dimensions of Schommer s hypothesized epistemological beliefs are examined, the same reasoning could be applied to show that the nature of a teacher s epistemological beliefs may be reflected in the teacher s approach to science instruction. For example, for the dimension 'simple knowledge, if a teacher sees knowledge as isolated bits and pieces, then his or her teaching strategies may be inclined towards traditional content-focused, text-book driven strategies. In contrast, a teacher who sees knowledge as integrated may utilize more student-centered strategies aimed at implementing a more cohesive and relevant science curriculum. If the assumption is made that teachers epistemological beliefs develop as a result of their experiences in formal education, then their 'simple knowledge beliefs may actually be inclined to a belief of knowledge as discrete isolated concepts. This is because traditional science instruction has focused on breadth of content with students being expected to learn a wide range of disconnected facts. This would partly explain their continued reliance on traditional approaches.

For the dimensions of 'quick learning and 'innate ability, teachers who believe that students ability to learn is fixed, may be inclined to use teacher-centered approaches, while those who believe that all students can learn, albeit at different rates, and students ability to learn can be improved, will be more inclined to use student-centered approaches. Again, many teachers experiences being taught using traditional approaches, involved mixed ability classroom situations where the majority of students experienced much difficulty learning the science content. For elementary teachers, this, in many cases, resulted in them either failing, or dropping the pure science subjects. This may be instrumental in the development of simple 'quick learning and 'innate ability beliefs in these teachers.

With regards to teachers 'omniscient authority beliefs, experiences from both formal and informal learning experiences may be instrumental in the development of simple beliefs. This include the focus of instruction on notes, textbooks, and the teacher as the source of knowledge, as well as societal influences such as that of religious and other doctrines.

2.6.2 Teachers beliefs about science teaching and learning

With regard to teaching, Chai, Teo and Lee [43] cited a number of researchers (e.g. Enstwistle et al., 2000; Kane, Sandretti and Heath, 2002; Samuelowicz and Bian,

2001; Teo, Chai, Hung and Lee, 2008) who classified teachers beliefs about teaching into two broad categories:

a. Teaching as a process of knowledge transmission.

b. Teaching as facilitating students knowledge construction.

With regards to science teaching, the first is in harmony with the traditional approaches, while the second indicates an important aspect of IBI. Elementary teachers beliefs about science teaching would most likely have had its strongest influence first from their experiences being taught science in primary and secondary schools, and secondly from their experiences in teacher education classrooms. These two experiences may be quite contradictory for teachers since they were most likely exposed to traditional instruction in primary and secondary schools while their teacher education experiences would have focused on IBI. The actual beliefs developed would most likely depend on which of the experiences had a stronger impact on teachers cognition. Researchers, such as Nespor [31], claim that the experiences of many years of primary and secondary school should far outweigh the two years of teacher education. Therefore, any beliefs about science teaching developed by teachers during primary and secondary school experiences may actually persist beyond teacher education. These beliefs may actually favour traditional approaches to science instruction. It can therefore be concluded that elementary teacher education should not only focus on teaching preservice teachers about the use of IBI, but should also include strategies to change unsatisfactory beliefs about science teaching.

With regards to teachers beliefs about learning generally, and particularly the learning of science, these beliefs should tie in with epistemological beliefs which also represent beliefs about how people come to know. Of particular importance are Schommer s epistemological dimensions of 'quick learning and 'innate ability , especially as regards to teachers beliefs about their own students ability to learn science. As previously indicated, teachers experiences with learning science may lead to negative beliefs about their own students ability to learn science. Also of relevance to teachers beliefs about the teaching and learning of science are teachers beliefs about the subject itself. The research literature has pointed to negative attitudes to science and science teaching from a significant number of elementary school teachers (E.g. [44,45,46,47]), which may be the result of negative beliefs about science developed from teachers experiences as science students.

2.6.3 Science teaching efficacy beliefs

It was Bandura [33] who suggested that, based on various life experiences; individuals develop general expectations about their own capabilities of performing certain tasks. He referred to this as self efficacy and defined it as "a judgment of one s capability to accomplish a given level of performance (p.391). This judgment may be based on a number of factors, which most likely would include the type of experiences an individual had relevant to the particular task in question. For example, with regards to the teaching of science, a teacher may have developed low self efficacy because of negative experiences with the learning of science as a student.

Teacher self efficacy has also been defined in relation to teachers belief in their own ability to positively affect students performance. Tschannen-Moran and Woolfolk-Hoy [48] described teacher self efficacy as their beliefs about their ability to teach every student, including those who may be difficult or unmotivated.

With regards to teachers classroom behaviours, a number of researchers indicated findings showing that the levels of self-efficacy beliefs are connected to teachers behaviours and practices in the classroom (e.g. [49,50,51,52]). Marshall et al [51] cited Hoy and Woolfolk (1993) as well as Tschannen-Moran and Woolfolk-Hoy (2001) who found that the more efficacious teachers are, the more likely they are to successfully implement new instructional strategies as well as effectively respond to classroom challenges. These findings are important when considering the implementation of IBI by teachers. More highly efficacious teachers are therefore more likely to engage and persist in IBI.

Deemer [49] provided a more detailed analysis of how teaching efficacy can influence teachers instructional practice. Suggesting that personal teaching efficacy influences the classroom goals of teachers, she specifically indicated that low efficacious teachers spend "little effort in finding materials and planning lessons that challenge students (p.74). These are fundamental requirements for planning inquiry-based lessons. Deemer also indicated that these teachers do not adequately persist with the students having difficulty with the concepts being covered. She also noted that the converse was true for highly efficacious teachers.

It is likely that the period of teacher training of elementary teachers may be instrumental in either the development or alteration of their educational beliefs. It is

therefore important to this discussion to consider the intended as well as the actual effects of elementary teacher education experiences on the knowledge and beliefs of teachers related to their science instructional practices.

3. ELEMENTARY TEACHERS PEDAGOGICAL TRAINING AND THEIR EDUCATIONAL BELIEFS

Initial teacher training in many jurisdictions is normally of two year duration and trainees may specialize in primary or secondary teacher education. In the primary teacher education programme, trainees are engaged in a number of content and methods courses. The content courses focus on the core areas of the primary school curriculum i.e. language arts, mathematics, science and social studies. The methods component should ideally expose student teachers to both the student centered and reform based orientations to science teaching suggested by Magnusson, Kracjik and Borko [11] or IBI approaches. Teachers should also be exposed to instructional strategies aimed at encouraging their use of IBI.

Cook, Smagorinsky, Fry, Konopak and Moore [53] identified a lack of congruence in several instructional factors associated with schools with that associated with universities and colleges offering teacher education. They identified these factors as goals for schooling, expectations of the kinds of learning that benefit students, and the means through which students acquire and represent academic knowledge. These can all be considered to be very important and even fundamental factors in the education process that may serve to determine the way students are engaged in the teaching-learning environment. The result may actually be confusion in the minds of newly trained teachers entering the classroom, and according to Cook et al. [53], they may actually abandon the teaching strategies learnt and practiced at college and gravitate to the values of the school since it is here that their teaching competence will ultimately be judged.

These differences in instructional goals of elementary schools and teachers colleges may result in either the development or maintenance of educational beliefs which favour the goals of elementary schools. The reason for this was identified by Lortie [17] when he pointed out that the thousands of hours teachers spend in classrooms far outweigh the effects of the relatively fewer hours spent in teacher education. Although it

can be argued that this is not a fair comparison since the teacher education experience is for more mature individuals and is primarily focused on teacher training, the merit in the comparison is seen when one considers that it is based on the development of beliefs which, according to Irez [8], have strong linkages to personal, episodic and emotional experiences. Rokeach [29] had actually noted that the time spent by teachers as students in primary and secondary schools are fertile ground for the development of educational beliefs. Pre-service teachers enter teacher education with these beliefs firmly in place [6,7,18] and, according to Jones and Carter [6], these beliefs act as filters for the new ideas being learnt during the teacher education process.

One set of elementary teachers beliefs that are developed during the years of elementary and secondary education are epistemological beliefs. Since these teachers were mainly exposed to traditional approaches to science instruction, they would most likely have entered their teacher education programmes with very natve epistemological beliefs. Since, according to Pajares [7], these beliefs tend to be relatively stable and resistant to change, they may actually persist in teachers despite their teacher education experiences. This is especially the case since, as noted by various researchers; there are several inadequacies in the teacher education process. For example, Brouwer and Korthagen [54] discussed the fragmented view of knowledge presented in teacher education curricula. In producing their national standards, the NRC [23] had noted that the preparation of pre-service primary school teachers was inadequate both in content and pedagogy. Brouwer and Korthagen [54] also expressed the widely held view that teacher educators generally do not display the best examples of good teaching. So the persistence of natve epistemological beliefs in in-service teachers may be reflected in a predominance of traditional approaches to science instruction.

The inadequacies of the teacher education process may also result in the maintenance of low science teaching efficacy beliefs in elementary teachers. These beliefs have their background in the limited conceptual understanding of science ideas as noted by Plourde [18], and Hechter [55]. That these low science teaching efficacy beliefs persist even after pre-service teacher education has been noted by several researchers (e.g. [2, 5, 18, 56]). Abd-el-Khalick et al [2] extended this to a lack of teachers confidence teaching science in an effective inquiry-based manner. So the low science teaching efficacy beliefs of in-service teachers may also be reflected in their persisting with traditional approaches to science instruction. It has been suggested that teachers

who lack confidence teaching science give it minimal emphasis within the curriculum [6], resulting in the implementation of poorly conceptualized and ineffective learning experiences in science [18].

With regards to pre-service elementary teachers beliefs about science teaching and learning, the assumption can also be made that, because of unsatisfactory experiences in secondary science education, these beliefs are low. For example, as suggested by Jones and Carter [6], pre-service teachers generally view teaching as a process of knowledge transmission. However, the development of positive science teaching and learning beliefs would also depend on the quality of the teacher education experiences. Researchers have provided varied reasons why teacher education may not result in the development of positive science teaching and learning beliefs, especially with regard to inquiry-based instruction and learning. Abd-el-Khalick et al [2] actually expressed doubts whether teacher development programmes can actually develop teachers knowledge of inquiry. Cain [37] cited Doyle (1997) who observed that many pre-service teachers clung to their prior beliefs about teaching and learning even when their field experiences supported a different view. Varma et al [56] cited literature which suggested that inquiry-based instructional strategies in science are not uniformly incorporated into elementary science methods courses across the U.S. (E.g. Barrow, 2004; Smith and Gess-Newsome, 2004) and that field experiences may not provide appropriate models for IBI (Abell, 2006).

From this discussion, it seems clear that, as was noted by Pajares [7], teacher education curricula must take into consideration the entering beliefs of pre-service teachers. However, even if a teacher education programme is successful at developing more positive beliefs in elementary teachers there are contextual factors related to the school environment that may threaten the stability of that change.

4. SCHOOL CONTEXTUAL FACTORS AND ELEMENTARY TEACHERS BELIEFS

Elementary teachers PCK should represent a blend of their science content knowledge and general pedagogical knowledge within the unique contexts of their school and classroom situation. The development of these teachers PCK may therefore be problematic because of their inadequate conceptual understandings of science and also,

as pointed out by Fang [28], because these "contextual factors can have powerful influences on teachers beliefs, and, in effect, affect their school practice (p.53). The common conception that teachers do not use the IBI practiced at teachers colleges, may be due to the influence of these contextual factors. Based on their years of experience, teachers may actually develop what the authors of this paper refer to as applicability beliefs with reference to IBI. These are teachers beliefs of the applicability of IBI in their particular school s social, psychological and environmental contexts.

The conflict that is described by various researchers between teachers beliefs and their practices (e.g. [6]) may actually be the result of intervening applicability beliefs developed due to contextual factors impacting their implementation of the science curriculum. In many cases, the beliefs measured by researchers are epistemological beliefs and beliefs about science teaching and learning that were developed prior to and as part of in-service experiences. Fang [28] referred to these beliefs as "situational and transferred into instructional practices only in relation to the complexities of the classroom (p.55). Applicability beliefs, on the other hand, are directly related to teachers experiences as classroom teachers and hence, may be more directly reflected in the classroom actions of teachers.

The social, psychological and environmental factors in schools that can be influential in the development of applicability beliefs to IBI are wide and varied. However, researchers have pointed to a number of key factors that are repeatedly raised by teachers when commenting on their implementation of the science curriculum. An important group of factors raised by a number of researchers are those related to the particular socio-cultural contexts of schools and their impact on beginning teachers. Brouwer and Korthagen [54] referred to this as the occupational socialization of teachers, and cited the view of Wideen et al. (1998) that beginning teachers may view their more experienced colleagues as more 'realistic role models than their pre-service lecturers. They therefore tend to conform to the instructional practices of these colleagues, one of which may be the reliance on traditional approaches to science instruction. Cook et al [53] also commented on the social environment of schools, indicating that it promotes an ethic geared towards content coverage and control.

Other socio-cultural and psycho-social factors cited in the literature are:

- Attitudes of school administrators and colleagues which can "support or diminish the effectiveness of beginning teachers by influencing beliefs about themselves and their students (Kilgore, Ross and Zbikowski; cited in [28], p.54).

• The adoption of particular instructional practices which are perceived by teachers to suit the particular characteristics of their students [5,15].

There are a number of factors related to the management of the school curriculum that may impact on the development of teachers applicability beliefs. One that has been raised by a number of researchers (e.g. [2,5,6,18]) is an insufficient amount of time to effectively implement the science curriculum. This would directly impact on the development of applicability beliefs related to IBI since more time is needed for the implementation of IBI strategies than traditional ones. If the science curriculum is viewed as extensive, these teachers may deem traditional approaches more suitable for instruction than IBI.

Teachers focus on preparing students for examinations may indeed be counter-productive to student learning and lead to an emphasis on traditional approaches to instruction. This is especially the case for national standardized examinations, e.g. Minimum Standards and Common Entrance and Secondary Certificate Examinations, where results may be inappropriately used for the assessment of schools and teachers. Teachers may be excessively concerned with content coverage, and hence, more likely gravitate to traditional approaches to instruction. Other factors include the greater requirement of materials and equipment for teachers implementing IBI. These may be difficult to obtain and so may deter teachers from using IBI [2,5,6,8,18]. Also, very often teachers have to use their own finances to purchase the required materials. This may be perceived by teachers as a lack of institutional support for IBI [51] and may also result in the development of negative applicability beliefs.

It is therefore the researchers contention that teachers face a variety of contextual factors in their day to day teaching activities, which may result in the development of applicability beliefs related to a number of expectations regarding their classroom instruction. For science teaching, one such expectation is the requirement for IBI. These applicability beliefs may be strong enough to be a greater determinant of the actual teaching practices of teachers when compared to, longer established, epistemological beliefs and beliefs about teaching and learning.

5. CONCLUSIONS AND RECOMMENDATION

The nature of all the belief constructs discussed suggests the distinct possibility that teachers, to varying extents, may develop these beliefs as a result of their

experiences in both formal and informal learning environments. It also suggests that these beliefs can be influential in determining the level of inquiry-based practices of teachers. It is therefore not only important to understand the nature and development of these beliefs, but also how teacher education and school authorities should deal with negative beliefs of teachers by the use of interventions for facilitating belief change.

Naive epistemological beliefs are probably the ones that would be most difficult to change because according to Pajares [7] they tend to be relatively stable. This resistance to change is most likely due to the nature of these beliefs and how they develop in individuals. Beliefs about knowledge and learning develop gradually as a result of both formal and informal learning experiences. So for example, dualist epistemological beliefs that knowledge comes from authoritative sources and is stable and unchanging may be the result of a variety of educational experiences where individuals are simply required to accept the information given from authoritative sources like teachers, parents, pastors, books, and also, as indicated by NRC [16], a lack of coherence in the k-12 science curriculum where students are expected to learn a large number of disconnected facts. Unfortunately, this is the normal way children are educated up to and including their adult life. For those who become teachers, the research literature has shown that developed natve epistemological beliefs are reflected in the traditional content focused instructional strategies rather than inquiry based strategies.

The movement towards the development of more sophisticated epistemological beliefs in k-12 educational institutions requires a rethinking of the education process that would allow teachers to move away from the content-focused instructional practices. The idea of schools focusing on breadth rather than depth of content is not new. However this seems to have so far not gained attention from curriculum developers in many countries who continue to cram large amounts of disconnected facts into science curricula and expect students to regurgitate them in examinations. Thus teachers are constantly under pressure to cover curricula and hence resort to the traditional approaches to instruction which would most likely lead to the development of natve epistemological beliefs. What is required instead is the in-depth coverage of a few core areas in science instruction, where students are made to see the links between concepts in science, between science and other subject areas, and between science and their everyday experiences. This can be achieve by restructuring of science curricula, inquiry-based approaches to instruction, and teachers trained to integrate the curricula of different subject areas.

With regards to teacher education, Pajares [7] pointed to a way these beliefs could be changed in preservice teachers when he cited the view of Posner, Strike, Hewson and Gertzog (1982) that their conceptual change model and Piaget s assimilation and accommodation theory can be used to explain the resiliency of epistemological beliefs. Pajares [7] reasoned that when individuals hold deep and strong epistemological beliefs, any new information contrary to these beliefs will more likely be assimilated but not accommodated. There must first be dissatisfaction with the existing belief, and then the new belief must be "intelligible and appear plausible (p. 320) before accommodation takes place. So conceptual change strategies could be used in teacher education curricula where student teachers are provided experiences where they are dissatisfied with their existing beliefs, and the new beliefs are made to seem intelligible and plausible. The study by Kienhues et al [57] actually found that the natve epistemological beliefs of a group of university students changed to more sophisticated beliefs using teaching strategies based on the principles of conceptual change. Deniz [58] did a similar study but with teachers as the target group, and found similar results.

Levitt [20] attributed teachers beliefs about science teaching and learning to accumulated images of an individual s experiences with learning science in the formal school system. Teachers experiences learning under traditional modes of instruction are most likely influential in the development of negative beliefs about science as well as the teaching and learning of science. For many elementary school teachers, these experiences also resulted in unsatisfactory levels of science content knowledge and poor attitudes to science. Since elementary science education should set the foundation for students appreciation and understanding of science, it is imperative that appropriate strategies be implemented to change this situation. These are the same strategies that were outlined for the improvement of teachers and students epistemological beliefs.

The applicability belief construct was conceptualized by the authors as a possible explanation of the findings of a number of researchers that teachers were claiming various psychological, environmental and socio-cultural hindrances to their use of IBI. These beliefs about school based hindrances to IBI are important in that they may actually be intervening variables that act against teachers implementing IBI despite the possibility that the other educational beliefs may actually facilitate IBI. Engendering positive applicability beliefs would however require widespread interventions to the management of school curricula including increased social and financial support for

teachers, alteration to timetables, integration of subject curricula, and a rethinking about the purposes of examinations.

In attempting to tackle elementary teachers low science teaching efficacy beliefs it is first important to identify the reasons for these beliefs being low for so many primary school teachers even after they have completed their teacher training. For a substantial number of these teachers, their experiences of secondary school science did not encourage the development of positive attitudes to the subject. This is most likely a key issue in the development of low science teaching efficacy beliefs. The strategies outlined earlier for the improvement in epistemological and science teaching beliefs are also applicable to improving the science teaching efficacy beliefs of teachers. However this is a long term solution. In the short term, the focus must be on teacher education, especially how the teacher education science curriculum and its implementation could be adjusted to cater for the low science teaching efficacy beliefs of students entering the programme, and turn out trained teachers with significantly improved beliefs.

To change preservice science teaching efficacy beliefs, Plourde [18] made a suggestion also utilizing similar principles to that of conceptual change models. He recommended that students be engaged in experiences in which they would be encouraged to first become aware of, and then confront their existing beliefs about their ability to teach science. Other strategies suggested by researchers ranged from effective integration of science content and pedagogy, to the use of IBI by teacher educators. Hechter [55] cited a number of studies in which the integration of science content and methods in single courses were showed to result in improved teachers science teaching efficacy (e.g. Appleton, 1995; Cantrell et al, 2003; Palmer, 2006). Liang and Richardson [59] looked instead at the effects of IBI on teacher candidates science teaching efficacy. They found that scaffolded inquiry techniques (where written instructional supports are provided to students during student-initiated inquiry) resulted in improved personal science teaching efficacy of teachers.

As this discussion has indicated, teachers educational beliefs are indeed quite possibly an important factor in their science instructional decisions. However, despite being deeply held and resilient, school based interventions as well as changes to teacher education curricula could be implemented to change the beliefs that result in the implementation of unsatisfactory content focused instructional approaches. There are promising developments in the U.S. where what is referred to as 'The Next Generation

Science Standards is in the process of being developed by collaboration between the NRC, the American Association for the Advancement of Science (AAAS) and Achieve. These standards are in the final stages of public consultation and articulate the need for integrating science, technology and engineering concepts in k-12 instruction. It is indicated that these curricula should focus on a smaller number of cross-cutting concepts, have a greater coherence in the science concepts done across grade levels, and utilize constructivist and inquiry-based strategies in the implementation of curricula [60]. If initiatives such as these are properly implemented in k-12 education, it should be instrumental in the development of positive beliefs in the next generation of elementary science teachers.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Aggression Behaviour of Delinquent and Non-Delinquent Adolescents

1. INTRODUCTION

In spite of facing many social problems, juvenile delinquency is one of the major problems in India. The menace is so severe that several thousands of children are officially labeled as delinquents every year and they are placed into correctional homes. There are also thousands of cases which are not officially recorded and brought under the justice system. Sustained increase in juvenile delinquency over decades has been affecting the growth and harmony of the society and it has been considered as a social, economic and ethical issue. However, it does not mean that the juvenile delinquency was non-existent in the country before. It might have been there but in a far less proportion. The joint family system, the self-sufficient pattern of the traditional Indian village and such other factors offered a kind of automatic check on the growth of delinquency in the past. Hence, the instances of children found to have indulged in delinquent behavior were rare. Dutta [1] observes "juvenile delinquency is rapidly becoming a serious menace in India and with the progressive industrialization of many parts of the country. Which were essentially rural areas until a few years ago, this problem will soon assume the same proportions as in many of the western countries".

According to Juvenile Justice (Care and Protection of Children) Act (2000) when young children below the age of eighteen indulge in criminal and antisocial

behavior, it is regarded as juvenile delinquency. Crimes of children are presumed as juvenile crime because they are not aware of the legal implications of their activities. Therefore, they are referred to as children with bad conduct. Crime committed by individuals above statutory age is called criminals because they are well aware of the criminal and legal implications of their anti-social behavior. The Indian Penal Code (IPC) used the term 'juvenile offence' instead of juvenile delinquency. Now it uses the term 'juvenile in conflict with the law' and the children between the 7–18 years are called as juvenile delinquents.

Juvenile delinquency is multidimensional phenomenon involving social, economic and psychological aspects. Psychological and psychiatric theories argue that criminal bahaviour originates primarily in the personalities of offenders rather than in their biology or in situation. Among many personality factors, emotional maladjustment has been considered as one of the important factors.

According to Glueck and Glueck theory delinquency is a symptom of emotional maladjustment. Many delinquents are emotionally disturbed [2]. Emotional instability would be expected to multiply with the antisocial conduct. It has been reported by many researchers that the crimes like murder and rape are mainly the crimes of emotionality [3,4]. As mentioned by Friedlander many delinquents not only have a long history of severe frustration, they also react aggressively to stress situations [5].

A range of childhood problems can be subsumed under the headings of internalizing and externalizing syndromes [6,7]. Under the heading of internalizing syndromes are a variety of problems reflective of depression, withdrawal, anxiety obsessions, somatic complaints and so on. Under externalizing syndromes aggressiveness and delinquency are included as main problems. Aggressive behavior seems to constitute both a common and sometimes serious problem of childhood that has important implications for later adjustment.

1.1 Aggression

Aggression involves hurting others on purpose. It has been defined as "any form of behavior directed towards the goal of harming or injuring another person" [8]. Traditionally, psychologists have directed aggression as behavior against another

person with the intention of committing harm. This definition refers to socially unacceptable behaviour. Working definition of aggression define aggression as the willingness to engage in physical and psychological acts of harm in order to control the actions of other people. It incorporates the idea that aggression involves psychological as well as physical harm. According to widely accepted definition, aggression is: "an aggressive act in any form of behaviour designed to harm, or injure a living being who is motivated to avoid such treatment" [9]. It has become increasingly clear that it can be displayed by children and adolescents.

One distinction frequently examined in research is between reactive and proactive aggression [10]. Proactive aggression is aggressive behaviour that is initiated by the individual to achieve some desired outcome. It is important to note that aggressive behaviour need not involve fighting or other forms of physical attack. The individual may show physical aggression in the form of hitting, shoving, biting, scratching, and kicking or they may display nonphysical aggression by being verbally abusive toward others. Reactive aggression is generally defined as aggression that occurs as an angry response to a perceived provocation of threat [11], whereas proactive aggression is conceptualized as aggression that is unprovoked and is used for instrumental gain or dominance over others [12,10].

Indirect aggressiveness is defined as harming others through covert behaviours such as gossiping and rumor spreading [13].

1.2 Aggression and Delinquency

Huesmann et al., [14] tracked one sample of 600 subjects for 22 years. They found that highly aggressive 8 year olds often became relatively hostile 30-year-olds who were likely to batter their spouses or children and to be convicted of criminal offenses. Twin studies suggest that some individuals are genetically predisposed to have aggressive behaviour and other antisocial acts [15,16]. Childhood aggression is frequently associated with a host of negative outcomes such as subsequent psychopathology, juvenile delinquency and criminality [17,18,19]. In addition, early aggression tends to be fairly stable. Aggression that begins early in childhood is the single best predictor of later criminal behaviour [20]. Longitudinal investigations have demonstrated that aggression is one of the best known predictors of

future social, psychological, behavioural, delinquency and peer victimization [21].

Two aspects of social-psychological adjustment–aggressive behaviour and delinquency, were assessed before and after one year period of time. It was revealed that the strongest predictor of future social-psychological adjustment problems was the combination of relational and physical aggression. Relational aggression also contributed unique information relative to physical aggression in the prediction of future maladjustment [22]. Youths with earlier ages of onset were more likely to engage in several types of physical aggression, frequent lying, theft and vandalism [23]. Research on adult forensic samples suggest that antisocial individuals who show psychopathic traits are more aggressive than other antisocial individuals, exhibiting a higher rate of aggression both inside and outside of forensic institutions and showing aggression that result in more severe harm to their victims [24]. The presence of callous-emotional (CU) traits may designate a particularly severe and aggressive pattern of conduct problems [25,26] and it may enhance the prediction of later delinquency. Several studies have documented the presence of CU traits predicting subsequent delinquency, aggression, number of violent re-offending in antisocial youths [27,28,29]. There is also evidence to suggest that children with conduct problems who are aggressive also tend to form a severe and chronic subgroup of antisocial youth [30].

Higher frequency of aggressive acts was significantly associated with higher levels of anger and stronger beliefs that physical aggression is an appropriate course of action in conflicts. Juvenile offenders reported higher levels of anger experience and higher frequency of aggression and antisocial behaviour compared to high school students [31]. Childhood exposure to violence against females and male-modeled anti-social behaviour were examined as risk factors for sexual aggression and non-sexual aggression and delinquency among adolescents. Both risk factors produced direct and indirect effects on non-sexual aggression and delinquency [32]. Hamalainen and Pulkinen [33] showed that a group of convicted men had been more aggressive and lower in prosocial behaviour. Juvenile delinquents had been more aggressive than adolescent delinquents. Among those, recidivists were more aggressive and lower in prosocial behaviour.

Researchers assessed the prevalence of severe aggressive behaviour and conduct disorder in runaway and homeless adolescents. Conduct disorders were present in 55% and severe aggression in 62% of the subjects. Severe aggression was associated with

other problem behaviours including arrests and convictions [34]. Exposure to socially deviant peers, even in treatment environments, has been shown to produce lasting detrimental effects on young males including long term increases in aggressive and antisocial behaviour [35].

Within the backdrop of above studies emphasizing on aggressive traits more prevalent among the delinquents the present study was conducted with the below mentioned objectives and hypotheses.

2. METHODOLOGY

2.1 Objectives

1. To ascertain the magnitude of aggressive behaviour among delinquent and non-delinquent adolescents.
2. To examine the effect of domicile on aggressive behaviour of delinquent and non-delinquent adolescents.

2.2 Hypotheses

1. Magnitude of aggressive behaviour is significantly higher among delinquent adolescents than non-delinquent adolescents.
2. There is significant effect of domicile on aggressive behaviour of delinquent and non-delinquent adolescents.

2.3 Study Sample

This research on exploring the level of aggressive behaviour was conducted on 321 **male** adolescents consisting of two sub-sample groups. Female samples were not included in the present study due to lack of availability of adequate size of delinquent adolescents. The characteristics of the sample groups have been mentioned below:

2.3.1 Delinquent adolescents

The male adolescents, between the age group of 14-18years, who have committed offense ranging from petty theft to serious offenses like murder and rape,

were selected for this group. They were confirmed cases of offense under Indian Penal Code (IPC) and they were selected from the State Observation Homes located in Bangalore, Mysore, Shimoga and Dharwad. The delinquent adolescents were administered the questionnaire individually, the researcher read out the statements and responses given by them were recorded carefully. The sample sizes of the delinquent adolescents were 150.

2.3.2 Non-delinquent adolescents

The non-delinquent adolescents were selected from the schools and colleges studying in 8^{th} grade to II preuniversity course. They were selected from Karnatak Public High School, Karnatak College, K E Board School and Basel Mission High School located in Dharwad city of Karnataka state. The sample size of the group was 171 adolescents. In selecting the non-delinquents sample adolescents the inclusion criterion of the adolescents not having any delinquency background were considered.

2.4 Tools

2.4.1 Aggression scale

The aggression scale developed by Pal and Naqvi [36] was administered to the subjects. The scale has 30 items of statements measuring various aggressive behaviour ranging from rude answering to violent attacking on other individuals. Each item has 6 alternative answers. The scoring was done following the below method. For answer of 'very much' a score of 5 was given and a score of 0 was given for 'not at all' responses, and intermediate scores were given for the remaining responses. Total raw score was calculated simply adding the scores on all items. The total raw score ranges from 0 to 50. The higher score on this scale indicates higher aggressive behaviour. But the scale does not provide separate scores for proactive and reactive aggressive behaviour. It provides scores including both the types of aggressive behaviour.

The test author has calculated the split-half reliability by odd-even method. The correlation co-efficient was 0.82, which shows that the scale is highly reliable. The test-retest reliability of the scale was found to be 0.78. The validity of the scale has been calculated by two methods. For the content validity the items of the scale has been

collected through the experts' opinions and available literature. The validity of this scale was again checked through the administration of both, present scale and Chauhan and Tiwari's Frustration test (only aggression scores were calculated). The validity co-efficient was found to be 0.74, which shows that the present scale is valid for measurement of aggression.

2.4.2 Pilot study

A pilot study on 50 subjects including both above said groups was conducted. Necessary modifications in the terminologies and statements were made in the test which was translated from English to Kannada language. After the data collection the data was subjected to 't' analysis. The findings provided significant difference in the aggressive behaviour that the scores more favouring the delinquent adolescent groups. Later, data for the main research was collected using the modified Kannada version questionnaires. Further analyses was carried out and interpreted.

2.4.3 Procedure

After seeking the permission by the concerned authorities of the institutes, including that of Karnataka State Women and Child Welfare Department and schools/colleges, 30 items aggression scale was administered to the subjects individually. For the ethical consideration, the subjects were explained about purpose of the study and they were assured of the confidentiality. The data from the subjects were collected from the first author.

The responses of the subjects were scored and subjected to statistical analysis.

2.4.4 Statistical techniques

After calculating the scores for each of the subjects, Mean and SD were calculated for the sub-groups separately. 't' analyses was carried out to determine the significance level of difference between the comparative groups.

3. RESULTS AND DISCUSSION

Aggression, as a personality trait, is closely related to delinquency of the adolescents. In the present research aggression was measured using the test among the delinquent adolescents and the non-delinquent adolescents.

Table 1. Means, standard deviations and t-value of the delinquent and the non-delinquent adolescents on aggression

Sample Groups	Mean	SD	't' value
Delinquent Adolescents (n=150)	117.75	16.78	
Non-delinquent Adolescents (n=171)	72.24	14.92	25.94**

*** Significant at 0.01 level*

Table 1. depicts the aggression scores of the delinquent adolescents and the non-delinquent adolescents. On aggression there was significant difference in the mean scores (delinquent adolescents mean 117.75 (SD 16.78)/non-delinquent adolescents mean 72.24 (SD 14.92), $t=25.94$, $p<0.001$). The above result clearly implies that the delinquent adolescents have higher level of aggression than the non-delinquent adolescents. They experience anger to the extent that they damage objects or harm the person who provokes anger. Even for a small thing they get anger too much and intend to harm others or harm others. They establish relationships with persons those retaliate against society (for example, involving with juvenile gang) and they go against the traditions and standards of the family and society. This shows that the delinquent adolescents inability to control or regulate aggression, they are much prone to delinquent activities or delinquent adolescents have aggression at the higher level than the non-delinquent adolescents.

Findings on the delinquent adolescents indicate that proactive aggression is associated with fights and delinquency [37,38] and reactive aggression is generally accompanied by anger and emotional outbursts and has been associated with impulsivity [39,10]. Loeber [19] and Patterson et al., [21] showed that aggression that begins early in childhood is the single best predictor of later criminal behaviour. Aggressive behaviour takes various forms and juvenile delinquency encompasses a wide range of acts that violate social norms and rights of others. Physical aggression such as hitting, pushing and kicking is one obvious example of delinquent behaviour. Non-aggressive delinquent behaviour includes lying, stealing,

breaking rules. Compared to physical aggression, non-aggressive antisocial behaviour is found to be a predictor of criminal offenses. Buss and Shackelford [40] mentions that the aggressive behaviour can be explained as a complex interaction of genetic dispositions, observational learning and cognitive scripts.

Table 2. Means, standard deviations and t-value of the delinquent rural and urban adolescents on aggression

Delinquent adolescents	Mean	SD	't' value
Rural (n=23)	119.26	15.54	0.47
Urban (n=171)	117.48	17.03	

Table 2. depicts the aggression scores of the delinquent rural and urban adolescents. On aggression, there were little differences in the mean scores obtained by the adolescents belonging to different domicile (rural delinquent adolescents mean 119.26 (SD 15.54)/urban delinquent adolescents mean 117.48 (SD 17.03), t=0.47, p>0.005). The above results state that domicile has no significant effect on aggression level of the delinquent adolescents. This non-significant result between the delinquent adolescents of the rural and the urban domicile are expected to be because of homogenous level of aggression among the delinquent adolescents irrespective of their domicile background. It may be assumed that adolescents indulge in delinquent activities irrespective of their domicile due to their higher level of aggression. The present results also support the view point that the aggression variable plays a significant role in the causation of delinquency irrespective their domicile.

Table 3. Means, standard deviations and t-value of the non-delinquent rural and urban adolescents on aggression

Non delinquent Adolescents	Mean	SD	't' value
Rural (n=89)	74.51	14.15	2.28**
Urban (n=82)	69.37	15.31	

*** Significant at 0.01 level*

Table 3. depicts the aggression scores of the non-delinquent rural and urban adolescents. The results indicate that the non-delinquent adolescents of rural domicile have higher aggressive behaviour than the non-delinquent adolescents of urban domicile (rural non-delinquent adolescents mean 74.51 (SD 14.15)/urban non-delinquent adolescents mean 69.37 (SD 15.31), t=2.28, p<001).

Studies indicate that juvenile delinquents from urban environment report more behavioural problems. This rural/urban difference may be attributed to greater opportunities to join deviant peer groups in urban environment. The juvenile delinquents of urban setting reported considerably elevated levels of internalizing, externalizing and other behavioural problems [41]. It was observed by researchers that the rural criminals were significantly maladjusted in emotional areas as compared to the urban criminals [42]. In another study no associations were found between living in an urban versus rural area and emotional/behavioural problems in the north Norwegian samples [43]. However other research revealed that rural Muslim students have higher aggression than urban Muslim students [44]. Children and adolescents from the lower socio-economic strata particularly males from larger urban areas exhibit more aggressive behaviour and higher levels of delinquency [45,46].

Present contradictory result may be verified with larger sample groups, as present study involves smaller sample size.

4. CONCLUSION

As hypothesized in the present research, the aggression behaviour was found to be more among the delinquent adolescents than the non-delinquent adolescents. The demographic variable domicile was found to be having significant diverse effect on the aggression level of the non-delinquent adolescents, aggressive behavior being found to be more among rural adolescents. Whereas on the delinquent adolescents the domicile background has no differential effect on aggressive behavior. It is suggested that the goal of rehabilitation of the delinquents should be to develop skills to control and regulate their emotions appropriately and adequately. Encouraging positive emotions should also be the part of the therapy for delinquent and non-delinquent adolescents.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and

approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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Complex Systems: Thoughts on the Causes of Nature

1. INTRODUCTION

According to authors [1] the heuristic significance offered by the paradigm of non-linear complex systems is high. Along these lines, authors [1] have mentioned that: "Certain psychological variables can be considered in an ecological context as the resultant of complex systems subject to uncontrollable and unpredictable impacts. Each value produced comes from a process of self-organization at time *t*. For this reason, a separate study of the constituents of the system will not in any way lead to an understanding of the comprehensive functioning of the system. The spirit cannot be reduced to separate mechanisms without taking into account the mutual influences and their coordination. In this sense, several specific psychological functions work in parallel in order to generate a superior structure able to bring forth a product that can be understood by everyone." There is a massive volume of literature in the field of complex systems (see [2]; for a complete review; see also [3-4]).

If we are to believe certain author [5], the principle of parsimony of hypotheses is "a simplifying representation" of the world of living things which is in contrast with complexity. In light of what has just been stated, we think that this principle pleads in favor of a *refined* hypothesis. In other words, it is a plausible representation of nature until proof of the opposite. As a reminder, the principle of parsimony referred to as *Occam's razor* (W. of Occam, 14th century) can be summarized with a simple statement: *"Pluralitas non est ponenda sine necessitate"*

(i.e. entities should not be multiplied unnecessarily). In this case, the approach used by the researcher involves translating concepts and constructs that are generally very complex into the simplest possible hypotheses.

Beyond this, we can add that a researcher should never be satisfied with one method, one appropriate experiment or one statistic regardless of its power, in determining the significance of an object of Nature. This is one of the divisions that the Sciences face in general, and this is true for the Humanities and Nature as well. The paradigm of complex systems is based on the idea by which a system is composed of a large number of distinct but interconnected elements. For this reason, the probable outcomes are exponential while the relationship between the uncertainty and the organization is broadly fleshed out.

This brings us to the insistent issue of entropy in the soft sciences. It is generally accepted in the hard sciences where it reflects (in particular) in thermodynamics for example, the irreversibility of a system. The transformation of heat into mechanical energy is intrinsically limited, because the conversions always operate from hot to cold.

In thermodynamics, we accept the existence of a *quantity* called *entropy* which is specific to the state of the system. The entropy of the system can only increase due to the wealth of probable events that directly or indirectly impact a resultant. Consequently, there is a process of self-organization at time *t*. Here, the infinite multiplication of the hypotheses (called "H") is a temptation which all researchers face, despite the fact that the base postulates (called "A") are within a vectorial space that is finite. Whence the necessity, as we believe, to unify – not to say reconcile – the orientations of the complexity with those of the principle of parsimony of hypotheses. This is the point of view defended in this research note. The challenge to be taken up is a substantial one because it requires an in-depth remodeling, both in terms of the epistemology of the sciences, and the methodologies to be implemented to support a coherent paradigm. In this case, the nomothetic construction depends on the elimination of duplicate hypotheses in favor of the one that is both true and acceptable, reasonable, to justify what seems plausible in the occurrence of an event and/or a behavior, keeping in mind that both of them are subject to the laws of Nature. Research aims at bringing probable answers until proof of the opposite.In this way, the explanation of a fact remains furtive only when it is presented within a multiplication

of hypotheses, without necessity, to the detriment of those that are both true and sufficient to explain this fact.

Although we accept the paradigm of the complex system as a plausible representation of a situation, the evaluation of the variances remains problematic, because an infinity of causes and events leads to an infinity of outcomes, each one as probable as the others. Logically, the ways to reach the same result are multiple.

It appears, from the standpoint of the *philosophical doubt* introduced by Pinel (see the dictionary of the medical sciences, C. L. F. Panckoucke (under the direction of), Paris: C.L.F. Panckoucke, 10 (Dise-Eau), pp. 239-242.), that such variability is clearly an advantage, especially for the anchoring of the research problematic, for the hypotheses that address it accompanied by appropriate experiments, but what about the principle of the parsimony of hypotheses?

Starting from this postulate, the originality of our reasoning is based on a simple idea: there exists an infinite set of hypotheses leading to a finite set of solutions or outcomes by virtue of the principle of the theory of the explanation of the causes of the things of Nature - or epistemology of the things of Nature. The paradigm defended is presented in the following section.

2. REGARDING NATURE

Work of the author [6] relates to the study of logic, epistemology and sciences cognitive. This work concerns the study of the logic and the philosophy of sciences of nature. Its research relates to the designs on the nature of human rationality and their effects on social operation.

In the idea of Robert [6], deductive reasoning follows several rules, the most important of which are *modus ponens* (if *a* then *b*) and *modus tollens*. In the equation of Robert, according to the logic of *modus tollens,* the verification of a hypothesis strictly follows the mathematical expression:

$(H + A) \rightarrow e^* \; e^* \rightarrow (H + A)$

In this expression, H represents the hypothesis, A the postulates and e* the resultant (observed fact). This is where *modus ponens* (if *a* then *b*) comes in. We can represent it in the following manner:

The founding rule of deduction is read in the following manner:

- If *a* is true.
- And if *a* is true then *b* is also true.
- Then *b* is true.

For practical examples : see [7-8-9-10-11]

The founding rule of the abduction is illustrated as follows:

- If *b* is true
- And if *a* is true then *b* is also
- Then *a* is true.

According to [12]: "Abduction or, as it is also often called, Inference to the Best Explanation is a type of inference that assigns special status to explanatory considerations. Most philosophers agree that this type of inference is frequently employed, in some form or other, both in everyday and in scientific reasoning. However, the exact form as well as the normative status of abduction is still matters of controversy. This entry contrasts abduction with other types of inference; points at prominent uses of it, both in and outside philosophy; considers various more or less precise statements of it; discusses its normative status; and highlights possible connections between abduction and Bayesian confirmation theory".

For the author (op.cit. [12], and see [13-14-15] for a complete historical review):

"Abduction is normally thought of as being one of three major types of inference, the other two being deduction and induction. The distinction between deduction, on the one hand, and induction and abduction, on the other hand, corresponds to the distinction between necessary and non-necessary inferences. In deductive inferences, what is inferred is necessarily true if the premises from which it is inferred are true; that is, the truth of the premises guarantees the truth of the conclusion. A familiar type of example is inferences instantiating the schema

All As are Bs. a is an A.

Hence, *a* is a B.

But not all inferences are of this variety. Consider, for instance, the inference of "John is rich" from "John lives in Chelsea" and "Most people living in Chelsea are rich." Here, the truth of the first sentence is not guaranteed (but only made likely) by the joint truth of the second and third sentences. Differently put, it is not necessarily the case

that if the premises are true, then so is the conclusion: it is logically compatible with the truth of the premises that John is a member of the minority of non-rich inhabitants of Chelsea. The case is similar regarding your inference to the conclusion that Tim and Harry are friends again on the basis of the information that they have been seen jogging together. Perhaps Tim and Harry are former business partners who still had some financial matters to discuss, however much they would have liked to avoid this, and decided to combine this with their daily exercise; this is compatible with their being firmly decided never to make up."

Presentation of the illustration of the reasoning (source: http://www.les-mathematiques.net) In deduction we state that:

"All men are mortal, Socrates is a man, therefore Socrates is mortal." In abduction we state that:

"All men are mortal, Socrates is mortal, therefore Socrates is a man." Also, in induction, we state that:

"All men whom I know are mortal, therefore all men are mortal."

It is about a logical demonstration of the principles.

Modus tollens and *modus ponens* imply that if e* is not observed, then H and/or A cannot be true because the deduction and the abduction are violated.

On this level, if e* is false, it is impossible to know whether we must reject H or A or H and A. However, we do not exclude the idea that the contamination of an unverified or parasite variable can distort the research paradigm. A complex system will always generate outcomes that exceed the predicted range of outcomes of even the most well-encoded model, regardless of size and intricacy of the model. From a probabilistic standpoint, we can accept that the multiplication of the paradigms can reduce the probability of the appearance of an element not predicted in the model. For these reasons, we expect an effect of narrowing or proximity of the expression of the data of e* (i.e. the resultant or the observed fact + uncertainly calculation) around a central trend index once the estimation of the error of measurement or error calculation has been done.

However, probabilistic logic also shows that in the strictest experimental conditions, for the observed facts there is always a fluctuation which is not expected in the model, once the error of measurement has been introduced in the equation of the

model. As a reminder, the error of measurement (or error calculation) is called Delta (Δ) by convention.

With no surprise, we can say that there is a set of techniques that exist for the purpose of estimating the error produced on a numerical result. This error is equivalent to the uncertainties or errors made on the measurements that lead to the observed result. The total error is the product of the sources of error such as: the accuracy of the measurement of uncertainty (Δ1); statistical dispersion (Δ2); and systematic error (Δ3).

The sources of error are defined as follows:

✓ Δ1: refers to the distances separating the graduations of the analog devices. This is mostly present in the hard sciences;

✓ Δ2: corresponds to the external disturbing phenomena that very slightly influence the experimental conditions (we speak of the principle of quantum uncertainty) when the experiment is repeated x times;

✓ Δ3: refers to the very slight difference or statistical dispersion that results from a sampling error for example.

The total error is thus expressed in the following manner:

$$\Delta = \Delta 1 + \Delta 2 + \Delta 3$$

These elements lead me to think that the equation of the author [6] is incomplete. The theory that we propose is underpinned by an approach that is assumed to be *contemporary* but which by virtue of Nature, we believe, is already obsolete. This theory is based on the simple idea that the combination of conditions *a* and *b* allows for the expression of a law, i.e. that all of the regular and observed facts in the presence of *a* and *b* lead to the expression of phenomena not predicted in a complex and determined model given the error calculation (Δ). Logically, this idea implies that the researcher's approach is constantly in *motion*.

Beyond the discourse and predictions promised by the *motion*, it is essential to think about the processes, influences, and resistances that will hinder the evolution of subjects, groups, and organizations. From a scientific standpoint, this issue is obviously not new.

However, in the reasoning that we are presenting, we accept the existence of a hidden variable which is paradoxically omnipresent in the sequence of verification of a hypothesis.

The theory that we are presenting has the following form:

$(H \times A) + k \rightarrow e^{*\alpha}$

$-e^{*\alpha} \rightarrow -(H \times A) + k$

The terms are the same as those presented previously, i.e.:

H: represents the hypothesis; A: represents the postulates;

e*: represents the resultant (variation of the fact observed given Δ).

The mathematical expression of the author [6] which is presented above, and after modification, sets forth the hypothesis that the resultant (e*) is the product of H (hypothesis) multiplied by A (the postulates). In this case, the base postulates are contained in a finite system. The presence of a constant *k* not provided for in the deductive reasoning - itself associated with a constant or squaring (small *α*) - expresses a condition of equivalence in the left term ((H x A) + *k*) which predicts the set of variations that is illustrated using the values of the right term ($e^{*\alpha}$).

Thus, in a *deductive* approach which, as a reminder, is based on the idea that the researcher first establishes a hypothesis, logically infers a research protocol for the purpose of materializing it (the hypothesis), proving it, then deriving new models and more complete theories from it, the presence of a constant small *α* is expressed as follows (rules of deduction and abduction):

The founding rule of the deduction after modification is read in the following manner:

- If *a* squared by small *α* is true;
- And if a^{α} is true then *b* squared by small *α* is also;
- Then *b* is true only in the presence of the squaring of small *α*.

The rule of the abduction after modification is illustrated as follows:

- If *b* squared by small *α* is true;
- And if a^{α} is true then *b* squared by small *α* is also;
- Then *a* is true only in the presence of the squaring of small *α*.

Thus, the product of a set of resultants (facts observed given Δ) is in a universe between -∞ and +∞ because the presence of the constant small *α* expresses the squaring of a set of phenomena (deductive reasoning), of which the base components are located in a universe of hypotheses and postulates which, in the presence of the

constant *k*, has no limits. Consequently, the product of e* (the resultant i.e. the variation of the fact observed given Δ) can be simplified as follows:

$$e^{*\alpha} = (H+ A) * (H + A)\, e^{*\alpha} = (H + A)^2 + k$$

An explanation of the causes of the things of Nature

3. CONCLUSION

At the end of this analysis, our wish was to submit to the sagacity of the reader a paradigm on which a *refined* hypothesis is based. We have just done this. Contrary to the preceding, does this mean that the principle defended following the example of the theory on which a *refined* hypothesis is based forms a coherent model?

However, the idea presented does not always seem to be satisfactory. We see at least two reasons for this.

First, there was no consideration of the fact that a resultant is not a fact in and of itself, but merely a plausible representation of e* at some point. Also, it seems to me that the static nature of the approach suggests that it is far from being able to predict the outcomes of a multitude of events that emerges from new properties in a system that oscillates between equilibrium and non-equilibrium. The theory and the idea of the *refined* hypothesis that stems from it must therefore be covered by a deepening for the purpose, not just of being scientifically refuted, but also to be in line with the simple idea that the elegance of a theory lies in the simplicity of the terms that compose it.

Beyond this, it seems that another fundamental issue must be raised. This involves the methodology and the epistemology that illustrate the approach and its limits. This pressing issue must guide the researcher, and it is already a subject of debate [16].

On the methodological level, reliable metrological instruments must be available for this. Consequently, researchers are constantly caught in a dogmatic strait jacket, a doctrine from which they must resolutely break free if they want to reach the ultimate goal which is the universality of knowledge and thus the understanding of the

things of Nature, the emancipation of the human species and the quest for happiness and the truth.

Thus, the introduction of nomothetic research must involve the invariance of the paradigmatic structure, which itself lies in the capitalization of knowledge. It is no surprise that the observable goes through the prism of personal experience and the subjectivity of the investigator. It therefore seems that the fruit of research work most often makes a contribution to the knowledge of an object, without however prejudging the veracity of the proven models and the approach needed to validate them. This is one of the fundamental limits of all research approaches.

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Conversation Textbook Assessment: A Critique of Survival English

1. INTRODUCTION

Students attend conversation classes with the primary goal of learning to be able to orally communicate with speakers of English, a concept known as Basic Interpersonal Interaction Skills (BICS) [1]. With BICS, students can better facilitate their interaction in different aspects of the real world, such as the workplace, when traveling, and when attending social events. How can teachers assist students to achieve this goal? Selecting effective textbooks is a crucial step in making this goal a reality. Textbooks provide a clear framework that directs students to a destination. Through a well-organized structure, students will be able to acquire the language necessary for communication in a systematic manner [2, 3].

This paper describes the features of conversation textbooks necessary for the enhancement of students' oral abilities. Following this description are the guidelines for selecting conversation textbooks and a critique of *Survival English*, one such textbook used by several colleges and universities in Taiwan. It is hoped that the critique will inspire textbook writers to develop more beneficial teaching materials, which, in turn, will enhance students' oral proficiency in the long run.

2. FEATURES OF EFFECTIVE CONVERSATION TEXTBOOKS

Crawford [4] advocates the use of well-developed textbooks. Those textbooks, based on sound learning principles, are appropriately paced, which might alleviate students' anxiety and further promote learning. Furthermore, they cover a variety of language functions, which is facilitative in the development of communicative abilities.

On the whole, textbooks serve as a helpful scaffold for improving students' skills and advancing them to higher levels.

2.1 Language must be Contextualized

Effective conversation textbooks have at least two features [4, 5]. First, language in textbooks must be contextualized. Language is used for a purpose, such as arguing, persuading, interpreting, complaining, negotiating, or informing. As language is functional, dialogues, activities, and any other contents in textbooks must be language in use. Ideal conversation textbooks should design a setting (such as choosing a major) in which language functions (such as giving opinions, in this case) can fit. It just does not make any sense to scramble a bunch of unrelated sentences in a lesson. According to Coelho [6], effective instruction should focus primarily on context-embedded tasks. The contextual or interpersonal cues in such tasks will provide students with assistance in determining the meanings of the oral communication. It is highly likely that decontextualized tasks will confuse students and result in a breakdown in communication.

2.2 Language must be Realistic

Language is a social practice. Every social situation requires its own distinct language type. Therefore, genres or registers have to be taken into account when textbook writers design dialogues, activities, and any other contexts [4,5]. For instance, it sounds very unnatural when a mother says, "Would you please kindly open the door for me, sir?" to her child. Second language learners must learn not only what to say but how to say it appropriately. Realistic language provides students with a concept of how language is used in different social situations, and this will minimize sociolinguistic inappropriateness.

In general, effective conversation textbooks must offer students ample opportunities to experience authentic language use. Through meaningful learning in contexts, students will have better opportunities to sharpen their communicative competences [7]: grammatical competence (enables speakers to speak accurately),

discourse competence (enables speakers to speak clearly), sociolinguistic competence (enables speakers to speak appropriately), and strategic competence (enables speakers to prevent communication failures).

3. GUIDELINES FOR SELECTING TEXTBOOKS TO DEVELOP COMMUNICATIVE COMPETENCE

The following sections summarize and synthesize concepts proposed by several researchers [8-10] to offer guidelines for the selection of textbooks for conversation classes at colleges or universities.

3.1 Students' Background

The background of the students (age, language proficiency, purpose for learning English, etc.) is one of the considerations for selecting conversation textbooks [8-10]. In terms of age, the contents of the textbooks must be compatible with the maturity and interests of the students. Suitable topics for college students may include hot issues, such as the upcoming Presidential election, or their favorite form of entertainment, such as online games. It is simply not suitable to offer such topics as "How to Tie Your Shoes" or "How to Dress your Barbie Dolls" to college students.

As far as language proficiency is concerned, Cummins' four quadrants [1] can be applied to material selection. For low-proficiency students, we can start with the top-left quadrant, offering a 'simplified' version, material with high context and low cognitive demand. The simplified version contains not only easier linguistic elements but also the addition of visual supports such as 'context-embedded' organizers [11], which facilitate low-proficiency students' comprehension of the material. Then, with the students' proficiency improving, we can move to the second quadrant, which is low context and low cognitive demand. Personal components (such as conversational cues and visuals) are reduced in this stage. The goal of the materials used in these two stages is to improve the BICS (Basic Interpersonal Communication Skills) of students.

For intermediate and advanced students, however, we can start with Cummins' third and fourth quadrants. In these two stages, students receive less or none of the context clues. It is recommended that teachers use as many authentic materials as possible. The underlying principle behind this is that authentic materials can reinforce the direct relationship between the language classroom and the outside world for students. Moreover, the high context and high cognitively demanding material can help students improve their Cognitive Academic Language Proficiency (CALP), which they need in both schools and the workplace.

Purposes for learning English are another consideration in choosing conversation textbooks. Most university students learn English for daily communication with speakers of English. *Survival English* may be a good starting point. Contents such as the bargaining process, how to describe medical symptoms to a doctor, or making small talk with someone new might be of interest to university students. On the other hand, workplace English such as how to stand out at a job interview has to be taught to university students who are about to graduate. In general, the contents of the textbooks must address the goals of the students. If the goal is for students to strengthen their basic interpersonal communication skills, then high context and low cognitive material is recommended. If, however, the desired result is an improvement of students' cognitive academic language proficiency, then high context and high cognitively demanding material will be a more effective solution [1, 11].

3.2 Meaningful Activities

In addition to the students' background, another consideration is whether or not textbooks offer a variety of meaningful interactive activities that will elicit student participation [8, 3, 9, 10]. The key to enhancing oral abilities is speaking up. Students feel more motivated to speak if activities are meaningful. If university students are asked to practice a dialogue that is unlikely to take place in the real world, they might be reluctant to talk. An example such as the following might make even beginner university students feel stupid, and not want to practice:

A. What time do you get up every morning? B. I get up at 6:00.

A. What time do you go to school? B. I go to school at 7:00.

A. How do you go to school? B. I take the bus.

It seems very unlikely that such a conversation would occur in real life. The conversation is unnatural and robot-like. Dialogues in textbooks should be those that will happen in real life, not just mechanical sentence drills.

3.3 Cultural Aspects

It is suggested that conversation textbooks should include cultural aspects. Understanding cultures in the target language will equip students with an awareness of social appropriateness [8, 3, 9, 10]. Therefore, conversation textbooks need to include cultural contents that might prevent university students from asking absurd questions like, “Are all Americans as fat as you are?” to a person they meet for the first time.

3.4 Focus on Language Forms

Effective conversation textbooks also need to focus on the three major elements of a language: pronunciation, vocabulary, and grammar [12, 8, 3, 9, 10, 13]. With a solid foundation of a language, students will be better able to express themselves. It is no surprise that students often fail in communication because they don’t have sufficient lexical knowledge to convey what they want to say. Also, sometimes their utterances are unintelligible to speakers of English as a result of poor sentence structures and inaccurate pronunciation. It is critical that conversation textbooks offer opportunities to practice pronunciation, vocabulary, and grammar. Without mastering these three language elements, it is unlikely that students will develop their speaking proficiency.

3.5 Extended Practice

Practice is vital to the enhancement of oral abilities. Textbooks are considered more effective if supplementary materials such as workbooks and interactive audio/visual aids are available [8, 9, 10]. Given the limited nature of classroom time, not every

student will be able to do enough practice in class. Practicing outside the classroom can compensate for this limitation. Teachers can assign activities in workbooks as homework and see the results in class. An old proverb states, "Practice makes perfect." This is quite applicable to the improvement of student's speaking proficiency.

3.6 Putting Them All Together

Overall, teachers need to take the background of their students, including their age, language proficiency, and purposes for learning English, into account when choosing conversation textbooks. In addition, it's better to adopt conversation textbooks that feature a variety of meaningful activities, which will increase the students' involvement. Cultural aspects cannot be ignored in conversation textbooks, either. Guiding students toward social appropriateness will develop their tact and reduce the chance that they will engage in impolite communication. Another indispensable element in effective conversation textbooks is that they must provide opportunities for students to improve their knowledge of pronunciation, vocabulary, and grammar, as these three elements are the foundation of developing oral proficiency. Furthermore, supplementary activities included in workbooks or interactive CDs will be facilitative in the enhancement and reinforcement of students' speaking abilities. All of these characteristics should be integrated in conversation textbooks to hone students' communicative competence [5, 8, 9, 10].

4. A CRITIQUE OF *SURVIVAL ENGLISH*

Survival English [14] was first published in 1994 by Heinemann English Language Teaching. It is designed for people who need English for work or travel. The topics include business, socializing, travel, hotels, money, and food and drink. By offering learners important new language which they can read, listen to, practice, and use, the book writer hopes that learners will be able to engage in simple everyday conversations, order meals, change travelers checks, check into a hotel, have meetings, and so forth. The ultimate goal of the book is to help learners succeed in

scenarios such as business trips, vacations, or social situations where the medium of communication is English.

Having decided on the essential features of conversation textbook and more important, having established the criteria to be applied to conversation textbooks, now is the time to apply the already-established criteria to determine whether a typical conversation textbook, namely *Survival English*, meet the standards or not.

4.1 Sequence of Topics

Survival English is a conversation textbook that covers various topics in food, shopping, housing, transportation, education, and entertainment. The diversified topics in this book familiarize students with practical expressions used in daily life. However, the sequence of presentation is not very organized. For instance, Lesson 1 is about travel, Lesson 2 is about education, and Lesson 17 is back to travel again. It would have been more beneficial if the authors of *Survival English* had grouped lessons of the same topic, so that it would be more convenient for teachers to plan their lessons. As the forward design approach [5] necessitates, educational materials should be linear. More specifically, such materials should be clustered in sequences, for example, arranged by increasing complexity or categorized by subject or theme. The discursive organization of topics in this textbook results in teachers not having a very fluid presentation of lessons if they follow the sequence of the lessons as they currently appear in the book. It is, thus, suggested that topics should be followed by related subtopics, which will provide a sense of structure for teachers to teach and for students to learn.

4.2 Types of Texts

Survival English is presented in the form of dialogues, which results in two negative elements. First, the dialogues are too short in length to demonstrate how they are integrated into real-world communication. Quite often, students are frustrated by the fact that they want to know what happens next, but the dialogues just stop.

More in-depth discussion should be incorporated into the dialogues. Second, different types of texts should be provided in textbooks, such as lectures, speeches, announcements, and jingles. With different forms of texts, students will gain a better understanding of how language is used in a variety of social situations.

4.3 Degree of Focus on Language Forms

Insufficient focus on language forms is another shortcoming of *Survival English*. Each lesson in the book begins with a dialogue. Following the dialogue is a related listening task. The book provides no more elaboration upon vocabulary building, grammar enforcement, or pronunciation sharpening. With this textbook, teachers will need to spend a significant amount of time producing materials to consolidate the three basic language elements. The writers of *Survival English* should have designed more tasks to develop students' knowledge in these three areas.

For example, consider vocabulary building. The textbook writers can first use a listening close task in which students fill in the blanks by using words and phrases that appear in the dialogue. Reviewing these words and phrases will reinforce students' knowledge of these new vocabulary items. After that, teachers can provide students with another opportunity to use the vocabulary items in the form of answering questions. If, for instance, the target word is "freezing," ask a student to answer the question, "Which is worse for you: to be *freezing* or to be too hot?" using the target word in their answer. In this way, students first recognize a new word in a dialogue, then review it in a related listening task, and finally internalize it by using it in various exercises.

In terms of pronunciation, emphasis should be placed not only on segmental parts like phonemes but also on suprasegmental parts like intonation. Activities such as "Listening for Stressed Words," "Comparing Unreduced and Reduced Pronunciation," and "Listening for Reductions" are facilitative in the development of students' aural sensitivity.

Equipping students with a solid foundation of language elements can promote the four basic skills. On the contrary, a weak foundation of language elements results in the failure of students to develop skills in listening, speaking, reading, and

writing. A competent speaker must possess good knowledge of language elements in vocabulary, pronunciation, and grammar.

4.4 Cultural Aspects

Survival English offers students little knowledge about different cultures. Because every culture is unique, students should be exposed to the distinctive qualities of different cultures to minimize culture shock when they travel abroad. For instance, when the topic is dining, the textbook can offer culture capsules about formal dining. Students often complain that they don't know how to eat a Western meal. Should forks be placed on the left or the right side of the plate? Should they eat bread with their hands or with forks? If table manners were covered in the textbook, students would feel more at ease when they have the opportunity to attend a formal dinner with American friends. Also, when the topic is dining, regional foods from America can be introduced to students to increase their cultural knowledge. EFL learners should be exposed to cultural elements for which they lack sufficient knowledge. After all, learning a language is learning a culture, to some extent.

4.5 Extended Practice

Survival English provides teachers with very few extended activities, necessitating the development of their own tasks that will consolidate students' speaking skills. The textbook writers should have provided a greater variety of resources such as role playing, making speeches, summarizing ideas, and interviewing to provide students with more opportunities to practice the language and develop their oral skills.

5. CONCLUSION

Conversation textbooks can function as a syllabus to assist teachers to address fundamental aspects of language that will foster students' oral proficiency.

Effective conversation textbooks must provide meaningful language used in real-life situations. In addition, various activities should be embedded in textbooks, so students will have more opportunities to practice the language. Furthermore, cultural aspects must not be overlooked. With sufficient cultural knowledge, students will be better able to speak appropriately. Effective conversation textbooks, a critical element in developing the communicative competence of students, possess the aforementioned features [3, 5, 13].

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Communicative construct as 'tunnel window' of media discursive reality

Abstract. The article deals with the communicative construct as 'tunnel window' of media discursive reality as a complex communicative and interactive phenomena and complex communication technology of dissemination and implementation of the "virus" of information.

Keywords: communication, discursive reality, "tunnel window", communicative construct.

Discursive reality created by acts of media discourse, is the infosphere product (media space), where the discourse performs functional and instrumental, the role of a cannon constructed format, a sort of "window" through which passes the information to the consumer with it and proposed author ("orchestrated") assessment of verbal and communicative events created discourse as a stimulus (stimulus) with the appropriate response, which "becomes a psychological tool by virtue of its use as a means of psychoactive effects, and behavior" (Vygotsky, 1982: 106-107).

Verbal communicative events are the acts of media discourse, that "becoming an instrument as a means of psychological impact on the psyche and behavior," are aimed at social change not only in the global world space, as well as in its individual parts. Often such verbal and communicative events, supporting social change, are referred to the "media viruses" (Rushkoff, 2003: 10), capable of using the media discourse acts to

spread "viral" or memetic information in the form of a "gun" discursive "incentives" - messages and thus affect the psyche of the recipient, "raising and immensely empowering its behavior" (Vygotsky, 1982: 107).

In this light, the media discourse as one of the elements of the "protocols of power" (Sauls, 2007) has shown its ability to perform - and admittedly is successfully performing, if we trace the shift dynamics in the "color wheel" revolutionary transformation of Central Asia, the Middle East to Europe and Latin America - a kind of role "means the formation of human consciousness in social processes", according to L.S. Vygotsky (1982; 1982a) or "mediators" capable of using "a variety of psychological tools and their complex systems," including "language mnomotehnicheskie tools algebraic symbolism, works of art, writing, charts, diagrams maps, drawings, various symbols, etc." (Vygotsky, 1982: 103) discursively create infosphere as "new territory, open to human interaction the expansion of the economy and in particular for social and political machinations" (Rushkoff, 2003: 9; Romanov, Romanov, 2015; 2016).

The transformation of "extended media space" in the global info-sphere as the information area can not only monitor the proceeding in the process itself, but also thereby discursively have an active influence on the perception of the target mass produced its discursive reality, with all the features. Discourse as a "psychological tool" in the "system of means of the formation of human consciousness" as a "gun" infosphere element is "included in the behavior of the process of" mass destination as a consumer-designed and targeted information and is able to "modify everything flowing and the whole structure of mental functions" of the consumer "defining a new structure for its properties of artificial ... instrumental act." It is important to bear in mind that "artificial (instrumental) acts ... are the same natural" that "may be without reserve to the very end and spread reduced to the latter" (Vygotsky, 1982: 103-104). Discursive reality created by acts of media discourse, there infosphere product (media space), which performs the functions discourse-rationally-instrumental cannon role of a constructed format, a sort of "window" through which passes the information to the consumer and with it and proposed the author ("orchestrated") assessment of verbal and communicative events created (or created) discourse as a stimulus (stimulus) with the appropriate response, which "becomes a psychological tool by virtue of its use as a tool on the psyche and behavior of the impact "in the interpretation of L.S. Vygotsky (1982: 106-107).

In the context of this performance "massive consumer information attacks senses" becomes understandable desire to understand the reasons for the rapid and successful spread of media-discursive acts in the infosphere and identify features of the mechanism of "implantation" in the mass consciousness of consumers of information material or communicative practices different, including network, media. No less important, in particular, it is an attempt to describe the specific conditions of success (fruitfulness) distribution of "living ideas", "living estimates," "ideas, sews through consciousness" (Romanov, 2002: 149, 169-175) consumer network communication and install their role in shaping the technology of progressive gradual unwinding mechanism ('implant') information viral memetic manipulative senses, able to emulate and replicate itself in the consciousness of the mass consumer (Romanov, Malysheva, 2016).

The most convenient tool for solving these problems may serve as a model above the agreed conditionally "discursive window" or "window of discourse" as the cognitive-communicative construct. The basis of such a model can be a) acts of media discourse in the space of discursive realities created by the acts of those in the infosphere, b) a particular discourse as a complex sign-Causer with sliding means in the interpretation of J. Lacan, i.e. discourse, due to the presence memetic (viral) discursive practices, free from hard referential bindings to subject, event or factual world, c) discourse as a real proposal for the introduction and implantation (promotion) together mean forms, plunging into which the addressee as a subject speaking up for (interprets, evaluates, explains) in its own way no subject The correlation and believes in his explanation.

In cooperation with the discourse (c) the addressee creates a subjective objectivity or of the availability of the proposed forms of discursive practices themselves (i.e., from the presence of the expression plane), or from having its own interpretation, evaluation, installation, without the possibility of reinforcing their veracity, but relying on the belief that expressed (or expressed) in the proposed format ("window") of discourse, even factually. In other words, if the recipient believes in what is stated in the proposed "window discourse" and is guided by it, believing in the "surface side of Descartes 'doctrine' for J. Sauls (2007: 31), more precisely, in his paraphrased version:" If say report, inform about anything, so it really exists for me" It becomes obvious that it is within the (format) created specifically speaking subject discursive reality offered (are) the possibility and conditions for the implementation imperceptible introduction of information into the consciousness of the consumer.

The idea of using the model of the media "discursive window" in the design of self-propagating faith mechanism in information in order to use "orchestrated" (engineered) discourse as a "psychological tool" in the "system of means of the formation of human consciousness" and simultaneous use as a "gun" infosphere element intended to create "individual tunnel" discursive (konversatsionnoy) reality, in which in the course of an intensive "bombing" semantic messages plunges man and in which (in the tunnel so discursive reality) it will be to live with faith in their existence is not entirely new so radical idea (Romanov 2002: 58 - 92). It has been noted that in the process of finding a destination individually tunnel space discursive reality carried out to develop a new, reformatted (reprogrammed) mass behavior as a consumer destination designed and targeted information (Romanov, 2002; Romanov, 2007).

In addition, a number of studies of the Tver researchers scientific direction dynamic model of regulatory communication also noted that "individual tunnel discursive reality" not only for one person, but as the events of "color revolutions", and for society as a whole "is a kind of concrete sign (communicative) construct. It appropriates to mental space of the individual, which determines the dimension of the personal level of integrity in his perception of the world "created in the infosphere reality particular discourse or discourses (Romanov, 2002; Romanov, Romanova, 2005).

Such a tunnel "in the form of a specific sign (communicative, verbal) construct can be defined for the participants of communication a reality", in which they placed themselves and operate meanings and images. It was also noted that the current attempts to distinguish different classes (level) "tunnels" that are given such ideas or meanings, faith, love, honor, good, justice, beauty, truth, sin and OE, and that the holders of ideas are energy-field of cognitive spaces studied cognitive semantics in linguistics and semantics in subjective psychology (Romanov, Romanova, 2016). The real identity information of the Incarnation in this space are the designated energy-education (typical "tunnel" signs) as a particular aspect of discourse ("window-discourse"), representing the unity of the activities of consciousness and the speaking subject of language as a cognitive agent. It is important to bear in mind that the energy-structure capable materialized not only in the verbal signs, but in the movements of the primary terms of the genesis of human activities, as well as in kinesics and proxemics (Romanov, 2015; Romanov, Malysheva, 2016). Moreover, the qualities of consciousness as fluidity, dynamism, spontaneity, dialogism, harmony and find their

implementation in the relevant verbal structures, their specific "tunneling signs", such as "repentance", "vows", "commandments", "amulets" etc.

Properties of energy and informative structures accumulate in the discursive "tunnel signs semantic (meaningful) variables" discursive reality or cognitive "dimension" of discursive meanings given in the concept of "communicative constructivism / constructionism" (Romanova, 2007; Romanov, Romanova, 2005) where the differential dimensions (attributes values) contraries represented on the horizontal (time) axis from a diametrically opposite to the possible, acceptable or absolutely neutral.

For example, the semantic volume "tunnel" of discourse meaning "consolation" - for example, the most trivial: "Tanya, Tanya, do not cry, do not drown in the river ball" - includes not only the contraries values "Disorder" and "Lada", but and arranged on the time axis values which are depending on the direction of movement of the sender and the recipient in the interactive space, "comfort" of the tunnel - a joint, and possibly separate motion to "Lada" or move to "Disorder" - must go through the neutral zone or point. Movement participants (sender and recipient) in either direction on the volume line (scale) of the communicative aspect of the construct shows a set of real or possible actions, eligible participants for the evaluation and implementation of their plans and actions.

In other words, the movement of participants shows the possible pro-space discourse - its "window" - actions (operations of verbal, reasoning, messages in the form of communicative practices, movies, photos, cartoons, etc.) or "windows borders" in which (discursive space) they are together or each separately (independently) may or may not be included (not submerge or sink) that according to the degree of their choice admissibility of their actions and the actions of another (i.e. the sender's and recipient's action, the recipient) interpret and evaluate them on a scale of "accept" or "do not accept" as a guide to action.

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The study of attitudes and values of young wedding people

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Исследование установок и ценностей молодых людей, вступающих в брак

Уровень благополучия семьи как социального института служит барометром состояния общества, показывает степень его продвижения по пути предоставления своим гражданам реальных возможностей для социально-культурного развития. В браке упорядочивается и реализуется естественная

потребность людей в продолжении рода, преобразованная социальными условиями и культурой. Как правило, брак подразумевает ведение супругами совместного хозяйства и наличие общего имущества, передаваемого по наследству, а также воспитание ими детей [1].

Сегодня в стране сложная демографическая ситуация, кроме того, отношение молодёжи к браку неоднозначно. Подготовленность к семейной жизни одно из решающих условий счастливого супружества, гармоничного брака. Оценка готовности к семейной жизни и прогноз благополучия супружеских взаимоотношений нацелены на создание прочного брака и на совершенствование взаимоотношений в период становления брачной жизни.

Предметом данного исследования являются установки и ценности молодых людей, вступающих в брак. Для решения экспериментальной задачи были использованы следующие методики: тест И. Юнды для оценки готовности молодых людей к семейной жизни, опросник Ш. Шварца с целью изучения системы ценностей личности [2].

Исследование проводилось на базе отдела РАГС Южно-Казахстанской области. В опросе приняли участие 40 пар молодых людей в возрасте от 18-25 лет, подававших на момент исследования документы на регистрацию брака.

Анализ результатов изучения готовности молодых людей, вступающих в брак, к семейной жизни позволяет оценивать общую готовность молодых людей к семейной жизни как высокую. Молодые люди осознают ответственность за других членов семьи, понимают важность удовлетворения потребностей и интересов супругов. Однако высокий уровень готовности выделен не по всем показателям.

Более актуальными у опрошенных являются сексуальные потребности (80,4%), что можно объяснить особенностями физиологического развития молодого организма.

Высокая степень значимости для молодых пар наблюдается по следующим семейным функциям: совместное времяпрепровождение (80,0%), оказание эмоциональной поддержки членам семьи (77,5%) и соблюдение моральных и правовых норм поведения в семье (64,6%).

Средний уровень готовности наблюдается по таким параметрам, как готовность иметь (53,8%) и воспитывать детей (56,3%). Стоит отметить, что данная готовность выражена у респондентов, исповедующих ислам.

Готовность соответствовать новому социальному статусу (муж, жена, мать, отец) и способствовать духовному развитию членов семьи в большей степени характерна для девушек.

Только 40,8% опрошенных молодых пар, вступающих в брак, готовы материально обеспечивать свою семью.

Анализ ответов девушек показал следующее. Более половины всех опрошенных, то есть 62,1% девушек, вступающих в брак в ЮКО, считают, что девушка готова создать семью в возрасте от 20 до 25 лет, на втором месте по результатам опроса от 18 до 20 лет (22,9%), а старше 30 лет (0%) девушек для замужества считают не допустимым.

45,8 % опрошенных считают, что наиболее подходящим брачным возрастом для мужского населения является возраст от 25 до 30 лет. 40,0% девушек считают, что в возрасте от 20 до 25 лет молодые люди также готовы у браку.

Молодые люди считают, что для женского пола оптимальным возрастом вступления в брак является в период от 20 до 25 лет. По их мнению, девушки в этом возрасте готовы к вступлению в брак. При этом, по мнению парней, для женского пола не обязательно иметь высшее образование, главное, чтобы она смогла выполнять хозяйственно-бытовые обязанности.

Для мужского пола оптимальным возрастом создание семьи считается возраст от 25 до 30 лет. Это связано с тем что, в этом возрасте мужчины уже закончили ВУЗ, либо обеспечены работой и готовы материально обеспечивать семью. Многие мужчины в период от 25 до 30 лет экономически независимы от своих родителей.

Таким образом, оптимальным возрастом для женского пола, считается тот возраст, когда он отвечает критерию готовности выполнять хозяйственно-бытовые обязанности. Для мужского пола оптимальным возрастом создания семьи является критерий способности мужчины материально обеспечивать свою семью.

Для молодых людей значимыми нормативными ценностями являются «универсализм», «безопасность семьи», «доброта». На четвертом месте по приоритетности стоят «жизненные достижения каждого из супругов». Таким образом, для молодых людей важно семейное понимание, терпимость, защита благополучия всех людей и в том числе природы. «Безопасность» как ценность, относящаяся к коллективной безопасности, в значительной степени выражает цель безопасности и для личности (социальный порядок, безопасность семьи,

национальная безопасность, взаимное расположение, взаимопомощь, чистота, чувство принадлежности, здоровье). Выбор ценности «доброта» свидетельствует о фокусировки опрошенных на благополучии в повседневном взаимодействии с близкими людьми (полезность, лояльность, снисходительность, честность, ответственность, дружба, зрелая любовь).

Среднее значение среди ценностей на уровне нормативных идеалов у молодых людей от 18 – 25 лет, вступающих в брак, являются «достижения», «самостоятельность» и «власть». Таким образом, потребность в самоконтроле и самоуправлении, а также выраженность интеракционных потребностей в автономности и независимости для данных молодых людей не являются значимыми. Такие ценности как «конформность», «традиция», «гедонизм», «стимуляция» менее характерны для молодых, вступающих в брак, данного региона.

В ходе исследования выяснилось, что у молодых людей, вступающих в брак в возрасте 18 – 20 лет, более доминирующими являются «традиционные ценности», уважение, принятие обычаев и идей, которые существуют в культуре (уважение традиций, смирение, благочестие, принятие своей участи, умеренность) и следование им. На втором месте «доброта», которая характеризуется взаимодействием с близкими и сохранением хорошего отношения с людьми, с которыми индивид находится в личных контактах (полезность, лояльность, снисходительность, честность, ответственность, дружба, зрелая любовь). Следующим по уровню значимости ценностей ставится «безопасность»: безопасность семьи и самого себя. Для молодых, вступающих в брак, не менее важен универсализм, терпимость и понимание друг друга.

В этой группе низкий показатель выбора таких ориентаций, как «стимуляция», «достижения» и «власть». В эту группу входят молодые люди, которые заканчивают обучение в высшем учебном заведении, и те, кто не учится. Таким образом, их не интересует авторитет, богатство, социальная власть, сохранение своего общественного имиджа и общественное признание.

По результатам ответов респондентов, вступающих в брак возрасте от 21 до 25 лет, можно выделить в качестве значимых следующие ценности: «самостоятельность», «доброта», «достижение» и «власть». В эту группу вошли девушки и юноши, которые закончили Вуз, многие из них работают. Для них важно достижение социального статуса или престижа, контроль или

доминирования над людьми и средствами, т.е. их нормативами являются: авторитет, богатство, социальная власть, сохранение своего общественного имиджа, общественное признание.

В возрасте 21-15 лет только половина респондентов выбирает ценности принятие обычаев и идей, которые существуют в культуре (уважение традиций, смирение, благочестие, принятие своей участи, умеренность).

Для данной группы не характерно сдерживание и предотвращение действий, а также склонностей и побуждений к действиям, которые могут причинить вред другим или не соответствуют социальным ожиданиям (ценность « конформность»). На последнем по уровню значимости ценностей для группы находится ценность «гедонизм». Данная группа опрошенных оценивает удовольствие, наслаждение жизнью самыми низкими баллами.

Таким образом, у опрошенных высокий показатель самотрансцендентности, то есть, выражена ориентация на ценности «универсализм» (социальная справедливость), и «доброта» (готовность оказывать помощь). На втором месте представлена ориентация на «консерватизм» (безопасность, конформность, традиция) и на «самовозвышение» (власть, достижение и гедонизм).

Не выражены у молодых, вступающих в брак, ценности открытости изменениям (самостоятельность, творчество и свобода) и «стимуляция» (захватывающая жизнь).

Результаты данного исследования фиксируют невысокий уровень готовности молодых людей к браку. Многие респонденты не готовы к появлению детей, их воспитанию, не готовы материально обеспечивать семью, заботиться о духовном развитии членов семьи, выполнять хозяйственно-бытовые обязанности. К сожалению, отмечается низкая ориентация молодых людей на традиции, в том числе в создании семейных отношений.

Сегодня отмечается трансформация системы ценностей и установок у молодых людей, вступающих в брак. Данные изменения отражаются в кризисных характеристиках молодой семьи: в нашей стране высокий уровень разводов; высокий процент матерей-одиночек; у молодых супругов не сформированы умения улучшать нравственно-психологический климат семьи, разрешать возникающие конфликты компромиссом, взаимными уступками; низкий показатель ориентации на традиционные стандарты семейного уклада; обострение межпоколенческих отношений, особенно в связи с критическим подходом

молодых людей к опыту и семейным традициям старшего поколения; существуют сложности для молодых женщин сочетания репродуктивной и профессиональной деятельности; низкая культура интимных отношений; высокий показатель абортов, отрицательно сказывающихся на здоровье молодых женщин.

В настоящее время молодые люди, вступающие в брак, нуждаются в социальной, психологической, педагогической, правовой поддержке, в социальной защищенности. Многие молодые супруги нуждаются в консультационных психологических услугах, в эффективных превентивных мероприятиях направленных на сохранение семьи как важного социального института, формирующегося на традиционных ценностях с учетом современных реалий жизни.

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Main objectives of psychological problems impacting on the subject-developing environment

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Основные задачи психологических проблем, воздействующих на предметно-развивающей среды

В общеобразовательном национальном учебном плане/ по протокольному решению № 20 правительства РА,27 мая 2004 года/, в основных принцыпах государственного стандарта дошкольного образования закреплено создание образовательной и физической среды,ориентированно на детей, а также значениние наблюдения и контроля организации образовательного процесса и результата. [1, ст. 17]

Требования к развивающей предметно-пространственной среде, о которых мы читаем в Законе «Об образовании» Республики Армения /глава 2, статья 17/ [2] являются безусловно оправданными, но современная реальность диктует свои условия. Обеспечение дошкольных учреждений современными техническими средствами, реализующими образовательные задачи, пополнение среды различными материалами все более необходимо в условиях развития образования и решения многоплановых образовательно-воспитательных задач. В связи с вышесказанным, возникает вопрос. Может ли учреждение самостоятельно справиться с этими требованиями?

Анализ теории развития высших психических функций Л.С. Выготского [2, с.125] – приоритет объективного мира и действия над ними в процессе развития личности. В то же время, принимая в основу понятие "зона актуального и ближайшего развития",отзывы которых рассматриваются в основе отношений "взрослый и ребёнок", можно полагать, что эти отношения охватывают в какой-то степени возможные воздействия предметно-развивающей среды.

Рисунок 1.



Рисунок 1. Ингредиенты предметно-развивающей среды

Конечно, они включают возможности, предлагаемые материальной средой, которые создают некие удобства в процессе развития ребёнка. Подчёркивая одновременное воздействие различных компонентов в процессе развития ребёнка, обсуждается суть развития и воздействия на окружающую среду. В обсуждаемых вопросах также важно учитывать организацию подразделений образовательных процессов, которая в основном означает развитие практической реализации единого принципа в коммуникационной среде, который представляет собой сокровенные сущности образования, связанные с методом выбора. В этом контексте, он обеспечивает формирование положительной эмоциональной атмосферы у детей,воспитательей и родительей.

Явно видно, что с методом их обеспечения, можно также обеспечить гармонию с окружающими. Немало важно для благоприятного фактора развития учитывать территорию детского сада, интерьер, классические и современные культурные ценности, которые содержат мощный потенциал для воспитания. Этот вопрос очень важен, учитывая то, что дети очень чувствительные и их мышление во многом субъективное и основывается на восприятии. Именно поэтому, объективная развивающая рабочая среда влияет на представление об искусстве с раннего возраста, обучает математике, грамоте и понятии о науке.

Социологический опрос среди родителей, педагогов и родителей показывают, что занятия, обеспечивающие различные знания по отдельности, важны, но больше акцентставится на развитии практического значения прдеметно-развивающей среды (90 процентов), которым, как конечный результат, важно подготовить к школьному обучению. 80 процентов респондентов показывают выбор таких методов организации развитияпредметной среды, который обеспечит увеличение шансов на сохранение всестороннего детского интеллектуального развития.

Развитие ребенка зависит не только от того, как организован процесс воспитания и развития, но и где и в каком окружении он живет. Иначе говоря, правильно организованная взрослым среда, в которой живет ребенок, способствует его развитию. Активность ребенка в условиях обогащенной развивающей среды стимулируется свободой выбора деятельности [5, с.22].

Под развивающей средой мы понимаем естественную комфортную, уютную обстановку, рационально - организованную, насыщенную разнообразными сенсорными раздражителями и игровыми материалами [4, с. 5-7]. В такой среде возможно одновременное включение в активную познавательно-творческую деятельность всех детей группы. Определяющим моментом в создании развивающей среды является педагогическая идея, цель которой руководствуется образовательным учреждением. Достижение этой цели осуществляется через реализацию образовательной программы.

Предметно-развивающая среда рассматривается на основе способов её создания, познавательных способностей, которые направлены на стимулирование умственной и физической активности у детей. Естественно, необходимы определенные условия для развития развивающей среды, способствуя созданию целенаправленного развития ситуации.

Считается, что существует разница между раннее полученными знаниями и навыками, а с другой стороны – существующие новые возможности, особенно с точки зрения игровой деятельности, в результате столкновения становятся заметными проявлениями интеллектуальной деятельности ребенка.

Эта чрезвычайно сложная, комплексная задача постоянно присуща исследованиям, занимающихся вопросами детей. И до сих пор продолжаются исследования в этой области, особенно в мотивировании ребёнка, в том, как обеспечить ту социальную среду, которая поддерживает деятельность дошкольной производственности, условиями игр.

Понятие "развивающей среда" почти одинаково используется вместе с "предметной средой", которая до сих пор требует некоторых разъяснений. Обобщая существующие определения можно сказать, что развивающая-объектная среда является системой необходимых условий для обеспечения активности и развития ребёнка. Она включает в себя некоторые основные пункты, которые необходимы для физического, эстетического, познавательного социального развития ребёнка. Так как среда развития – это система определённых условий, поэтому необходимо структурные и функциональные компоненты, затем выяснить,как они взаимосвязаны друг с другом. Структурные компоненты подразделяются на:

- реальные-жизненные предметы,с которыми ребенок часто встречается, особенно, когда они не заменяются какой-нибудь игрушкой;
- спортивные и азартные игры, медицинские средства, которые ребенок использует в детском саду и подготовительных учреждениях;
- игровые-предметные, игровые-компьютерные системы.

Каждый из перечисленных пунктов имеет свои функции и значения, как физического, так и психологического здоровья детей, в процессе укрепления, как его познавательного, так и чувственности, в цели развития. Среда развития включает в себя конкретные объекты, которые работают не только по отдельности, но и вместе. "Ребёнок-ребёнок", "ребёнок-взрослый", члены семьи, учителя и др. Контактирование с ними в значительной мере способствуют формированию и развитию теплых и близких отношений и взаимности. Принимая во внимание, что в конечном счету развивается и укрепляется интеллект ребенка, его деятельность. Следовательно, важны действия ребенка к умственным и

словесным действиям. В приоритетном порядке важнее организация действий и следовательно условия созданий образовательной среды.

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Interrelations of ashough traditions in Kars and Alexandrapol in the second half of the XIXth century

In the XIXth century in the theatre of Russian-Turkish war operations unique preconditions were created of historical and political, historical and cultural origin in the towns of Kars and Alexandrapol for the development of cultural parallels or for the formation of interrelationships.

In different spheres of urban culture adequate phenomena were formed reciprocally which in the course of time were established with local characteristic features. Among the cultural interrelations of the two towns, ashough art took an important place which, at the end of the XIXth century, was developed highly and got to its destination in Alexandrapol.

The latter became a famous ashough center by strengthening ashough traditions of having new national basis. Until now in ashough studies there are surface studies of an episode origin concerning the ashough traditions of these two towns. In this paper we shall touch upon various issues concerning the heritage of the traditions, interrelations.

In historical and cultural context rather complex events touching upon the peculiarities of favourable atmosphere in Kars-Alexandrapol's urban culture are noticed, in this work we have tried to present the heritage of Turk ashoughs acting there in comparison with the Armenian ones.

Historical and cultural interrelations of the Armenian two towns were significant especially in the second half of the XIXth century.

In Late Middle ages Kars became one of the centers of Turk- Persian conflicts. In future owing to its impregnable fortress the town was known as an important strategic castle in the form of the Ottoman Turkey.

In this sense an importance was attached to its role in the course of the wars of XIX Russian-Turkish wars (1828, 1855, 1877 Kars was occupied by the Russians) [1].

In this period, conditioned by historical events, Kars became close to Alexandrapol in the sense of populations' ethnic form and cultural development tendency. In the Armenian historiography it is mentioned that despite the Turk- benefit policy carrying out in the province of Kars in the Middle ages, the great majority of Kars' urban population were Armenians.

"After 1878 on the right bank of the river Kars, on the plane to the south, the new town districts of Kars were founded. Many Armenians from Karin, Alexandrapol, Akhaltsikhe take their refugees in Kars. In 1913 Kars had 12175 inhabitants, 10250 of them were Armenians, 921- Turks, the others were Greek and Russians" [2].

At the end of the XIXth century about sixty types of trades were in the peek of their development "the great majority of which is included in trade list of Karin and Alexandrapol, a circumstance which once more certifies the common features of trade traditions between Karin and Alexandrapol"[3].

The Armenian cultural element in Kars had to adapt to other cultural dominants. The ashough art enjoys great popularity in rural and urban environments, which has been appreciated and "sponsored" in handicraft midst in the sense of aesthetic values and entertaining content. At the same time it has served the ruling class.

We want to mention the Armenian ashoughs of Kars according to chronology. G. Levonyan, as one of the most famous ashoughs in the region, mentions the name of ashough Tujari/1760-1840-s/. "He was born in Ghani village in Kars". He was a famous story-teller. He has invented exceptionally in Turkish. The songs are chiefly religious and complex" [4].

It is common knowledge that this ashough with eastern accoutrements was known in the whole Anatolia as "Tujar Effendi". It is noteworthy that in Turkish sources among the names of Kars ashoughs Tujari is mentioned who has lived earlier /1720-1805/ [5].

In all likelihood the speech goes on the same person. At the beginning of the XIXth century Qyamali was a famous ashough in Kars/1803- 1832/ who despite his young age, was able to attract the audience with his mastery.

The facts certify that the ashough traditions in Kars have had deep roots and enjoyed great popularity in the first half of the XIXth century.

What was the language of Armenian ashoughs? Naturally, besides the Armenian language, they mastered in Turkish and Persian for achieving great auditoriums. It is also possible that in a close environment Armenian songs were heard with the local accent and colloquial language.

To sum up, at the beginning of XVIII–XIX centuries the ashough traditions in Kars were formed and in the region it was known with ashough competitions.

In the second half of the XIXth century, conditioned by Russian-Turkish strategic conflicts, locomotives of the Armenian population from Kars and other Armenian residences is noticed mainly to the province of Alexandrapol. Alexandrapol becomes a unique shelter where the Western Armenians among them the dwellers of Kars continue to develop the traditions of urban culture in a new Armenian-speaking environment.

According to G. Levonyan, Sari Oghlan /Turkish: fair-haired boy /was one of the most famous ashough of Kars migrated from Alexandrapol. He was fluent playing the saz. He died in Eganlar village in 1890. Malul was also known as a Kars' prominent ashough. It should be noted that he was ashough Igit's /Gegham Martirosyan/ grandfather. Malul was born in Kars in 1823. Then he settled down and lived in the village Ghanlicha in Alexandrapol. His songs came out in 1884 entitled "Sion's songs". K. Durgaryan has included the poetic texts of ashough's 12 songs in his work mentioning the fact that the Turkish songs of Malul and other Kars ashoughs were gradually forgotten and only the Armenian ones have been popularized.

The phonographic versions of ashough's "Բազմա- ցանվերքերս» and "Օրըմեկտրտմություն" songs have been preserved in A. Brutyan's collection. Armenian songs of two Kars ashoughs were recorded in Alexandrapol at the end of the XIXth century. They are the songs of Chtchi Tatos/Tatus/ "*Չիմ գիտի ի՞նչ պիտի տանիս" and Krpe's "Էս ի՞նչ թավուր քար ջիկարիմ*".

As we notice, in the second half of the XIXth century Alexandrapol became the inheritor of Kars' ashough traditions. Moreover, well-known coffee houses of Kars are transferred here; their names were ashoughic and those were the places where ashough competitions were taking place in.

Among them we can mention Hovhannes and Talyans' café where ashough Jivani was creating his art. Jivani and Alexandrapolian ashoughs were permanently connected with Kars' ashough life, have taken part in traditional ashough competitions aiming to develop the Armenian ashough traditions of the town.

In ashough art, songs of love nature were dominant. But ashoughs have touched upon the issues concerning historical and cultural events as well. It is noted in some sources that issues dealing with freedom, patriotism are key themes in the songs of XIXth century ashoughs. Though in ashough song art there are texts addressed to nursery, lullabies are rare. Conditioned by specific cases, ashough lullaby texts can be found in the song list of ashough folk art. On the other hand, the lullaby text with its thematic content, gives the ashough an opportunity to create unique texts. In this context lullaby can be considered to be an open text. Ashough lullabies /despite their small amount/, are immediate and improvised texts.

Kars has always been the main center of the Armenian ashough song. The great majority of urban ashoughs have realized the development of local traditions.

To sum up, Armenian ashough schools and centers have been established in such historical and cultural environment where the folk professional poet- musician's art and creativity was in great demand.

The multi-content essence of this art or trade gave the ashoughs the chance to arise interest in different social classes on such issues as modern cultural, political or of entertaining origin.

The ashough school in Alexandrapol emerged and develepod under the direct influence of historical and cultural activities and with its social demand carried out its main mission- the digestion of new qualities of the Armenian national mentality in different spheres of ashough folk art- ideological, didactic, musico-poetic. The ashough union of Alexandrapol is the direct developer of Kars' ashough traditions.

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Theoretic and methodological aspects of making a model for management of buildings condition

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Теоретико-методически аспекти на изграждането на модели за подобряване състоянието на сградния фонд

Abstract. Theoretic and methodological aspects of making a model in general comprise the application of different scientific methods. In the current case, management of buildings condition, the appropriate methods are related to the architectural and construction features of buildings, to the energy savings gained through improvement of

the outer elements (walls, floors, roofs), and to investment appraisal. The general question is how to combine these methods in order to elaborate an overall model which may be used irrespectively of the type of the building (housing, administrative, production or agricultural).

Key words: economic efficiency, energy efficiency, investment models.

Необходимостта от подобряване състоянието на сградния фонд произтича не само от естествената нужда на неговите потребители от комфорт и функционалност, но и от следните значими статистически данниза броя на жилищните сгради [1] в страната (табл. 1) и дела на енергопотреблението на домакинствата [2] спрямо общото енергопотребление в националната икономика (табл.2):

Жилищни сгради (брой)	Разпределение по материал на външните стени		
	томанобетонни и панелни	тухлени	други
2 069 867	77 812	650 013	42 042

*Таблица 1.***Жилищен фонд в България към 31.12.2014г.**
Източник: НСИ

гори	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
устрия	3451	2443	2549	2693	2576	2579
нспорт	2832	2772	2738	2722	2871	2604
акинства	2125	2149	2262	2391	2377	2257
ско стопанство	186	183	184	204	198	193
уги	958	939	987	1040	1021	964
ДО	9552	8486	8720	9050	9043	8597
на домакинствата	22%	25%	26%	26%	26%	26%

*Таблица 2.***Крайно енергийно потребление по сектори в хил.т. н.е. [3]**
Източник: НСИ

Съвкупността от посочените данни дава възможност за **нов поглед върху методите за подобряване състоянието на сградния фонд**, като по – голямо внимание се обръща на тези от тях, които гарантират**по-нисък разход на енергия** при използването на сградите. Всяко действие, което води до трайно понижение в енергопотреблението на сградите, способства за подобряване на тяхната енергийна ефективност.

Според Рамковата конвенция на ООН за изменение на климата същността на понятието „енергийна ефективност" [4] се свежда до намаляване на замърсяването на атмосферата чрез контролиране на отделяните парникови и други газове и субстанции посредством по-ефективни производство, пренос, разпределение и потребление на енергия.

Сред препоръчителните мерки, които Международната енергийна агенция посочва с оглед постигане на енергийна ефективност в ежедневието на икономическите субекти, еименно **изборът на ефективна изолация и прозорци** за обитаваната сграда [5] с оглед спестяване на енергия и парични средства.

В Директива 2010/31/ЕС относно енергийните характеристики на сградите се посочва, че **сградният фонд формира повече от 40 % от общото енергийно потреблени** [6] **в ЕС**, като тенденциите сочат нарастване на този процент, а оттук и увеличаване на емисиите на парникови газове. Следователно, повишаването на енергийната ефективност на сградния фонд ще подпомогне изпълнението на поетите задължения по Протокола от Киото към Рамковата конвенция и спазването на дългосрочните ангажименти за намаляване до 2020г. на общите емисии от парникови газове с най-малко 20% спрямо равнищата им през 1990г.

Влиянието на сградния фонд върху потреблението на енергия в дългосрочен план от една страна налага необходимостта от прилагането на общ подход при проектирането на нови сгради при спазване на изискванията за близко до нулевото нетно енергопотребление, а от друга - извършване на основно обновяване на съществуващите сгради. В текста на Директивата от 2010 г. като **„основно обновяване"** се определят такива случаи, при които се засяга повече от 25% от площта на външните ограждащи елементи на сградата или случаи, при които общите разходи за обновяване на конструкцията или на сградните инсталации (за отопление, климатизиране, вентилация, топла вода и осветление) надвишават 25% от стойността на сградата, без да се включва стойността на терена. Директивата не поставя конкретни минимални изисквания към енергийните характеристики на сградите, но изисква от страните – членки да определят такива съобразно съотношението разходи – ефективност, т.е. **изискванията за основно обновяване трябва да позволяват възвращаемост на инвестираните за неговото изпълнение парични средства, в рамките на разумен срок, съотносим с очаквания технически живот на използваните материали, посредством натрупаните енергийни спестявания**.

Изложените дотук обстоятелства дефинират двата основни метода за подобряване състоянието на съществуващия сграден фонд от гледна точка на икономията на енергия: **(1) посредством саниране на ограждащите елементи на сградите** (посредством топлоизолационни материали) и **(2) посредством-подмяна на сградните технически инсталации с енергоефективни,** в т.ч. такива, които позволяват използването на възобновяеми енергийни източници в самите сгради**.**

Практиката предлага множество **техническимодели за саниране на сградните ограждащи елементи**.Тяхното многообразие е обусловено от:

- различните видове материали, приложими за саниране на определен вид ограждащ елемент (под, стена, прозорец, покрив);
- начина на изпълнение на санирането – от външната или вътрешната страна на ограждащия елемент, или от двете страни;
- прилагане на саниране само на един вид ограждащ елемент или в съвкупност.

Решението за прилагане на тези модели зависи в изключителна степен оттяхната **икономическа ефективност**. Най-разпространени в икономиката и най-подходящи за изразяване на стопанските процеси са математическите модели. Процесът на построяване на математически модел включва определяне на величините, които са решаващи в структурата на модела и определяне на възможните съчетания от отношения между тях.Икономико - математическият модел [7] е подмножество в системата на математическите модели и представлява съвкупност от математически зависимости (уравнения или неравенства), които изразяват отделни аспекти от реална икономическа ситуация при различни условия за тяхното реализиране. Неговото методологично ядро се явява оценката на съотношението между разходи и резултати. Оттук възниква и въпросът дали е възможно нейното оценяване да се изрази чрез модел.

Очевидна е необходимостта от **анализ на подходите замоделиране** [8]**:**

- **Построяване на единен модел** – поради големия брой на променливите величини, които характеризират икономическите процеси, този подход не може да осигури връзката между съществуващите зависимости помежду им. Единният модел изисква допълнителни построения, които да отчитат реални предпоставки и ограничения.

• **Постепенно моделиране –** изразява се в агрегиране и дезагрегиране на ресурсите, без обвързване на моделите чрез входно – изходната информация.

• **Системно моделиране** – построяването на система от модели позволява да се анализират голям брой показатели. Връзката между моделите в системата се осъществява чрез входно – изходната информация, характеризираща взаимосвързаността между отделните задачи.

Оценката за ефективност на дадена дейност или процес предполага използването и на друга група подходи: проблемно-ориентиран, резултатно-ориентиран, процесен и системен [9]. Тяхната същност е разгледана от позицията на приложението им при изграждане на моделите за подобряване състоянието на сградния фонд.

• **проблемно-ориентираният подход** се изразява се в установяване и анализиране на причините за определен проблем, в контекста на настоящото изследване - висок разход на енергия в сградите;

• **резултатно-ориентираният подход** изисква оценяване на степента, в която са постигнати предварително определени цели, например определено ниво на икономия на енергия;

• **процесен подход**- изразява се в дефиниране на последователността от процеси, чието изпълнение ще гарантира икономия на енергия в сградите, а оттук и подобряване на тяхното състояние;

• **системният подход –** изразява се в установяване на връзката между входящите ресурси и крайните резултати и на необходимите процеси.

Тенденции и нормативна уредба относноподобряване състоянието на сградния фонд

Тенденциите относно подобряване състоянието на сградния фонд от гледна точка на икономията на енергия са предопределени от насоките, заложени в европейските програмни документи, регламенти и директиви:

• План за действие за енергийна ефективност: осъществяване на потенциала;

• Директива 2012/27/ЕС относно енергийната ефективност;

• Директива 2010/31/ЕС относно енергийните характеристики на сградите.

Очертаните тенденции се свеждат до:

• намаляване на големите различия между отделните държави – членки при реализирането на потенциала за икономия на енергия в сградите;

• определяне на минимални изисквания за енергийните характеристики на сградите и на сградните компоненти с цел постигане на оптимален баланс между направените инвестиции за тяхното удовлетворяване и спестените разходи за енергия през жизнения цикъл на дадената сграда.

Подобряването на състоянието на сградния фонд от гледна точка на икономията на енергия е част от националната политика по енергийна ефективност, регламентирана чрез набор от стратегически и нормативни документи, които са разработени в съответствие с регулативната рамка на ЕС в тази област.

Основополагаща по своето съдържание е **Енергийната стратегия на Република България до 2020 г.** [10], която дефинира приоритетните направления в енергийната политика, едно от които е намаляване енергоемкостта на икономиката и увеличаване на енергийната ефективност, включително чрез енергийно независими сгради. Това е действително наложително предвид данните за енергийния интензитет на българската икономика (табл.3, фиг.1), които еднозначно сочат, че неговите стойности са най – високи спрямо тези на останалите икономики в ЕС:

Таблица 3.

Енергиен интензитет, енергопотребление и емисии в ЕС-28 за 2014 г.

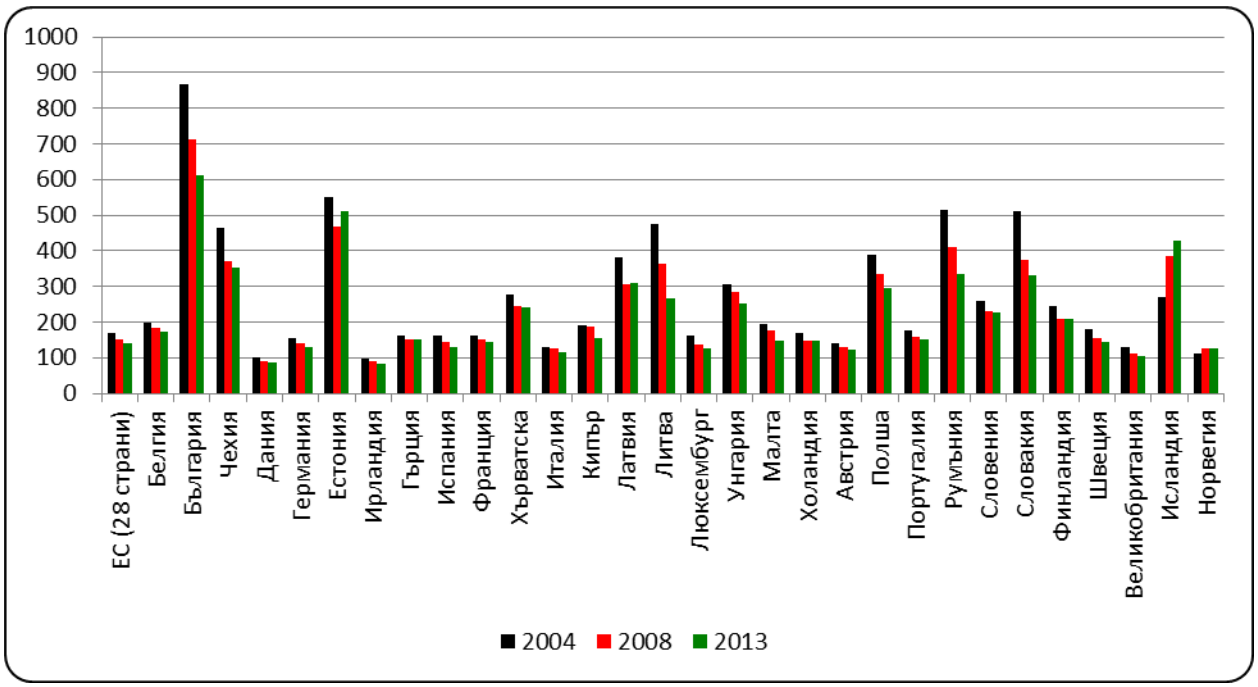
Държава	Енергиен интензитет (тне/$1000 БВП) ППС 2000	Първична енергия (тне/глава от населението)	Електропотребление (kWh/глава от населението)	емисии CO2 ($kgCO_2$/USD) ППС 2000	Държава	Енергиен интензитет (тне/$1000 БВП) ППС 2000	Първична енергия (тне/глава от населението)	Електропотребление (kWh/глава от населението)	емисии CO2 ($kgCO_2$/USD) ППС 2000
Великобритания	0.11	3.40	6067	0.28	Швеция	0.17	5.36	14811	0.15
Ирландия	0.10	3.37	6277	0.28	Финландия	0.21	6.64	16351	0.34
Дания	0.11	3.46	6462	0.28	Естония	0.24	4.03	6346	0.78
Германия	0.14	4.08	7148	0.34	Литва	0.17	2.73	3557	0.26
Нидерландия	0.15	4.85	7229	0.33	Латвия	0.14	1.98	3087	0.24
Белгия	0.18	5.47	8523	0.34	Полша	0.17	2.57	3733	0.53
Люксембург	0.13	8.42	15883	0.33	Чехия	0.21	4.28	6461	0.54
Франция	0.15	4.16	7703	0.21	Словакия	0.19	3.39	5268	0.38

Испания	0.13	3.04	6310	0.29	Унгария	0.16	2.64	3989	0.33
Португалия	0.13	2.27	4822	0.28	Словения	0.16	3.83	6918	0.34
Италия	0.11	2.94	5656	0.28	Румъния	0.18	1.83	2488	0.41
Австрия	0.12	3.99	8218	0.25	**България**	**0.26**	**2.59**	**4595**	**0.64**
ЕС-28	**0.14**	**3.51**	638 4	0.31	Гърция	0.11	2.71	5723	0.34
ЦИЕ	0.27	2.45	3411	0.67	Кипър	0.14	3.24	6172	0.42
Светът	0.19	1.83	2782	0.46	Малта	0.10	1.99	4818	0.33

Източник: http://www.iea.org/stats/index.asp

За постигане на положителни резултати в набелязаното направление стратегията поставя амбициозната цел за намаляване енергийната интензивност на БВП до 2020г. с 50% и възприема утвърдената в общностните директиви **насока към енергийно спестяване**. Две от действията, предвидени за изпълнение в тази насока са:

- своевременно **подобряване на енергийните характеристики на съществуващите сгради** и **въвеждане на по-строги енергийни стандарти** за новостроящи се сгради;
- подкрепяне на частните инициативи в процеса на **повишаване енергийната независимост на публичните и жилищните сгради чрез саниране** и намаляване на енергийните разходи чрез изграждане на слънчеви инсталации за топла вода, локални отоплителни системи, базирани на биомаса или термални и геотермални източници.



*Фиг.1.***Енергиен интензитет на европейските икономики (кне/ €1000 БВП)**[11]
Източник: Евростат[12]

Национален план за действие за енергийна ефективност 2014-2020 г.

Базирайки се на целевото повишаване на енергийната ефективност в общността с 20% до 2020 г., определено според обобщени прогнозни анализи от страните-членки за стабилизиране на енергопотреблението до 2020 г. на сегашните нива и нарастване на БВП общо за ЕС с 28 %, новата национална енергийна стратегия си поставя още по-амбициозната цел за намаляване на енергийната интензивност на БВП [13] с 50%, за чието постигане предвижда създаването на поредица от планове [14] с конкретни мерки, част от които следва да бъдат съобразени с европейското изискване за оползотворяване на пълния потенциал за икономия на енергия в сградния сектор. По отношение на тази смела прогноза Енергийната стратегия от 2011 г. търпи критика. На първо място, стратегията утвърждава подхода „Top Down" [15] (в превод: отгоре-надолу), като прилага „спуснати отгоре" визии и директиви и не отделя нужното внимание на проблемите, които домакинствата и МСП срещат при тяхното прилагане и на подходящите за тези субекти енергийно ефективни решения. Представените в раздел „Поглед към 2020 г. в цифри" междинни прогнози за всеки 5 години до 2030 г. действително отразяват стойностите, определени в базовия и целевия (препоръчителния) сценарии [16], изготвени от Главна дирекция „Енергетика" на ЕК респективно въз основа на прилаганите политики до април 2009 г. и на база одобрените между април 2009 г. и декември 2010 г. политики, по възприети методи за моделиране на трендовете (GEM-E3, PROMETEUS и PRIMES), отчитайки по този начин влиянието на финансовата и икономическа криза от есента на 2008 г. насам. Предложената въз основа на тези два сценария дългосрочна стратегия, според специалистите, не аргументира избора на конкретните цели с прилагане на анализа „разходи-ползи" спрямо други възможни политики и не посочва отделно проучване за реалния капацитет за енергийна ефективност при крайното потребление и при производството, лишавайки по този начин експертите и обществото от независима оценка. В допълнение, предвиденият механизъм за евентуално ревизиране на поставените стратегически цели в случай, че се констатира разминаване на реалните показатели спрямо прогнозираните стойности посредством двугодишни отчети за наблюдение, предполага изменения в националната законодателна база за сравнително кратки период от време, а това често иманегативен ефект върху поведението на икономическите субекти.

Опасенията на ЕК, че въз основа на наложените до момента регулации ЕС ще постигне само половината на своята 20-процентова цел за намаляване потреблението на първични енергийни ресурси, налагат разработването на нов План по енергийна ефективност. Документът защитава тезата, че най-големият потенциал за енергийна ефективност се крие в сградите. Имайки предвид, че 12% от сградния фонд на ЕС е публична собственост, както и че 2/3 от крайното електропотребление в жилищните, административните и други сгради е предназначено за отопление, планът се фокусира върху по-агресивни мерки за подобряване енергийните характеристики на сградите, като от 2013г. предвижда и въвеждането на правнообвързващи механизми за държавите – членки, в случай че не се наблюдават положителни тенденции относно икономията на енергия. С оглед подпомагане на финансирането и предоставяне на експертна помощ в областта на енергийната ефективност, новият план има за задача да ревизира ефективността на използваните от ЕС до момента финансови инструменти [17] (Кохезионен фонд и Структурните фондове, Програма „Интелигентна енергия - Европа", кредитни линии от международни финансови институции, Европейска програма за икономическо възстановяване и Европейска програма за научни изследвания, технологично развитие и демонстрации) и планира разширяване на техния обхват (от 2011 г. се позволява усвояване на средства не само от публичния сектор, но и от жилищния сектор във всички страни-членки), а също и създаване на нови схеми за финансиране. Първият етап от реализирането на План 2011 по енергийна ефективност на ЕК предвижда неговото внедряване в националните планове и програми на страните-членки. От тази гледна точка, се очаква евентуално осъвременяване на изготвената от АЕЕ през 2005 г. **Национална дългосрочна програма по енергийна ефективност до 2015 г.** и съставяне на пореден Национален план за действие по енергийна ефективност. В националната програма ясно се изтъкват препятствията [18], свързани с финансирането на проекти по енергийна ефективност в България: затруднен достъп до финансов ресурс и слаби финансови стимули за крайния потребител на енергия; липса на новаторско финансиране на енергийната ефективност; недостатъчен капацитет за разработване на проекти, атрактивни за банково финансиране по енергийна ефективност; поемане на значителен риск. Възможните направления за прилагане на предвидените в Плана на ЕК от 2006г. финансови инструменти за подпомагане на енергийната ефективност, които

набелязва дългосрочната програма се изразяват в: средства от републиканския бюджет за изпълнение на целевите годишни програми (в т.ч. и общинските) за осъществяване на мерки по енергийна ефективност; безвъзмездни средства (грант, субсидия) от различни фондове и международни програми (конкретно в полза на общините – инструментите JEREMIE, JESSICA и JASPERS); кредитни линии, предоставени от ЕБВР и МФК чрез местните търговски банки, за малки енергоефективни проекти в битовия сектор (домакинства и асоциации на енергопотребители в етажна собственост) и МСП (главно в индустрията) при облекчен режим; цялостно или частично финансиране от дружества за енергоефективни услуги и средства от Фонд „Енергийна ефективност".

С Регламент от май 2009 г. до 4 % от средствата от националните фондове за регионално развитие трябва да бъдат използвани за подобряване на енергийната ефективност в съществуващите жилища. Като резултат, допълнителни 8 млрд. евро ще бъдат насочени към саниране на тези сгради и ще дадат значителен резултат от гледна точка на създаване на нови работни места в държавите-членки.

Първият приет у нас **Закон за енергийната ефективност (ЗЕЕ)**, съобразен с Директивите на Европейския парламент и Съвета на Европейския съюз, отнасящи се до енергийната ефективност, с Европейската енергийна харта (Протокол към Енергийната харта относно енергийната ефективност и свързаните с нея аспекти на околната среда) и с Протокола от Киото към Рамковата конвенция на ООН по изменение на климата, става реалност през 2004г. Този закон отменя приетият десет години след началото на прехода (1999г.) Закон за енергетиката и енергийната ефективност (ЗЕЕЕ). Отменението ЗЕЕЕ, независимо от обстоятелството, че полага основите в правното регулиране на енергийната ефективност [19], не отговаря в достатъчна степен на изискванията, поставени пред страната във връзка с присъединяването й към ЕС и в редица направления не успява да задоволи непрестанно развиващите се обществени отношения в проблемната област. Приемането на самостоятелен закон за енергийната ефективност е продиктувано именно от спецификата на регулираните обществени отношения, излизащи извън отрасловата рамка на енергетиката, както и от необходимостта за хармонизиране на държавната политика по повишаване на енергийната ефективност с европейската. Конценпцията на новия закон се основава на виждането, че либерално развиващите се процеси в пазарната икономическа среда за подобряване на енергийната ефективност следва да се

подкрепят от прилагане на пазарно – ориентирани мерки и действия за постигането на формулираните в Енергийната стратегия от 2002 г. национални приоритети и цели. Целта на закона е да предостави по-ясна дефиниция на енергийната ефективност като национален приоритет [20] при провеждането на държавната политика в тази област, да определи по-точно ангажиментите и подкрепата на държавата за нейното развитие, да създаде институционални, нормативни и финансови условия за реализиране на националната политика като предпоставка за успешно интегриране с Европейския съюз. Законът създава административна система за осъществяване на политиката за повишаване на енергийната ефективност, съчетаваща правомощията на централната и териториалната изпълнителна власт. В съответствие с изискванията на Директива 2010/31/ЕС относно енергийните характеристики на сградите, в закона са създадени императивни норми, които икономическите субекти следва да спазват при проектирането, изграждането, реконструкцията, модернизацията и експло-атацията на обекти със значителна консумация на енергия. По регламент на ЗЕЕ се създава Агенция по енергийна ефективност (АЕЕ), чрез която се цели осигуряване на необходимите институционални предпоставки за прилагане на интегриран подход в областта на енергийната ефективност. ЗЕЕ разпорежда упражняването на контрол именно от страна на изпълнителния директор на АЕЕ по спазването на императивните нормативни изисквания. Със ЗЕЕ се конституира Фонд „Енергийна ефективност", чиято главна цел е управлението на финансови средства, предоставени по инвестиционни проекти за повишаване на енергийната ефективност, съобразно приоритетите, заложени в приетите от Министерския съвет (МС) годишни програми по енергийната ефективност. Средствата на фонда, освен за издръжка на самия орган, са предназначени за ***възмездно финансиране*** на проекти за развитие на енергийната ефективност в България и за гарантиране на кредитите от финансово-кредитни организации, отпуснати по проекти за енергийна ефективност.

След присъединяването на България като пълноправна страна-членка на ЕС, ЗЕЕ е изцяло заместен с нов закон [21], който в по-голямата си част преповтаря съдържанието на нормативния акт от 2004 г.

Законът за енергийната ефективност от 2008 г. предвижда създаването на наредби, пряко свързани с топлосъхранението и икономията на енергия в сгради, с енергийните характеристики на сградите, с процесите на обследване и сертифициране на сградите за енергийна ефективност, включително и с реда за

вписване в регистър на лицата, извършващи процедурите по обследване и сертифициране на сградите:

Наредба №РД-16-1058 от 10.12.2009 г. за показателите за разход на енергия и енергийните характеристики на сградите;

Наредба №16-1594 от 13.11.2013г. *за обследване за енергийна ефективност, сертифициране и оценка на енергийните спестявания на сгради;*

Наредба №7 от 2004г. за енергийна ефективност, топлосъхранение и икономия на енергия в сгради.

Последната определя основните показатели за енергийна ефективност на сградите, минималните изисквания към енергийните характеристики на сградите, техническите изисквания за икономия на енергия и топлосъхранение в сгради, методите за определяне на годишния разход на енергия и техническите правила и норми при проектиране топлоизолацията на сгради. Наредбата се прилага при проектиране топлоизолацията на нови и съществуващи жилищни и нежилищни сгради, които допълнително са класифицирани в две групи: сгради със среднообемна нормативна температура на вътрешния въздух над 15°C и относителна влажност на въздуха до 70%; сгради със среднообемна нормативна температура на вътрешния въздух в границите 12÷15°C, които се отоплявat най-малко три месеца годишно. Първата редакция на нормативния документ предвижда класифициране на сградите при граници на показателя „среднообемна нормативна температура" от 12 до 19°C и над 19°C, а за показателя „относителна влажност" – до 75%. Ново уточнение в наредбата е нейната приложимост включително по отношение на производствени сгради, в които има необходимост от поддържане на определен микроклимат, както и при проектиране топлоизолацията на ограждащите конструкции на сгради със специални параметри на температурно-влажностния режим, като обществени перални, стационарни хладилници, помещения с относителна влажност на въздуха над 70%, селскостопански и животновъдни сгради, оранжерии и др.

Енергийната стратегия, утвърдената и действащата законова уредба на страната, видно от анализа на документите, има за основна цел повишаването на енергийната ефективност в България. Нещо повече, това е една от стратегическите задачи, която следва да бъде обект на периодично изследване с оглед по-нататъшното развитие на икономиката ни. Задачата на научните

изследвания в тази област е да аргументират набелязаните цели с икономически ефективни методи и непрекъснато да подпомагат мениджмънта на енергийната ефективност чрез текущо обследване на сгради, промишлени и стопански обекти и системи.

Модели за подобряванесъстоянието на сградния фонд на база архитектурно – строителни детайли

Нормативната уредба, относима към подобряване състоянието на сградния фонд чрез саниране на ограждащите елементи, не налага конкретна класификация на сградите.

Утвърдената от НСИ Класификация на сградите и строителните съоръжения (КСС - 2001), която позволява съвместяване на изследванията на сградния фонд на национално, европейско и международно ниво, определя сградите като жилищни и нежилищни според основната им експлоатация. Жилищни сгради са тези обекти, при които поне половината от общата полезна площ е предназначена за жилищни цели и за постоянно обитаване. Към нежилищните сгради се отнасят сгради за краткосрочно пребиваване, административни, търговски, производствени и складови, транспортнисгради и сгради на съобщенията, обществено – обслужващи сгради и други сгради, в т.ч. селскостопански.

Законът за устройство на територията(ЗУТ) дава приблизително същата класификация на сградите въз основа на тяхното функционално предназначение, като дефинира и т.нар. сгради със смесено предназначение, в които обектите за нежилищни нужди, свързани с масов достъп на външни лица, се разполагат под жилищните обекти. В допълнение, нормативният акт разглежда сградите като видове строежи и ги класифицира по категории – от първа до пета [22].Така жилищните сгради се делят на такива с високо, средно или ниско застрояване, обществено – обслужващите сгради се различават според разгънатата застроена площ или капацитета за посетители, а производствените сгради според капацитета за работни места.

Нормативната уредба не предвижда и класификация на сградите според вида на конструкциите и на ограждащите сградни елементи – обект на саниране. Отново такава е налична за статистически цели, според която се различават стоманобетонни, масивни и други сгради [23].

Разграничаването на сградите, строени по индустриален способ [24] - ЕПЖС (едропанелно жилищно строителство), ППП (пакетно-повдигани плочи), ЕПК (едроплощен кофраж), пълзящи кофражи и разновидностите им, също не е нормативно дефинирано.

Дадените класификации на сградите според предназначението им и вида на ограждащите елементи иматопределяща роля при избора на модел за санирането им и оценка на икономическата ефективност на инвестицията за неговото осъществяване.

Ограждащите елементи (стени, покрив, прозорци, под) имат съществена роля за създаването и поддържането на определен микроклимат в сградите, тъй като те ги отделят от въздействието на околната среда. Обикновено от двете противоположни страни на ограждащия елемент съществува разлика в температурите и относителните влажности на вътрешния и външния въздух. Тази разлика обуславя протичането на физически процеси на пренасянето на топлина през ограждащите сградни елементи.В тази връзка, основните функции [25], които трябва да изпълнява топлоизолацията на ограждащите сградни елементи са:

- да затруднявамаксимално топлообмена между въздуха в сградата и атмосферния въздух;
- да допринася за намаляване на енергийните загуби при отоплянето на сградите през зимния сезон, както и за ограничаване на потреблението на енергия за охлаждането им през летния сезон.

Разработени са редица варианти на архитектурно-строителни детайли, които стоят в основата на различните модели за саниране на ограждащите сградни елементи посредством използването на топлоизолационни материали (табл.4).

Количествените параметри на посочените в табл.4 детайли при използване на топлоизолационните материали стиропор, фибран и минерална вата,които са в масова продажба и достъпни за всеки строител. Детайлите указват дебелините натоплоизолационните слоеве и тяхното място в ограждащия елемент [26]. За всеки от слоевете в разгледаните архитектурно-строителни детайлиса посочени и съпротивленията на топлопреминаване.

Таблица 4.

Модели за саниране на база архитектурно – строителни детайли

Ограждащ елемент	Архитектурно – строителен детайл				
стена	Тухлена стена (25 см) с топло-изолация отвън (нова сграда)	Тухлена стена (25 см) с топло-изолация отвътре (нова сграда)	Тухлена стена (25 см) с топло-изолация отвън (съществуваща сграда)	Бетонна стена с топлоизола-ция отвън	Зидана стена от ИТОНГ с топлоизолация отвън
покрив	Единичен - с хоризонтална бетонова плоча	Единичен - с наклонена бетонова плоча	Двоен - с хоризонтална бетонова плоча и скатен дървен покрив	Двоен, плосък с бетонови плочи	Метален
под	Над неотопляемо помещение с топлоизолация отдолу	Над неотопляемо помещение с топлоизолация отгоре			

При разработването на архитектурно - строителните детайли следва да се използват т.нар. ефективни [27] топлоизолационни материали, т.е. тези, чийто коефициент на топлопроводност е $\lambda \leq 0{,}18$ W/m.K.

Ограждащите елементи, и преди всичко фасадните стени, обикновено имат участъци, които са изпълнени от материал с повишена топлопроводност (бетон, стомана) [28], наричани още „**топлинни мостове**". Характерните топлинни мостове в една сграда са стрехите, корнизите, балконите и лоджиите, еркерите и проходите, плочите над неотопляеми мазета, прозорците и балконските врати, напречните бетонни стени, колоните, външните стени, гредите и ъглите на сградите. За всеки от тях също са разработени модели за саниране чрез топлоизолационни материали [29].

Заподобряване състоянието на сградите чрез икономия на енергия от значение са както положението на топлинния мост спрямотоплоизточника, така и мястото му в конструкцията на сградата. Основен принцип за топлинните мостове в сградите е топлопоглъщащите повърхности да бъдат по-големи от топлоизлъчващите. Всеки елемент, който следва да бъде изолиран, има

специфичен характер и е обект на конкретен анализ, както в технически, така и в икономически аспект.

Енергийно акумулиране. Приложение намират схеми за пасивни топлопечалби за сметка на слънчевата радиация, като се вграждат елементи към сградите за директна, дифузна през оранжерия, базиликални отвори, масивна стена, колекторно-акумулиращи стени, колекторно-акумулиращи покриви, система термосифонен ефект, водни и термично-фазово променящи се колекторно-акумулиращи стени. Вграждането на схемите към фасадите на сградите е въпрос и на конструктивна съвместимост, конкретна икономическа обосновка и съгласие на клиента. Особено внимание представлява енерготрансформиращата ограждаща конструкция. Разработен е цялостен технико-икономически модел на елемента в два варианта. Единият елемент съдържа два конструктивни модула, вторият - един. Елементите се оптимизират параметрично чрез функцията на минималните годишни приведени разходи. Предлага се гамата от елементите да са свързани с критериите на подобие и моделиране, прилагани при изследването на техническите и конструктивни им параметри.

Архитектурно-строителните детайли са дефинирани прагматично и дават ясна ориентация за изпълнение на топлоизолацията при санирането, но не са обвързани с важни параметри като типа на сградата, температурно-влажностните условия в помещенията и не дават информация за икономическата ефективностна проектите за топлоизолация. Независимо от това, представените данни за изпълнение на санирането на ограждащите сградни елементи имат важен и еталонен характер и могат да служат като мярка за сравняване на резултатите при различните модели за саниране на сградите.

Методи за оценка на икономията на енергия вследствие санирането на сгради чрез топлоизолация

Икономията на топлина, вследствие саниране чрез топлоизолация, е разликата между разходите за отопление преди и след полагане топлоизолацията на сградата. Разработени са множество методи за определяне необходимата енергия за отопление. Конкретно, за оценка на проектите за саниране чрез топлоизолация, чрез Наредба № 7 са зададени техническите изисквания за икономия на енергия, техническите правила и норми за проектиране топлоизолацията, които се отнасят за сгради с нормативна температура по-висока от 19°C и относителна влажност на въздуха под 75%.

Нормирани са техническите критерии, както следва: максималните нормативни стойности на годишната потребна топлина за отопление на един квадратен метър полезна жилищна площ ($Q_{h\max}/V_e, kW.h/m^3$,където $Q_{h\max}$ е сумарният годишен разход на топлина; A_u - полезната жилищна площ), в зависимост от фактора на формата $f_0 = A/V_e$ и денградусите $DD, K.d$ при температури на вътрешния въздух над 19^0C (*табл.1.6*), като V_e еотопляемия обем на сградата; максималните нормативни стойности на коефициентите на специфични топлинни загуби от топлопреминаване $H_{T\max}'$, в зависимост от фактора $f_0 = A/V_e$ и процента на остъкляване (*табл.1.7*); максималните нормативни стойности на годишната потребна топлина за отопление на един кубичен метър отопляем обем за нежилищни нискотемпературни сради $Q_{h\max}/V_e, kW.h/m^3$, които се отоплявят годишно повече от 3 месеца при вътрешна проектно температура 15^0C (*табл.8*); коефициентите на топлопреминаване $U, W/m^2.K$ за отопляеми сгради (*табл. 9, 10 и 11*).

Таблица 6

f_0 [a] (m^{-1})	Q_{hmax}/A_u [b] (kWh/m^2)			
	DD (*K.d*) [e]			
	2100	2500	2900	3300
≤0.20	50.0	51.8	54.0	56.5
0.30	55.4	57.3	59.4	61.9
0.40	60.8	62.7	64.8	67.3
0.50	66.2	68.1	70.2	72.7
0.60	71.6	73.5	75.6	78.1
0.70	77.1	78.9	81.1	83.6
0.80	82.5	84.3	86.5	89.0
0.90	87.9	89.7	91.9	94.4
1.00	93.3	95.1	97.3	99.8
≥1.05	96.0	97.8	100	102.5

Таблица 7

f_0 (m^{-1})	H_{Tmax} [c] ($W/m^2.K$)	
	≤ 30%	≥ 30%
≤0.20	1.15	1.65
0.30	0.90	1.25
0.40	0.78	1.05
0.50	0.70	0.93
0.60	0.65	0.85
0.70	0.61	0.79
0.80	0.59	0.75
0.90	0.57	0.72
1.00	0.55	0.69
≥1.05	0.54	0.68

Таблица 8

f_0 (m^{-1})	Q_{hmax}/Ve [d] (kWh/m^3)
≤0.20	33.9
0.30	36.5
0.40	39.0
0.50	41.6
0.60	44.2
0.70	46.7
0.80	49.3
0.90	51.8
1.00	54.4
≥1.05	55.7

(a) $f_0(m^{-1})$ – фактор на формата; (b) $Q_{hmax}/A_u(kWh/m^2)$ - ...; (c) $H_{Tmax}(W/m^2.K)$- ...; (d) $Q_{hmax}/Ve(kWh/m^3)$ - ....; (e) *DD* (*K.d*) - .....

Към Наредба №7 от 2004г. за енергийна ефективност, топлосъхранение и икономия на енергия в сгради е приложена методика за детайлно изчисляване на показателите за разход на енергия и на енергийните характеристики на сградите. Методиката е разработена съгласно БДС EN 832 и добрите европейски практики в областта на топлосъхранение, като е съобразена с климатичните условия у нас. Пресмятат се топлинните загуби през ограждащите елементи и вътрешното топлопредаване, от вентилацията на сградите и топлинните печалби от слънчевото греене и вътрешните източници. Разходите на енергия се определят при базовите стойности на следните климатични фактори: средномесечни температури на въздуха, продължителност на отоплителния период, денградусите и средночасовия интезитет на слънчевото греене.

Таблица 9

	$U, W/m^2.K$	
Видове ограждения	$\geq 19\ ^0C$	$\leq 19\ ^0C$
Външни стени и стени, граничещи с неотопляеми пространства	0,5	0,83
Преградни стени в неотопляеми пространства	1,6	1,0
Външни стени, граничещи със земята	0,7	1,2
Преградни стени в отопляеми тавански пространства	0,7	1,2
Подове, граничещи със земята	1,35	2,00

Таблица 10

	$U, W/m^2.K$
Видове ограждения	
Външни стени	0,50
Външни прозорци, балконски врати и покривни прозорци	0,50
Тавански плочи, граничещи с необитаеми пространства	0,50
Сградни ограждащи конструкции	2,0
елементи, граничещи отгоре или отдолу с външния въздух	2,0

Таблица 11

	$U, W/m^2.K$	
Видове ограждения	$\geq 19\ ^0C$	$\leq 19\ ^0C$
Външна стена, с топлоизолация отвътре или по средата на стената	0,45	0,75
Външна стена, при която топлоизолацията е отвън	0,35	0,75
Външни прозорци, балконски врати и покривни прозорци	2,0	2,8
Остъкления (стъклопакети)	1,8	3,0
Окачени фасади	1,8	3,0

Таванска плоча на студен покрив	0,45	0,83	Подове и стени, граничещи със земята	0,22	Външни прозорци, балконски врати и покривни прозорци с повишени изисквания	1,9	2,8
Подова плоча над неотопляем подземен етаж	0,35	0,83	подове над неотопляеми пространства	0,35	Окачени фасади с повишени изискваня	2,2	3,0
Стена, таван или под, граничещи с външния въздух	0,5	0,83			Наклонени покриви и вентилирани плоски покриви	2,3	0,4
Стена, таван или под, граничещи със земята, при вградено площно отопление	0,5	0,57			Плоски покриви без вентилируем слой	0,3	0,4
Топъл покрив	0,35	0,83			Подове и стени, граничещи с неотопляеми пространства	0,25	0,4
					Подове и стени, граничещи със земя, при които: А) топлоизолацията е отвътре Б) топлоизолацията е отвън	0,25 0,40 0,50	0,4 - -

Методи за определяне размера на инвестициите за подобряване състоянието на сградния фонд

Размерът на инвестицията в саниране на сгради чрез топлоизолация следва да се определя въз основа на разходно-калкулативния метод, тъй като реализацията на избран вариант за техническо изпълнение на топлоизолацията е съпътствано от извършването на конкретни строително – монтажни работи. Стойността на последните се калкулира съобразно утвърдените в строителния сектор схеми на ценообразуване, които се характеризират с определени особености.

Една от характерните особености на строителната дейност изисква при ценообразуването да се използва икономическата категория „сметна стойност"

[30] за всеки конкретен строителен обект и за всяка от строително – монтажните работи, предвидени за изпълнение в проектната документация. Съществуват два възможни подхода за определянето й - по цени на уедрен натурален показател (застроена площ и др.) и по видове строително-монтажни работи. И в двата случая трябва да бъде съставена генерална (обобщаваща) сметка, която характеризира завършеността на строителния продукт и възможността за неговото реалноексплоатиране.

С оглед съдържанието и конкретните икономически функции на сметната стойност може да се посочи, че вторият подход е подходящ при обекти със специфични технико-икономически параметри, каквито са сградите – обект на саниране чрез топлоизолация.

Прилагането на втория подход изисква съставяне на подробни стойностни сметки за единица мярка от отделните видове и разновидности строително – монтажни работи (за $м^2$ полагане на екструдиран полистирол върху тухлена зидария; $м^2$гипсова шпакловка; $м^2$ минерална мазилка и т.н.), обобщени накрая в генерална сметка.

Първостепенно значение има установяването на сметните цени на отделните основни ресурси, вложени за изпълнението на определен вид работа – материали, труд и машинно време. Определят се въз основа на уедрени сметни разходни норми според вида работа и зависят от текущите пазарни цени на материалите, договореното трудово възнаграждение на строителните работници, машиносмените на използваните строителни машини и действащите тарифи за превоз на материалите. В съответствие с количеството и сметните цени на извършените строително – монтажни работи се съставя обща стойностна сметка, която изразява основната част от сметната стойност на изпълнението на строителния обект – в конкретния случай саниране на сграда чрез топлоизолация. Към нея се прибавят т.нар. допълнителни разходи, направени за съхранение на материалите в склад, осигуряване на предпазни средства по време на труд и социални осигуровки, поддръжка на оборудването и машините, организация и управление на строителния процес. Допълнителните разходи обхващат голям брой и твърде разнообразни разходи, чийто размер не може да се установи при съставянето на сметната документация по разходни норми за единица строително-монтажни работи. Размерът им се определя като относителен дял от сумата на разходите за материали, труд и механизация. Общата стойностна

сметка на строително-монтажните работи и допълнителните разходи формират себестойността на строителната продукция.

Сметните цени не съдържат печалба. Тя се прибавя към себестойността на строително – монтажните работи, като нейният размер може да се договаря между инвеститора и изпълнителя – в абсолютна сума или в процент.

Разходните норми за материали, труд и механизация, въз основа на които се определят сметните цени на строително-монтажните работи, а чрез тях и на общата сметна стойност на строителните обекти, имат базов, ориентиращ характер. Проектантските и строителните фирми имат право да извършват обосновани корекции в тях в зависимост от специфичните характеристики и условия за изпълнение на строителните работи. Създаването на все повече нови индустриални продукти за топлоизолация предопределя промяна в разходните норми при тяхното използване, съпътства се от различно технологично време за тяхното полагане и от използването на специфично оборуване. В България източник на информация за разходните норми са множеството справочници за уедрени сметни норми и сметни цени на различни издателства, които се залагат и в софтуерните продукти за ценообразуване на строителната продукция. Поради незадължителният характер на разходните норми, вследствие тяхното отменяне при трансформирането на националната икономика в пазарна и налагането на механизъм за свободно определяне на цените, същите дълго време не са актуализирани съобразно настъпващите изменения. Едва отскоро се забелязват опити научноизследователски организации и специализирани строителни асоциации да предлагат разходни норми, определени въз основа на изследвания на съвременни материали и условия.

Методи за оценка на икономическата ефективност на инвестициите в саниране чрез топлоизолация

Икономическата ефективност обуславя ограничаването и избягването на загуби от използването на производствените фактори (в т.ч. природните ресурси) [31]. Ефективното използване на производствените фактори се изразява чрез оптимума (критерия) по Парето [32], чиято същност е използвана като отправна точка за настоящия анализ, а именно, че обществото трябва да възприеме всяка промяна, която не оказва вредно влияние на нито един индивид и едновременно подобрява общото благосъстояние на всички хора. Определящи за обществото и икономиката са суровинните и енергийни ресурси, в т.ч. конкретно при

построяването и експлоатацията на енергоикономични сгради – жилищни, административни, аграрни, индустриални. Ефективното им използване се оценява по множество признаци. По отношение на технологичните процеси определящи са оптимизирането на режимните параметри и нормите на енергопотребление.

Като основен показател за икономическа ефективност следва да се приема влиянието на енергопотреблението върху производителността на труда. Самото увеличаване на обема на производството при пропорционално нарастване на трудовите, материалните и енергийните ресурси не носи икономически ефект. Запазването на обема на производство при съкращаване на човешкия труд води само до ограничена интензификация на производството. Увеличаването на обема на продукцията при едновременно съкращаване на разходите на труд и енергия е най-интензивният път на развитие. На консервативния принцип - по-малко труд за производство на същия обем продукция, трябва да се противопоставя генералният принцип – по-малко труд и енергия за производство на по-голямо количество продукция. При всяка нова разработка се преследва постигането на икономически ефект още чрез: енергетичен ефект (предизвиква се от намаляването на разходите за гориво и енергия, намаляване загубите на енергия, използване енергията на околната среда и пр.); структурен ефект (проявява се чрез опростяване на конструкциите, съкращаване на производствени площи, увеличаване концентрацията на производственото оборудване, намаляване на инженерните комуникации и др.); технологичен ефект (постига се, ако принципът и схемите на енергосигуряване подобряват технологията на производството, например подобряване параметрите на микросредата); екологичен ефект (налице е винаги при икономия на конвенциални източници на енергия, както и при използване на алтернативни източници).

Обобщен показател, който характеризира енергийната наситеност на производството, са реалните инвестиции (в по-тесен смисъл капиталовложенията) K [33]за съответното енергийно и технологично обзавеждане. С увеличаване степента на нарастване на енергийните разходи като правило намалява разхода на човешки труд L. Първоначално тези разходи намаляват, а след определен момент, главно поради увеличаване на енергонасищането, същите отново започват да растат. Минимумът се постига при определена степен на капиталните вложения K_T . Тази точка, обаче, не съответства на минималната себестойност на продукцията C_{min}, тъй като в

същата, освен разходите за труд C_T, се калкулират и разходите за амортизация C_a. Капиталните вложения, при които се постига минимална себестойност - K_{Cmin}, са по-малки от K_T, като C_{min} се постига при скорост на намаляване на разходите на труд във функция от капиталните вложения равна на отрицателната стойност на коефициента на амортизационните отчисления, т.с. $\frac{dT}{dK} = -k_a$. Това условие се удоволетворява при $K < K_T$. Обаче и тази точка не се счита за оптимална. Намаляването на себестойността не трябва да бъде максимално, а такова, че вложените средства да се откупуват във възможно най-кратки срокове. Зададеното условие ще се удоволетвори при минимални стойности на приведените годишни разходи. Тези разходи, освен себестойността, включват и отчисленията за възстановяване на инвестицията, респективно кредита. Условието за минимум на функцията на приведените разходи е диференциалът от себестойността на продукцията спрямо направената инвестиция да бъде равен на отрицателната стойност на нормативния коефициент $E_H = \frac{1}{T_{отк.}}$ за ефективност на инвестицията в енергоефективни мерки, т.е. $\frac{dC}{dK} = -E_H$. Икономически по-ефективен е този вариант, при който сумарните приведени разходи са по-ниски. Колкото по-малък е срокът на откупуване на разработвания вариант в сравнение с изходния, толкова по-изгоден е той. Поради изчерпателният си характер, методът на сумарите приведени разходи се прилага много широко в областта на енергетиката и инженеринга. Конкретно, при разработването на проекти, свързани с подобряване на енергетичните характеристики на съществуващи сгради или с новостроящи се енергоикономични сгради, се приема, че инвестициите се влагат еднократно (в рамките на една година) и ефектът от икономия на енергия е дълготраен. Тогава функцията на сумарните годишни специфични разходи ще има вида:

$$з = W+(p+E_H).\ I_0 \qquad (1),$$

където W, ($kWh/\ m^2.год.$),са загубите на енергия през 1 кв.м. площ на ограждащите елементи на сградата (стени, врати, прозорци, тавани, покриви),

p, (%) - коефициентът на амортизационните отчисления за поддръжка на ограждащите елементи,

$E_н$, (*год.*$^{-1}$) - нормативният коефициент за ефективност на инвестициите в енергоефективни мерки;

I_0,(*лв./* m^2) - размерът на инвестицията (капиталовложението) за изпълнението на саниране чрез топлоизолация.

Годишните данъчни амортизационни норми (ГДАН) съгласно Закона за корпоративното подоходно облагане (чл.55) [34]се определят еднократно за финансовата година и не могат да превишават: категория I – 4% (масивни сгради, съоръжения); категория II – 30% (машини, производствено оборудване, апаратура); категория III – 10 % (транспортни средства, без автомобили); категория IV – 50% (компютри, софтуер); категория V – 25% (автомобили); категория VI – 33 1/3години (данъчни ДМА и ДНА, за които има ограничен срок на ползване); (категория VII – 15% (всички останали амортизируеми активи). Фирмите, в частност МСП, следва да разработват собствена амортизационна политика, съобразена със СС №4 – Отчитане на амортизациите от счетоводните стандарти за финансови отчети за малки и средни предприятия (ССФОМСП). Същите разработват и утвърждават амортизационен план за всеки амортизируем актив [35].

Отчисленията за възстановяване на инвестицията (респ. кредита) се определят чрез нормативния коефициент за икономическа ефективност $E_н = \frac{1}{T_{отк.}}$

Преди стойностите на този коефициент дори се нормираха. В условията на пазарната икономика подобни нормативи са лишени от смисъл. При разработването на бизнеспроектите, по преценка на авторите, се определя икономически ефективен срок за възстановяване на инвестицията, най-често по критерии минимум оперативен обем на инвестицията и минимум отчисления за нейното възстановяване (респ. лихвени плащания за възстановяване на кредита, ако е използван такъв източник на финансиране).

В случаите, когато се реализират проекти, целящи икономия на енергия, за да се определи тяхната икономическа ефективност, е необходимо да се изхожда и от следните показатели: стойност на спестената енергия; инвестиции за реализиране на икономия на енергия; допълнителни експлоатационни разходи, дължащи се на обслужване на съоръженията, спомогнали за реализиране на икономията на енергия; намалени разходи за добив и транспорт на използваните

конвенциални енергоизточници; намалени инвестиции в добивната промишленост вследствие на икономисаната енергия и пр.

Техническият живот на проектите за саниране (*n*брой години) се определя от физическата трайност на вложените материали, която по данни на производителите и/или вносителите и дистрибуторите на иновативни индустриални продукти е в порядъка на 10 години, но се предполага, че може да достигне и 50 години. Икономическият живот представлява периодът, за който проектът за саниране носи печалба (т.е. фактически реализира икономия на енергия). Практически това следва да бъде икономически обоснования период за възстановяването на кредита.

Технико-икономическа оценка на мерките за енергийна ефективност се извършва на база [36]: I_0(*лв.*) - инвестиционните разходи, свързани с проекта; S(*kWh/ год.*) - нетните годишни икономии на енергия в натурално изражение; E (*лв./ kWh*) - цените на енергоизточниците за периода на проекта;n (*год.*) - техническият живот на проекта; n_r(%) - лихвен процент, който ще се използва в дисконтовия фактор за изчисляване на настоящите стойности на паричните потоци; b (%) - ниво на инфлацията.

Показателят I_0 включва всички разходи, които трябва да се направят, както за стартирането на проекта, така и за неговото функциониране през целия му живот, а именно: разходи за проектиране; разходи, свързани със закупуването, доставката и полагането на топлоизолацията; енергийни разходи; експлоатационни разходи (в т.ч. разходи за поддръжка). Пропуснато е отбелязването, че при определяне на размера на инвестицията може да участват и допълнителни начисления върху разходите за труд и материали, съставляващи общата стойност на строително-монтажните работи от проекта за саниране, чиято цел е да осигурят рентабилност на вложения труд за полагане на изолацията, доставно-складови разходи за влаганите материали и печалба за икономическия субект (фирма), изпълняващ проекта за саниране [37].

Годишните нетни икономии при оценката на икономическата ефективност на проектите за саниране чрез топлоизолация се предлага да се определят съгласно зависимостта:

$$B = \sum_{i=1}^{k} S_i.E_i - \Delta O \,\&\, M \qquad (2),$$

където B (*лв./ год.*) е нетната годишна икономия на парични средства,

S (*kWh/ год.*) - енергията, спестена за една година, вследствие санирането,

E (*лв./ kWh*)- цената на енергията съобразно използвания енергоизточник,

ΔO&M(*лв./ год.*) - изменението в разходите за експлоатация и поддръжка на топлоизолацията.

Конкретно по отношение на инвестициите в саниране на ограждащите конструкции на сградите чрез топлоизолация, не се очакват промени в разходите за експлоатация и поддръжка в рамките на техническия живот на вложените продукти (съобразно тяхната техническа спецификация, посочена в декларациите за съответствие и сертификатите за качество на материалите), поради което променливата ***ΔO&M***в уравнение (2) може да отпадне. В зависимостта (2) не се отчита възможността за увеличаване на икономията чрез дисконта [38], вследствие от съкращаването на сроковете на възстановяването на на кредита.

С доказани ползи в практиката, от гледна точка на достоверност, при оценка на икономическата ефективност на инвестиционни проекти с оглед вземане на решение, са методите [39], които отчитат стойността на парите във времето, а именно: дисконтов срок на откупуване *PBP* (Payback period), нетна сегашна стойност NPV (Net Present Value), вътрешна норма на възвращаемост *IRR* (Internal Rate of Return), индекс на рентабилност *PI* (Profitability Index).

Проектите за саниране са дългосрочни, което предполага генериране на доходи за продължителен период от време. Това налага отчитане на **стойността на парите във времето**, определяно чрез норма на дисконтиране (сконтовия коефициент).

Привеждането на бъдещите нетни приходи, които проектът се очаква да донесе, към настоящия момент (моментът на извършване на инвестицията) съставлява същността на процеса на дисконтиране. Целта е двояка – да се определи сегашната стойност след няколко години и стойността на очакваната икономия към настоящия момент. Чрез генерираните очаквани икономии могат да се сравняват няколко проекта. Сконтираната стойност на бъдещите приходи се определя посредством зависимостите:

$$B_n = B_0\left(1 + n_r\right)^n \quad (3),$$

$$B_0 = \frac{B_n}{\left(1+r\right)^n} \quad (4),$$

$$r = \frac{(n_r - b)}{(1+b)} \quad (5),$$

където: B_0 е първоначалният размер на инвестицията (главницата); B_n - количеството пари в банката след n години; n_r - номинален лихвен процент; n - брой години на икономическия живот на проекта; b - инфлационен процент; r - реален лихвен процент; B_0 - сконтираната стойност на бъдещите приходи.

При саниране на сградите се предполага оптимизиране на изолационното ниво. Подобен вариант на дисконтиране чрез зависимостите от (3), (4) и (5) не се коментира. Тогава дисконтирането следва да се отнесе не до вариантите на проекта, а до вариантите за топлоизолационните продукти, чрез които ще се санира сградата.

Срокът на откупуване на инвестицията (*PBP)* се възприема като универсален критерий за оценка на икономическата ефективност на проекти, свързани с реализацията на енергоефективни мерки. При равни спестявания през годините вследствие осъществяване на проекта за саниране, срокът на откупуване се изчислява според зависимостта:

$$PB = \frac{I_0}{B} \quad (6),$$

където I_0 е първоначалната инвестиция(капиталовите разходи) за проекта;

B - нетните годишни спестявания от проекта.

В зависимостта (16) следва да се отчитат специфичните моменти, свързани с процеса на реализация на проектите за саниране, като сроковете и годишният сезон на реализация, схемите на усвояване на кредитите. Тогава ще се променят и показателите I_0, B.

Нетна сегашна стойност NPV**.** Когата проектът стартира с начална инвестиция (нулева година на проекта) и протича няколко години, следва да се отчита влиянието на инфлацията върху количеството пари, с които днес може да се купи повече след една или две години. Съответно икономиите, които ще се генерират след години ще имат по-малка сегашна стойност. Нетната сегашна стойност показва каква сума ще остане след като от сумата на дисконтираните нетни спестявания (нетни парични потоци) за периода на проекта се приспадне началната инвестиция, извършена през "нулевата година", като:

$$NPV = \sum_{1}^{n} \frac{B}{(1+r)^n} - I_0 \quad (7),$$

или при еднакъв ефект през годините:

$$NPV = \left[\frac{B_1}{(1+r)^1} + \frac{B_2}{(1+r)^2} + \ldots + \frac{B_{n-1}}{(1+r)^{n-1}} + \frac{B_n}{(1+r)^n} \right] - I_0 \quad (8).$$

Проектът се счита за печеливш, ако *NPV>0*. Методът на нетната настояща стойностима смисъл да се прилага едновременно с метода на срока на откупуване на инвестицията в тясна връзка със срока за възстановяване на кредита. Макар при санирането актът на усвояване на инвестицията да е в рамките на една година (сезон), показателят *NPV* запазва своя смисъла.

Индекс на рентабилност. Коефициентът $NPVQ$ е отношението между нетната сегашна стойност NPV и размера на инвестицията [I_0], или:

$$NPVQ = \frac{NPV}{I_0} \quad (9).$$

Коефициентът $NPVQ$ показва какъв приход ще генерира проекта на 1 лев (долар, евро) инвестиция за своя икономически живот. По-високият $NPVQ$ показва по-рентабилен проект и е подходящ за подреждане на проктите по приоритет.

Срок на изплащане PO**.** Представлява реалното време, което е необходимо за връщане на инвестицията, т. с. времето, необходимо нетната сегашна стойностда стане равна на нула (NPV =0),катосе вземе предвид реалния лихвен процент, като:

$$NPV = B.\frac{1-(1-r)^n}{r} - I_0 = 0 \quad (10).$$

Вътрешна норма на възвращаемост IRR**.** Това е този сконтов процент, при който NPV =0, или IRR е сконтовият процент, при който сконтираният нетен приход от проекта се равнява на първоначалната инвестиция. Проектите с по-висок IRR са по-добри. Ако например заемът е при 12% лихва, а IRR е 18%, тогава заемът ще се покрие и ще остане резерв.

Дисконтиране на проекта. Реализацията на икономии отенергия вследствие на санирането на сградите е предпоставка за дисконтиране на кредита за реализация на проекта. В зависимост от това, дали при сконтирането номиналната стойност на дълга се взема за увеличена с лихвата сума или пък за

основна сума, се отличават два вида дисконт - математичен (точен) дисконт и търговски (банков или неточен) дисконт .

математичен (точен) дисконт:

$$L_{ck} = K_n - E \quad (11),$$

$$E = K = K_n \frac{1}{1+n.l} \quad (12),$$

където L_{ck} е дисконтът или сконтото (това е отбивът, които се прави при предсрочното изплащане на дълга);

K_n - номиналната или бъдеща стойност (това е сумата на дълга, който се сконтира, т.с. сумата, която следва да се плати на падежа);

E - настоящата или ефективна стойност (това е сумата, която се изплаща предсрочно);

n_{ck} - сконтовото време (времето за което се извършва сконтирането);

l_{ck} - сконтовият процент (ставка) или сконтова такса (това е сконтото L_{ck}, което съответства на 100 парични единици от номиналната стойност на дълга, изплатени една единица време преди падежа).

търговски (банков или неточен) дисконт:

$$E = K_n.(1 - n.l_{ck}) \quad (13),$$

където $(1 - n.l_{ck})$ е дисконтов множител.

Дисконтът при саниране е адекватен на икономията на енергия, чието ниво зависи от климатичния сезон, като през октомври ще е нисък, постепенно ще нараства. Нормално през януари ще е най-висок и ще има вероятностен характер, с числени характеристи, сходни с тези на атмосферните температури. Ще бъде зависим и от климатичния район, като например за северната част на страната ще достига най-високо ниво.

В разработените и приети методики и използвания софтуерен продукт за обучението на специалистите по енергийна ефективност дисконтът не е въведен като елемент, влияещ върху икономическата ефективност на проектите. Отчитането на дисконта определено ще доведе до прецизиране на мениджмънта на инвестиционните процеси при реализацията на проектите за саниране чрез топлоизолация на ограждащите елементи.

Моделирането на паричния поток изисква определянето на всички приходи и разходи, свързани с реализацията на проекта за периода на неговото

техническо и икономическо съществуване. Моделите се изграждат на базата на анализираните показатели и критерии: I_0, S, E, n, n_r, b, B, $\Delta O \& M$, B_0, PB, NPV, $NPVQ$, PO и IRR. Разходът на енергия, както и очакваните икономиина енергия (респ. спестявания), се влияят от климатичните сезони - особеност, която се отразява на паричния поток. Схемите на предпроектната подготовка и проучване, проектирането, управлението на проекта за саниране, схемите и договарянето на кредитите и усвояването им ще бъдат зависими от тези предпоставки. Например, безусловно най-ефективна схема за управлението на паричните потоци ще се постигне, ако изолацията се положи непосредствено преди отоплителния сезон и тегленето на кредита е поетапно, съобразно последователността на технологичните операции.

В наредбите, свързани с осъществяването на мерки за повишаване енергийната ефективност на сградите, не се предлагат конкретни **показатели или критерии за качеството на саниране** и не се дефинира връзката им с методиките за проектиране. От всички възможни показатели, основни за качествата на ограждащите стени на сградите се предлага да бъдат два.

- *Защита от образуване на конденз*, която се осигурява от минимално необходимото съпротивление на топлопреминаване R_T, като:

$$R_T = \frac{\theta_T - \theta_0}{\Delta\theta_H . \alpha_i} \qquad (14),$$

където R_T ($K.m^2/W$) е минимално необходимото ниво на съпротивлението на топлопреминаване, за да не се допуска образуването на конденз,

θ_T - нормираната стойност на температурата в помещението, ^0C;

θ_0 - изчислителната температура на атмосферния въздух, ^0C;

α_i - коефициентът на топлопредаване от вътрешния въздух към вътрешната повърхност на ограждението (стената), $W/m^2.K$;

$\Delta\theta_H$ - температурният пад между температурата на вътрешния въздух и тази на вътрешната повърхност на ограждението (стената), ^0C.

Падът $\Delta\theta_H$ е функция на вътрешната и атмосферна температура и влажност на вътрешния въздух, които за всеки от обектите се променят в широк диапазон. Конкретно, за отделните случаи, се определя според зависимоста $\Delta\theta_H \leq (\theta_T - \theta_P)$, където θ_P е температурата на росата. Определя се по известни зависимости или

т.н. I-D на влажния въздух. Очевидно е, че падът $\Delta\theta_H$, както това е установено в зависимост от състоянието на влажния въздух в помещенията, оказва влияние пряко върхе необходимата дебелина на изолацията при едни и същи температури вътре. Изчислителната температура $\boldsymbol{\theta_0}$ е различна за всеки от районите на страната и е в зоната от -10 до -20 ^{0}C. Коефициентът на топлопредаване α е регламентиран в множество източници и има стойност $\boldsymbol{\alpha}$ = 8.7 W/ m^2.K.

- *Осигуряване на физиологичен комфорт* - това условие е зависимо от пада $\Delta\boldsymbol{\theta_K}$, който най-често е значително по-малък чувствително от пада $\Delta\boldsymbol{\theta_H}$.Например за хората $\Delta\boldsymbol{\theta_K \leq (\theta_T - \theta_C)/2}$. Този показател за качество не е отчитан досега при проектирането на сградите. Спазването му означава хора и животни, намиращи се в сградите, да се чувстват уютно, без усещане за студ и ограничаване на простудните заболявания сред тях. Естествено е, че това ще води до оскъпяване на самите сгради. Право на клиента е да приеме или не това оскъпяване за сметка на качеството.

Двата показателя за качество са въведени и изследвани от наредба 7. В нея обектите са стопански сгради. Въвеждането на показателя „защита от образуване на конденз" означава да се фиксира **минималното ниво** на инвестицията, необходима за полагане на изолацията, за да се осигури избягване на конденз в сградата, явяващи се причина за образуване на плесени и други вредни за здравето микроорганизми. Вторият показател – „осигуряване на физиологичен комфорт", фиксира по същество **максималното целесъобразно ниво** на инвестицията. Очаква се икономически оптималното ниво да бъде между тези две нива. Отчитането на показателите и интегрирането им в аналитичните модели разкрива възможността проектите за саниране да се управляват по качество и едновременно с това да се извършва оптимизация на тяхната технико-икономическа ефективност.

Реализирането на тази възможност изисква поелементна оптимизация на ограждащите елементи (стени, покриви, подове, др.) на сградите, с оглед повишаване на тяхната енергийна ефективност. Моделът е построен, като са въведени критериите за качество - защита от конденз и физиологичен комфорт. Построена е функцията на сумарните специфични годишни приведени разходи, изведени са функциите за оптимална дебелина на изолацията и минималните специфични годишни приведени разходи. В модела се съдържат определящите икономическата ефективност топлофизически, конструктивни и икономически

показатели и коефициенти, а именно:технологично желаната температура на въздуха в сградата (^0C); температурата на атмосферния въздух (^0C); падът между температурите в сградата и вътрешната повърхнина на стените (^0C); коефициентът на топлопредаване от въздуха в сградата към вътрешната повърхнина на стените (*W/m.K*); температурата на вътрешната повърхнина на стените (^0C), при която се образува конденз (температура на росата); температурата на стената (^0C); допустимият пад между температурите на сградния въздух и вътрешната повърхнина на стената, осигуряващ физиологичен комфорт в сградата (^0C); срокът за възстановяване на кредита (*год.*); коефициентът (индексът) на икономическа ефективност на капиталовложенията (кредита); сумарни специфични годишни приведени разходи (*лв./ m^2.год.*); дебелината на външните слоеве на стената (*m*); дебелината на въздушните междини (*m*); дебелината на топлоизолационния слой (*m*); дебелината на пароизолационното (пакетиращото) фолио (*m*); коефициентът на топлопредаване от външната повърхнина на стената към околната среда (*W/m.K*); коефициентите на топлопренасяне на материалите, от които са направени външните плоскости на стените (*W/m.K*); коефициентът на топлопренасяне на сухия въздух (*W/m.K*); коефициентът на топлопренасяне на топлоизолационния материал (*W/m.K*); коефициентът на топлопренасяне на пароизолационното фолио (*W/m.K*); загубите на енергия през стената (*kWh/m^2*); амортизационната норма – годишна/месечна(%); финансовият ресурс, необходим за изпълнение на санирането чрез топлоизолация (*лв./m^2*); стойностите на атмосферната температура през интервал от 2^0C; продължителността на задържане на атмосферната температура (*h*) в интервал през 2^0C; цената на енергията (*лв./kWh*) според използвания енергоносител; цените на материалите (*лв./m^3*), от които са изработени външните повърхности на стените; цената на топлоизолационния материал (*лв./m^3*), използван за саниране; икономически оптималната дебелина на топлоизолацията (*m*); минимално допустимите дебелини на изолацията (*m*), осигуряващи защита от образуването на конденз и физиологичен комфорт; минималните сумарни специфични годишни приведени разходи (*лв./m^2.год.*).

Формулирана е целевата функция на технико-икономическия модел [40] за енергоефективно ограждение за сгради, така че на всеки един етап от процеса на на изпълнение да се установява и управлява условието за абсолютно предимство. Това се постига чрез извеждане функцията на сумарните

специфични годишни приведени разходи (*лв./m^2.год*.), сумарните специфични годишни загуби на енергия, обема на инвестицията, в т.ч. допълнителните начисления за рентабилност на вложения човешки труд, за доставно-складови операции и за печалба, които се свързват с геометричните коефициенти на подобие и критериите на подобие за време и маса; динамичният критерий на подобие на Нютон, т.е. технико-икономическия модел на елемента се свързва със съответните критерии за подобие, заложени в експерименталния модел. Моделирано е минималното изолационно ниво на ограждението и са изведени условията за минимални капиталови разходи за изолацията.

От извършения анализ на методите за моделиране икономическата ефективност и оценка на проектите за саниране на сгради чрез топлоизолация следва, че:

- разработването на методи, теоретични и приложни методики и нормативи за оценка технико - икономическата ефективност ще предопредели бъдещето на проектите за саниране на сградите чрез топлоизолация;
- категорията „икономическа ефективност” като цяло в икономиката при оценката на проекти, в т.ч. и за енергийна ефективност, не е изчерпателно и еднозначно развита;
- когато се предлагат проекти за саниране на сградите, водещи до намаляване на разхода на енергия, обобщен показател е намаляването на сумарните специфични годишни приведени разходи. Изчерпателен е последният критерий. Въз основа на него се построяват функциите на сумарните специфични годишни приведени разходи, които предполагат възможността за оптимизация на показателите и минимизация на обема на капиталовите разходи;
- моделите за оценка на икономическата ефективност на проекти за саниране на сгради чрез топлоизолация следва да се базират на минималното и максималното ниво на инвестицията, съобразно показателите за защита от конденз и осигуряване на физиологичен комфорт;
- ефективността на усвояване на паричния поток ще нарастне при условие, че се прилагат схеми на мениджмънт на проектите за саниране с отчитане на сезонния характер на енергопотреблението и очакваните икономии от енергия и произтичащия от тези икономии дисконт (отбив) при своевременното изплащане на инвестицията.

• Динамичните методи за оценка на инвестициите в саниране на сгради чрез топлоизолация могат да бъдат прилагани при спазване на следните условия за тяхната модификация:

1) нетният паричен поток следва да се формира от стойностното изражение на постигнатото ниво на икономия на енергия, определено по текущи цени на използвания енергоизточник и при отчитане на физическото изхабяване на изпълнената топлоизолационна система;

2) адекватно определяне на нормата на дисконтиране, предвид обстоятелството, че инвестицията в саниране е едноактен процес и нейното изплащане стартира впоследствие от генерираната икономия на енергия;

3) срокът на възвръщане на инвестицията в саниране не трябва да надхвърля техническия експлоатационен срок на изпълнената топлоизолационна система, тъй като в противен случай, това обстоятелство категорично определя инвестицията като икономически неефективна.

Софтуерен продукт, използван при обучение на лица за придобиване на правоспособност за обследване на сгради за саниране

Създаден е софтуера ENSI [41] с две съставни части: за моделно обследване на сградите и пресмятане на финансовите параметри на проекта.

Част 1. Моделно обследване на обекта. Обследването се извършвасъобразно метода определен с БДС EN 832 и ENISO 13790. Сградата се въвежда като интегрирана система, в която като едно цяло се свързват: сградни ограждащи конструкции и елементи; системи за поддържане на микроклимата; вътрешни източници на топлина; обитателите; климатичните условия. Софтуерът съдържа 14 модула. Сле стартиране на програмата се маркира името на проекта. В общите входни данни се въвждат типа на сградата, климатичната зона, изчислителната температура, началото и края на отоплителния сезон, типа на сградата, основните параметри на сградата, отоплението, вентилацията, осветлението, битовото горещо водоснабдяване, вентилатори, помпи. Програмата работи в два режима – опростено и детайлно описание. В режим *„опростеното описание"* чрез програмата се пресмятат: отопляема площ; площ стени, прозорци, покрив, под; брутен обем; нетен отопляем обем. В режим *„детайлно описание"* данните се нанасят като се разпределят по осемте посоки (север, североизток, изток, югоизток, юг, югозапад, запад, северозапад). Отчитат се прозрачните и непрозрачни части, дела на преминалата слънчева радиация, степента на

инфилтрация на атмосферен въздух, приносите от вентилацията, осветлението и електрическите уреди.

Задават се енергоспестяващи мерки по сградната обвивка и пресмята промяната на съответния параметър коефициенти на топлопреминаване, инфилтрация и енергопреминаване): допълнителна изолация, външни стени; уплътнение на фугите във фасадите; ремонт на вратите; ремонт на входните врати; нови врати; нова входна врата на сградата; ремонт на прозорците; нови прозорци; допълнителна изолация покрив; допълнителна изолация под. По подобен начин се задават и оценяват енергоспестяващите мерки по отношение на вентилацията и отоплението, които в случая няма да се коментират, тъй като не са предмет на настоящото изследване.

В диалоговия прозорец "Енергоспестяващи мерки" се отпечатват очакваното намаляване на специфичния разход на енергия за стените, прозорците, пода и покрива в *kWh/m*^{2} и годишнияразход на енергия в *kWh*за сградата.

Част 2. Технико-икономическа оценка на мерките и проектите за енергийна ефективност. Целта на оценката е: да се установи дали проекта е печеливш или не; да се сравнят и поредат по важност различните мерки и проекти; да се установи дали финансовите показатели на проекта удоволетворяват финансиращата проекта банка. Въвеждат се: инвестиционните разходи, свързани с проекта; нетните годишни икономии в натурално изражение; цените на енергоносителите за периода на проекта; техническия/икономически живот на проекта; лихвени проценти; ниво на инфлацията.Последователно, след въвеждане на данните, се изчисляват рентабилността и паричния поток.

Модулът „Изчисления на рентабилността" позволява определянето на рентабилността по шест показателя: срок на откупуване (PB); нетна сегашна стойност (NPV); коефициент на нетната сегашна стойност $(NPVQ)$; вътрешна норма на възвръщаемост (IRR); срок на изплащане (PO); максимална инвестиция. Мерките за икономия на енергия се класират по всеки от шестте критерия, като мярката с най-висок коефициент на нетната сегашна стойност $(NPVQ)$ се определя като най-рентабилна. Всички мерки с $NPV \succ 0$ са рентабилни и обратно $NPV \prec 0$ се маркират като нерентабилни.

Модулът „Изчисления на паричен поток" съдържа списък на заложените варианти за проекта. Фиксират се условията за заема. За всеки вариант се изчисляват и сравняват: икономиите по години на живот на проекта; разходи за експлоатация и поддръжка; нето икономии; заем; нето паричен поток; акумулиран паричен поток.

ЗАКЛЮЧЕНИЕ

Въз основа на разгледаните теоретико-методически аспекти на изграждането на модели за подобряване състоянието на сградите чрез саниране посредством топлоизолационни материали и за оценка на инвестициите за тяхното изпълнение могат да се формулират следните **изводи**:

- Подобряването на състоянието на сградите чрез саниране посредством топлоизолационни материали, има доказано съществено значение за ограничаване на крайното потребление на енергия и свързаните с него емисии на парникови газове.
- Множеството параметри, които характеризират процеса на саниране и дефинирането на зависимостите между тях налагат прилагането на подхода „системно моделиране".
- Към днешна дата, в съответствие с изискванията на ЕС за повишаване енергийната ефективност на сградите във всяка от държавите-членки, в България са разработени, приети и въведени за целта стратегически и нормативни документи, в които са предвидени конкретни насоки/целеви параметриза подобряване на енергийните характеристики на сградния фонд.
- Създадени са кредитни финансови инструменти с цел подпомагане на процеса, достъпът до които се осъществява посредством търговските банки.
- Разработени са редица варианти на архитектурно-строителни детайли за саниране на сгради чрез топлоизолация, чието изпълнение се базира на множеството предлагани на пазара разнородни топлоизолационни материали. Детайлите указват необходимите изолационни слоеве и тяхното място в ограждащия елемент.
- Инвестиционният характер на разходите за изпълнение на саниране чрез топлоизолация обосновава прилагането на динамичните методи от финансовата теория при оценката на тяхната икономическа ефективност.В допълнение, релевантните директиви на ЕС поставят условието, при което да се осъществява

обновяването на сградите - начинът на неговото изпълнение да позволява възвращаемост на вложенията в саниране посредством натрупаните енергийни спестявания в рамките на разумен срок, съотносим с очаквания технически живот на използваните индустриални продукти.

Изложените изводи открояват следните **проблеми и въпроси**:

• Въведените нормативни документине гарантират изпълнението на мерките, свързани със саниране на сгради чрез топлоизолация в необходимия мащаб за националната икономика, тъй като инициативата за тяхното изпълнение е прехвърлена към собствениците на сгради и не отчита техните финансови възможности. Още повече, процесът на изпълнение на мерките за повишаване енергийната ефективност на сградите е усложнен от поставените изисквания и ограничения за лицата, които имат право да извършват обследване на енергийните характеристики на сградите и същественият размер на разхода за неговото извършване.

• Предлаганите архитектурно – строителни детайли за саниране на сградите чрез топлоизолация не дават на заинтересованите икономически субекти достатъчно яснота за потенциалните възможности за постигане икономия на енергия и факторите, които я определят.

• Предлаганите от търговските банки кредитни финансови инструменти за подобряване състоянието на сградния фонд чрез саниране на ограждащите елементи не успяват да убедят икономическите субекти в своята адекватност, поради:частичното и фиксирано до определена сума финансиране само на определен вид инвестиционни разходи за саниране; несъобразеност на кредитните условия среалните финансови възможности на субектите; липсата на информация за възвръщаемосттана инвестициите в саниране, реалните възможности за постигане икономия на енергия и възвръщаемост,

Изложените проблеми предпоставят процеса за подобряване състоянието насградния фондчрез саниране на ограждащите елементи да протича много бавно.

Целта на настоящия дисертационен труд е да предостави цялостно изследване на инвестициите в саниране на сгради чрез топлоизолация, чрез което да даде на заинтересованите икономически субекти необходимата яснота за:

- начина на определяне на инвестиционните разходи според избрания вариант за саниране,
- факторите, които оказват влияние върху размера на инвестицията;
- възможностите за възвръщаемост на вложените средства, въз основа на които да се направи предварителна оценка за икономическата ефективност на избраното решение за саниране чрез топлоизолация.

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Factors and a system of models for measuring their impact on the economic efficiency of investment in improving buildings condition

Abstract. The making of a model for management of buildings condition needs at first place to identify factors and their potential influence. As such has been recognizes the thickness of the thermoinsulation material, the energy savings provided by this material, the prices for the energy source used in the building and the size of investment in laying the thermoinsulation on the building. Measuring the impact of each factor requires specific analytical model. In addition, all these models can be combined in a system for evaluating the economic efficiency of an investment in overall building thermoinsulation. Expectations are that this system of models will allow to appraise in advance any investment when choosing among multitude thermoinsulation materials and having different energy sources within the building.

Key words: economic efficiency, energy efficiency, investment models.

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Фактори, определящи размера на инвестициите в повишаване на енергийната ефективност на сградите

Обект на моделиране са технически възможните варианти за саниране – външно и вътрешно полагане на изолацията. Изпълнителите по правило отдават приоритетна външното полагане на топлоизолацията, но клиентите следва да получават отговор и на въпроса доколко е приемливо и целесъобразно вътрешното полагане. Всеки от вариантите имат своите предимства и недостатъци [1].

Външно полагане на топлоизолацията:

предимства – външните стени през лятото се нагряват по-слабо, като се намалява акумулираното количество топлина във външните стени, освежава се фасадата на сградата;

недостатъци - изолацията от нагряването на стените и покривите през лятото старее по-бързо; разходите за изпълнение на топлоизолацията се повишават вследствие използването на скеле, защитни ограждения и транспорт;от нормативна гледна точка се изисква съгласието, а в някои случаи и участието със средства, на всички собственици на обособени имоти в сградата за процедурата на саниране; губят се средства за подобряване на вътрешния интериор на сградите, особено общинските, каквито са училищата, детските градини, болници и пр.

Вътрешно полагане на топлоизолацията:

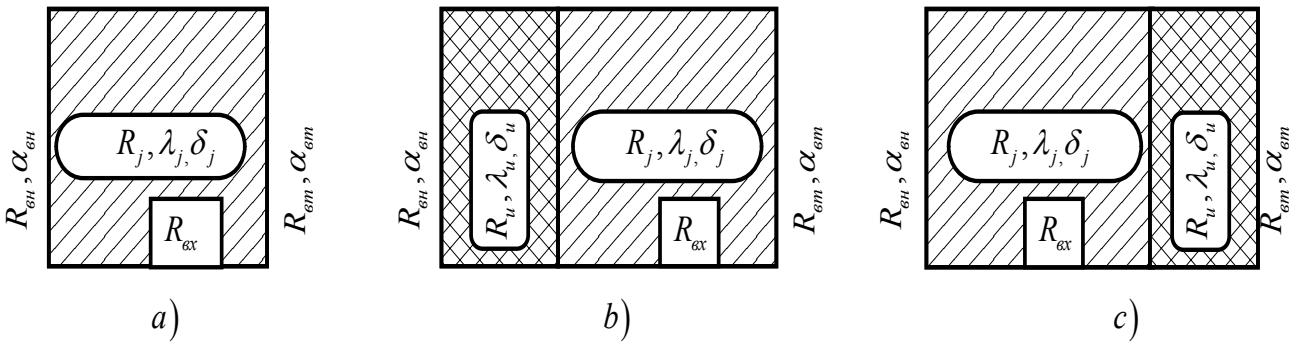
предимства – физическото остаряване на топлоизолацията се забавя; разходите за направа на вътрешната изолацияса по-ниски в сравнение с

външното й полагане; всеки собственик самостоятелно взема решение за саниране на жилището си; ограничава се акумулацията на топлина през зимата в ограждащите стени; увеличава се акумулираното количество топлина във вътрешните преградни стени;

недостатъци – увеличава се акумулираното количество топлина от външните стени през лятото.

Графично вариантите за изпълнение на топлоизолация са представени на *фиг.1*. Определящите параметри и зависимостите между тях саизведени от нормите за проектиране на топлоизолацията на сгради [2], схемите за изпълнение на топлоизолацията (*фиг.1*) иметодиката за определяне на очакваната икономия на енергия [3].

Размерът на инвестицията за направа на топлоизолацията зависи както от техническите характеристики и цените на влаганите материали, така и от варианта на изпълнение – външно или вътрешно полагане. Изчисляването на т. нар. анализна цена (поелементна калкулация) за изпълнението на 1 кв.м. топлоизолация се извършва съгласно трайно възприети в практикатауедрени сметни норми (УСН) в строителството [4], както и посредством специализиран софтуер – в конкретния случайBuilding Manager [5] (*табл.1*).



Фиг.1. Схема и определящи параметри на вариантите
за изпълнение на изолацията
(a – преди полагане на изолацията; b – външно полагане на изолацията;
c – вътрешно полагане наизолацията)

Таблица 1

Елементи и зависимости, определящиразмера на инвестицията в саниране на сгради чрез топлоизолация		
	Вариант на изпълнение	
Анализна цена (*лв./м*^{2})	външно полагане	вътрешно полагане
Разходна нормана	$T_{вн}$	$T_{вт}$

труд (*лв./ч.ч.*)		
Допълнителни разходи към труда (*лв.*)	$п_Т . Т_{вн}$	$п_Т . Т_{вт}$
Разходна норма на материали (*лв./м²; лв./кг; лв./м³*)	$М_{вн}=(\delta_и . S_и + М_{допвн})$	$М_{вт}=(\delta_и . S_и + М_{допвт})$
Допълнителни разходи за материали (*лв.*)	$п_М . М_{вн}$	$п_М . М_{вт}$
Разходи за механизация (*лв.*)	$С_{вн}$	*неприложимо*
Допълнителни разходи за механизация(*лв.*)	$п_с . С_{вн}$	*неприложимо*
Печалба	$п_{пч.}(Т_{вн+} п_Т . Т_{вн+} М_{вн+} п_М . М_{вн+} С_{вн+} п_с . С_{вн})$	$п_{пч.}(Т_{вн+} п_Т . Т_{вн+} М_{вн+} п_М . М_{вн})$

Алгоритъмът за калкулиране на анализна цена принципно е унифициран независимо от вида на строително-монтажната работа (СМР), която се изпълнява и обхваща разходите за труд, материали и механизация, както и свързаните с тях допълнителни разходи.

Разходите за труд се остойностяват въз основа на вложеното време труд, измерено в човекочасове (ч.ч.) за съответния вид СМРи определеното възнаграждение за 1 човекочас. Необходимостта от начисляване на допълнителни разходи за труд произтичат от нормативните изисквания за социално осигуряване и използването на лични предпазни средства при изпълнение на СМР, а в някои случаи и с осигуряване на транспорт на наетите лица до мястото на изпълнение на строителните дейности. Възприето е допълнителните разходи за труд да се изчисляват като процент от стойността на същинския разход на труд, който варира от 70% до 100%.

Разходите за материали се остойностяват въз основа на количеството вложени материали (*кг, лм, м², м³, бр.*, т.н.) и тяхната нетна цена (без косвени данъци) за единица количество. Начисляването на допълнителни разходи за материали произтича от съпътстващи доставно-складови дейности при изпълнение на СМР и евентуално минимално превишаване на заложената разходна норма на използваните материали. Аналогично, допълнителните разходи за материали се определят като процент от стойността на същинските разходи за материали в границите 10-15%.

Разходите за механизация произтичат от употребата на различни машини и оборудване в хода на изпълнение на СМР и свързаните с тях дейности по монтаж и демонтаж. Остойностяването на тези разходи, когато са свързани с използването на специализирана машина, се извършва на база количеството време работа на машината, измерено в машиночасове (мшч.) и съответното му възнаграждение (цена, без косвени данъци). Когато механизацията се свежда до монтаж и демонтаж на специализирано оборудване, в случая строително скеле, то разходите представляват стойността (заплащането) на разходеното време за изпълнение на монтажните дейности. Допълнителните разходи за механизация произтичат от наложителните дейности по поддръжка и евентуален ремонт на оборудването, както и от съпътстващата неговата употреба физическа амортизация. В зависимост от вида на оборудването и интензивността на неговото използване допълнителните разходи за механизация варират от 30% до 100% от стойността на същинските разходи за механизация.

Въз основа накалкулативните схеми от *табл.1* и вариантите на изпълнение, за определяне на размера на необходимата инвестиция за 1 кв.м. топлоизолация, са изведени зависимостите:

- за външно изпълнение

$$K_{вн} = (1 + п_{пч})\left[(1 + п_{Т})T_{вн} + (1 + п_{М})(\delta_{и}S_{и} + M_{допвн}) + (1 + п_{С})C_{вн}\right] \quad (1),$$

- за вътрешно изпълнение

$$K_{вт} = (1 + п_{пч})\left[(1 + п_{Т})T_{вт} + (1 + п_{М})(\delta_{и}S_{и} + M_{допвт})\right] \quad (2),$$

където:

$п_{М}$, $п_{Т}$, $п_{С}$ и $п_{ПЧ}$са процентите съответно за допълнителен разход на материали, труд, механизация и за печалба (%),

$\delta_{и}$ - дебелината на положената изолация (*м),*

$K_{вн}$,$K_{вт}$ - размерът на инвестицията съответно при външно и вътрешно полагане на изолацията (*лв./м*^{2}).

Независимо от обстоятелството кой от вариантите за изпълнение на саниране чрез топлоизолация ще бъде избран – външно или вътрешно полагане, всеки от тях следва да отговаря на две ключови условия – защита от образуване на конденз и икономическа ефективност [6].

Защитата от образуване на конденз практически е условие за качество на изпълнение на топлоизолациятаи фиксира базисното (минимално от гледна точка

на качеството) ниво на дебелината на изолацията, регламентирано съгласно нормите за проектиране на топлоизолацията на сгради:

$$\delta_u = \left[\frac{\left(t_i - t_{e_i}\right)}{\Delta t.\alpha} - R \right].\lambda_u \qquad (3),$$

където t_i е изчислителната (технологично желаната) температура на въздуха вътре в сградата, ${}^0C$;

t_e - изчислителната температура на външния (атмосферен) въздух, ${}^0C$;

Δt - температурният пад между температурата на вътрешния въздух и температурата на вътрешната повърхнина на стената, ${}^0C$;

α - коефициентът на топлопредаване от вътрешния въздух към вътрешната повърхнина на стената, $W/m^2.K$.

R – съпротивлението на топлопреминаване на ограждението преди санирането, $m^2.K/W$.

Изпълнението на условието за икономическа ефективност означавасумарните специфични приведени разходи за изпълнението и поддръжката на топлоизолацията да бъдат минимални. Това условие се удовлетворява, в случай чедебелината на изолацията има оптимален размер:

$$\delta_{u_{opt}} = \sqrt{\frac{\sum_1^n \left(t_i - t_{e_i}\right).\tau_{0_i}.10^{-3}.S_e.\lambda_u}{E.S_u}} - R.\lambda_u \qquad (4),$$

където $\delta_{u_{opt}}$ е икономически ефективната дебелина на изолацията (м),

S_e - цената на икономисаната (спестена) енергия, $лв/kW.h$,

$\tau_{0_{ij}}$ - часовете на задържане на стойностите на температурите на атмосферния въздух през отоплителния сезон по месеци (h),

S_u – цената на топлоизолационния материал (*лв./м*^{3}),

λ_u - коефициентът на топлопроводност на изолационния материал, $W/m^2.K$.

Моделиране влиянието на базисното ниво на инвестицията в саниране чрез топлоизолация

Базисното (минимално) ниво на инвестицията за изпълнение на санирането се определя от тази дебелина на съответния топлоизолационен материал, при

която за всяко от помещенията на сградата няма да се образува конденз. При определянето на минимално необходимата инвестиция следва да се изходи от основния топлофизически показател, определящ нивото на изолация - съпротивление на топлопреминаване, което се нормира [7] и се определя според зависимостта:

$$R = \frac{\left(t_i - t_{e_i}\right)}{\Delta t.\alpha} \qquad (5),$$

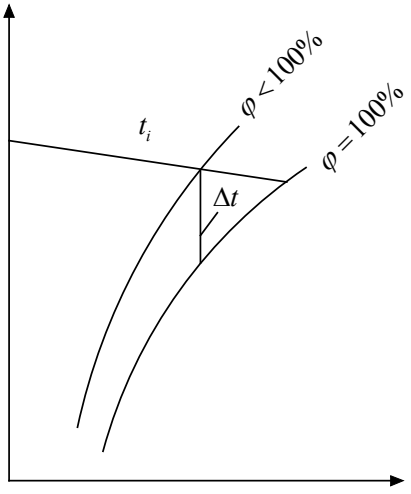
където t_i е изчислителната (технологично желаната) температура на въздуха вътре в сградата, ^0C;

t_{e_i} - изчислителната температура на външния (атмосферен) въздух, ^0C;

Δt - температурният пад между температурата на вътрешния въздух и температурата на вътрешната повърхнина на стената, ^0C;

α - коефициентът на топлопредаване от вътрешния въздух към вътрешната повърхнина на стената, $W/m^2.K$.

Коефициентите n и α са нормативно определени, като за външни стени техните стойности са съответно n = 1 и α = 8,7 $W/m^2.K$ [8]. Температурният пад Δt също е регламентиран в нормите за проектиране топлоизолацията на сгради, но е определен само спрямо температурните условия, без да се отчита влиянието на относителната влажност на вътрешния въздух. Влажността се отразява много чувствително върху пада. За установяване на връзката между пада и влажността е направена преценка при температура на вътрешния въздух от 5^{0}C до 30^{0}C и вариране на неговата относителна влажност от 40% до 95%. Използвана е I-Dдиаграмата за влажния въздух [9] (*фиг.2*).



Фиг. 2. Разположение на температурният падмежду температурата на вътрешния въздух и температурата на вътрешната повърхнина на стената наI-Dдиаграмата

Повърхнината на разпределение на температурния пад в зависимост от промяната на относителната влажност на вътрешния въздух е представена на *фиг.3*. Тази повърхнина ще определя и варирането на инвестицията в саниране на стенитевъв функция от относителната влажност на вътрешния въздух.

В аналитичен вид връзката може да се представи като полином от втори ред:

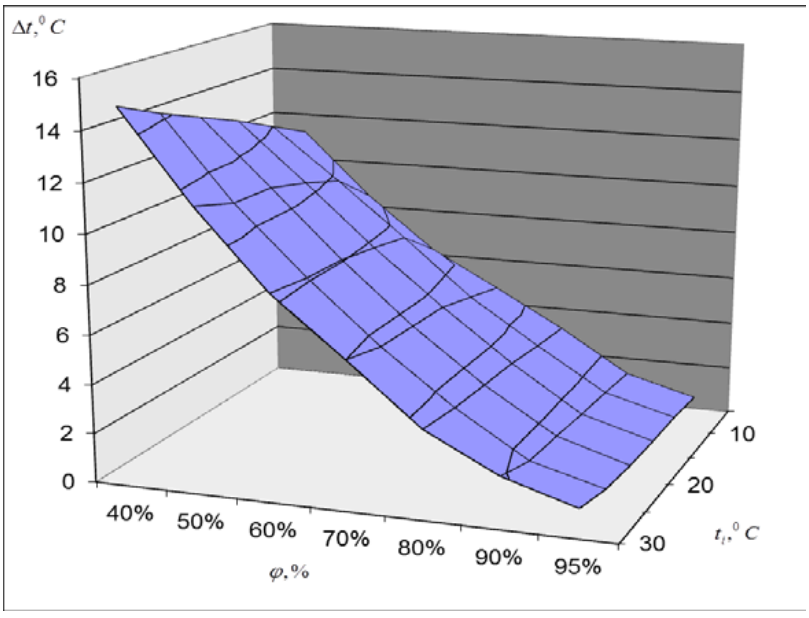
$$\Delta t = A.\varphi^2 + B.\varphi + C \qquad (6),$$

където A,B и C са коефициентите на регресионните модели (за някои от изследваните модели тези коефициенти са представени в *табл.2*),

φ - относителната влажност на въздуха в съответното помещение, %.

Таблица 2

Регресионни модели на температурния пад		
Температура, ^{0}C	Уравнение	Корелация
30	$\Delta t = 22.248\varphi^2 - 54.849\varphi + 33.32$	$R^2 = 0.9995$
25	$\Delta t = 17.397\varphi^2 - 47.724\varphi + 30.459$	$R^2 = 0.9999$
20	$\Delta t = 12.0998\varphi^2 - 39.854\varphi + 27.584$	$R^2 = 0.9998$
15	$\Delta t = 8.468\varphi^2 - 33.799\varphi + 25.03$	$R^2 = 0.9998$
10	$\Delta t = 7.378\varphi^2 - 30.97\varphi + 23.31$	$R^2 = 0.9994$
5	$\Delta t = 10.55\varphi^2 - 33.156\varphi + 22.605$	$R^2 = 0.9974$



Фиг. 3. Повърхнина на разпределение на температурния пад

във функция от относителната влажност на вътрешния въздух

В зависимост от температурният пад, като се отчита и влиянието на относителната влажност на въздуха в помещението, чрез уравнение (5) се получават стойностите за съпротивлението на топлопреминаване $R_{K\min}$, при които се осигурява защитата от конденз. Тези стойности се приемат за минимално допустимите, които трябва да се постигнат в резултат на санирането, като

$$R_{K\min} = \frac{1}{\alpha} + \frac{1}{\alpha_0} + \sum_1^n \frac{\delta_{c_i}}{\lambda_{c_i}} + \frac{\delta_{u_{\min}}}{\lambda_u} \qquad (7),$$

където α_0 е коефициентът на топлопредаване от външната повърхнина на стената към външния въздух, $W/m^2.K$;

δ_{c_i} - дебелините на съставните слоеве на стената, m;

λ_{c_i} - кофициентите на топлопроводност на материалите, от които са направени съставните слоеве на стената, $W/m\ .K$.

От формула (7) се извежда зависимостта за определяне на дебелината на изолационния слой, осигуряващ защитата от конденз:

$$\delta_{u_{\min}} = \left[R_{K_{\min}} - \left(\frac{1}{\alpha} + \frac{1}{\alpha_0} + \sum_1^n \frac{\delta_{c_i}}{\lambda_{c_i}} \right) \right] \lambda_u \qquad (8),$$

Минималното ниво на инвестицията при външно и вътрешно полагане на топлоизолацията може да се определи, като се извърши остойностяване на санирането на стените при дебелина на изолацията $\delta_{u_{\min}}$ съгласно алгоритъма на калкулативните схеми (2.1) и (2.2), които придобиват вида

- при външно изпълнение

$$K_{вн_{\min}} = (1 + п_{пч}) \left[(1 + п_T) T_{вн} + (1 + п_M) \left(\delta_{u_{\min}} S_u + M_{допвн} \right) + (1 + п_C) C_{вн} \right] \qquad (9),$$

- при вътрешно изпълнение

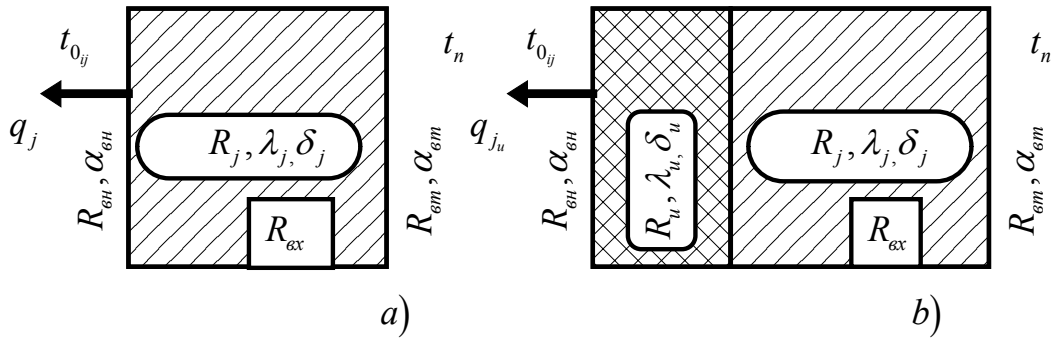
$$K_{вт_{\min}} = (1 + п_{пч}) \left[(1 + п_T) T_{вт} + (1 + п_M) \left(\delta_{u_{\min}} S_u + M_{допвт} \right) \right] \qquad (10).$$

Моделиране влиянието на икономията на енергия

Изходни условия

Съпротивлението на топлопреминаване на даден обект се установява чрез непосредствено измерване, като се използват действащите норми за проектиране на отоплителните инсталации на сградите и се отчитавлиянието на климатичния

район. Границите на промяна на съпротивленията на топлопреминаване са от 1 до 2,5 $m^2.K/W$ [10].



Фиг. 4. Изчислителни схеми за параметрите на стената преди (a) и след санирането (b)

Построяване на модела

За точно определяне на топлинните загуби на помещенията, нивото на съпротивленията на топлопреминаване следва да се отчита преди и след полагане на топлоизолацията. Съпротивленията на топлоотдаване от вътрешната $R_{вт}$ и външната страна $R_{вн}$ на ограждението не се променят. Реално съпротивленията на топлопреминаване след санирането нарастват според отношението δ_u / λ_u [11](*фиг.4*). Съгласно поставените изходни условия са изведени зависимостите:

-преди полагане на изолацията

$$(2.11)\quad Q_{mз} = Q_m + Q_в\,, \qquad (2.12)\quad Q_m = \sum_j q_j$$

$$(2.13)\quad q_j = \frac{(t_n - t_{из} - \Delta t_a).z_0}{R_{вт} + \sum_j R_j + R_{вх} + R_{вн}}, \qquad (2.14)\quad q_j = k.f.(t_n - t_{из} - \Delta t_a).z_0\,,$$

$$(2.15)\quad k = \frac{1}{R_{вт} + \sum_j R_j + R_{вх} + R_{вн}};$$

- след полагане на изолацията

$$(2.16)\quad Q_{mз_u} = Q_{m_u} + Q_{в_u} \qquad (2.17)\quad Q_{m_u} = \sum_j q_{j_u}\,,$$

$$(2.18)\quad q_{j_u} = \frac{(t_n - t_{из} - \Delta t_a).z_0}{R_{вт} + \sum_j R_j + R_{вх} + R_{вн} + R_u} \qquad (2.19)\quad q_{j_u} = k_u.f.(t_n - t_{из} - \Delta t_a).z_0$$

$$(2.20)\quad k_u = \frac{1}{R_{вт} + \sum_j R_j + R_{вх} + R_{вн} + R_u}, \qquad (2.21)\quad \Delta q_j = q_j - q_{j_u},$$

$$(2.22)\quad И_{e_i} = \frac{\delta_{u_i}}{R.(R.\lambda_{u_i} + \delta_{u_i})}.D.10^{-3}.S_e, \qquad (2.23)\quad D = t_i.G_{m\times n} - F_{m\times n}.G_{m\times n},$$

$$(2.24)\quad F_{m\times n} = \begin{vmatrix} t_{0_{11}} \\ \dots \\ t_{0_{i1}} \\ \dots \\ t_{0_{n1}} \end{vmatrix}, \quad (2.25)\quad G_{m\times n} = \begin{vmatrix} \tau_{0_{11}}\tau_{0_{12}}\dots\tau_{0_{1j}}\dots\tau_{0_{1m}} \\ \dots\dots\dots\dots\dots\dots\dots \\ \tau_{0_{i1}}\tau_{0_{i2}}\dots\tau_{0ij}\dots\tau_{0_{im}} \\ \dots\dots\dots\dots\dots\dots\dots \\ \tau_{0_{n1}}\tau_{0_{n2}}\dots\tau_{0_{nj}}\dots\tau_{0_{nm}} \end{vmatrix},$$

където $Q_{mз}, Q_{mз_u}$ са топлинните загуби преди $(Q_{mз})$ и след полагане $(Q_{mз_u})$ на изолацията, W/m^2;

Q_m, Q_{m_u} - загубите от топлопреминаване през стената преди (Q_m) и след (Q_{m_u}) полагане на изолацията, W/m^2;

$Q_в, Q_{в_u}$ - топлината, необходима за подгряване на постъпващия външен въздух (инфилтрацията) преди $(Q_в)$ и след $(Q_{в_u})$ полагане на золацията, W/m^2;

q_j, q_{j_u} - потоците на топлинните загуби преди и след полагане на изолацията, W/m^2;

t_n - температурата на въздуха в помещението, ^0C;

$t_{из}$ - изчислителната температура на външния въздух, ^0C;

Δt_a - корекционната температурна разлика, ^0C;

z_0 - корекционният коефициент за небесна ширина;

f - повърхнината на строителния елемент, m^2;

k, k_u - коефициентите на топлопреминаване преди (k) и след полагане (k_u) на топлоизолация, $W/m^2.K$;

$\alpha_{вт}$ - коефициентът на топлоотдаване на вътрешната повърхнина, $W/m^2.K$;

$\alpha_{вн}$ - коефициентът на топлоотдаване на външната повърхнина, $W/m^2.K$;

δ_j - дебелината на съответния слой от стената, m;

λ_j - коефициентът на топлопроводност на съответния слой от стената, $W/m.K$;

$R_j = \frac{\delta_j}{\lambda_j}$ - съпротивлението на топлопроводност на j – я слой от строителния елемент, $m^2.K/W$;

$R_{вт} = \frac{1}{\alpha_{вт}}$ - съпротивлението на топлоотдаване на вътрешната повърхнина на строителния елемент, $m^2.K/W$;

$R_{вн} = \frac{1}{\alpha_{вн}}$ - съпротивлението на топлоотдаване на външната страна на строителния елемент, $m^2.K/W$;

$R_u = \frac{\delta_u}{\lambda_u}$ - съпротивлението на топлопроводност на изолационния слой от строителния елемент, $m^2.K/W$;

$R_{вх}$ - съпротивлението на въздушен пласт, $m^2.K/W$;

δ_{u_i} - дебелината на изолационният слой, m;

λ_{u_i} - специфичният коефициент на топлопроводност на изолационния материал, $W/m.K$;

R_c - съпротивлението на топлопреминаване на стената (ограждението) преди саниране, $m^2.K/W$;

R - съпротивлението на топлопреминаване на стената (ограждението) след саниране, $m^2.K/W$;

S_e - цената на икономисаната енергия, $лв/kW.h$;

t_i - поддържаната отоплителна температура в сградата, ^0C;

$F_{n\times m}$ - детерминантата на разпределение на температурите на атмосферния въздух през отоплителния сезон;

$G_{n\times m}$ - детерминантата на часовете на задържане на стойностите на температурите на атмосферния въздух през отоплителния сезон;

$t_{0_{ij}}$ - стойностите на атмосферния въздух през отоплителния сезон, ^0C;

$\tau_{0_{ij}}$ - часовете на задържане на стойностите на температурите на атмосферния въздух през отоплителния сезон, h.

Зависимост между топлофизичните характеристики и цените на иновативните индустриални продукти за топлоизолация

Параметрите за класифициране на топлоизолационните материали в строителството, по отношение на топлофизическите им характеристики, се представят по групи съобразно вида и предназначението им [12], а именно: естествени камъни (обемна плътност ρ = 1700 ÷ 2800 *kg/m*^{3}, специфичен топлинен капацитет *c*=840 ÷ 920 *J/kg.K*, коефициент на топлопроводност λ =0.93 ÷ 3.49 *W/m.K*); бетони (обемна плътност ρ = 850 ÷ 2500 *kg/m*^{3}, специфичен топлинен капацитет *c*=840 ÷ 1450 *J/kg.K*, коефициент на топлопроводност λ =0.14 ÷ 1.63 *W/m.K*); разтвори и мазилки (обемна плътност ρ = 350 ÷ 1800 *kg/m*^{3}, специфичен топлинен капацитет *c*= 920 ÷ 1050 *J/kg.K*, коефициент на топлопроводностλ =0.1 ÷ 0.93 *W/m.K*); битуми и асфалтови материали и продукти (обемна плътност ρ = 500 ÷ 2100 *kg/m*^{3}, специфичен топлинен капацитет *c*=1050 ÷ 1460 *J/kg.K*, коефициент на топлопроводност λ =0.09 ÷ 0.7 *W/m.K*); зидарии (обемна плътност ρ = 900 ÷ 2680 *kg/m*^{3}, специфичен топлинен капацитет *c*=920 ÷ 1050 *J/kg.K*, коефициент на топлопроводност λ =0.9 ÷ 3.2 *W/m.K*); насипни материали (обемна плътност ρ = 150 ÷ 1600 *kg/m*^{3}, специфичен топлинен капацитет *c*=840*J/kg.K*, коефициент на топлопроводност λ =0.06 ÷ 1.1 *W/m.K*); почви (обемна плътност ρ = 1400 ÷ 2700 *kg/m*^{3}, специфичен топлинен капацитет *c*=840 ÷ 920 *J/kg.K*, коефициент на топлопроводност λ =1.5 ÷ 3.5 *W/m.K*); метални, гипсови и азбесто-циментови продукти (обемна плътност ρ = 500 ÷ 11500 *kg/m*^{3}, специфичен топлинен капацитет *c*=380 ÷ 840 *J/kg.K*, коефициент на топлопроводност λ = 0.35 ÷ 380 *W/m.K*); дърво и продукти от него (обемна плътност ρ = 400 ÷ 800 *kg/m*^{3}, специфичен топлинен капацитет *c*=1250 ÷ 2090 *J/kg.K*, коефициент на топлопроводност λ =0.081 ÷ 0.41 *W/m.K*); ефективни топлоизолационни материали (обемна плътност ρ = 15 ÷ 300 *kg/m*^{3}, специфичен топлинен капацитет *c*= 840 ÷ 1500 *J/kg.K*, коефициент на топлопроводност λ =0.06 ÷ 0.18*W/m.K*).

Санирането на сградите се осъществява, като се използват материали от групата „ефективни топлоизолационни", напримерминералната вата, чийто коефициент на топлопроводност $\lambda \leq 0.06$ *W/m.K*. Данните от извършено обстойно проучване на тази група материали са синтезирани в *табл.5*.

Данните, съдържащи се в *табл.5*, носят информация за определящите икономическата и архитектурно-строителна ефективност показатели на проектите за саниране на сгради. Налице са също и някои връзки между показателите, които е важно да се отбележат:

1. Материалите с повишена топлоизолационна способност (ниски стойности на коефициента на топлопроводност) са по-леки, в резултат на което масата на сградата ще нараства в по-малка степен при санирането. При равни други условия, и самата дебелина на изолационния слой, и степента на увеличаване на обема на сградата при външно полагане, както и намаляването на обема на помещенията при вътрешно полагане, също ще бъдат по-малки.

Таблица 5

Топлофизични характеристики и цени на ефективните топлоизолационни материали							
№	Топлоизолационни материали	Обемна плътност ρ (kg/m^3)	Спец. топл. капацитет c, $J/kg.K$	Коефициент натоплопроводност, λ ($W/m.K$)	Число на дифуз. съпр. на водна пара μ	Цена	
						мярка	лева
	2	3	4	5	6	7	8
	Минерална вата	200	840	0.041	1	m^3	138
	Корк експандиран	120	1670	0.041	10	m^3	4450
	Корк импрегниран	160	1670	0.041	22		
	Плочи от полистирен (на блокове)	15	1260	0.041	25		
		20	1260	0.041	35		
		25	1260	0.041	40		
		30	1260	0.041	45		
	Полистирен (формован в пресформа)	20	1260	0.041	40		
		25	1260	0.041	50		
		30	1260	0.041	60		
	Плочи от фенол, изрязани от	40	1260	0.041	35		

	блокове	60	1260	0.041	40		
	Плочи от полиуретан, изрязани от блокове	30	1380	0.035	40		
		40	1380	0.035	50		
	Поливинилхлоридни плочи	50	1260	0.041	200		
	Екструдиранполистирен	20	1500	0.030	80		
		60	1500	0.040	250		
0	Плочи от дървесни влакна	190	2000	0.045	10		
1	Дюшеци от стъклена вата	14	840	0.038	1		
		23	840	0.034	1		
		30	840	0.032	1		
		60	840	0.032	1		
		80	840	0.034	1		
2	Дюшеци и плочи от минерална вата	30	840	0.038	1		
		80	840	0.034	1		
		100	840	0.033	1		
		160	840	0.037	1		
		180	840	0.039	1		
3	Перлитови плочи	150	1000	0.060	5		
4	Пеностъкло	140	1100	0.060	∞		
5	Пенополиуретанова пяна	15	1500	0.025	30		
		80	1500	0.040	100		
6	Камъшит						
7	Гума	800	800	0.046	2		
8	Линолеум	1000	1470	0.160	10000		
		1200	1880	0.190	500		
9	Талашитови плоскости						
	над 15 mm	550	2010	0.140	11		

	над 25 mm	500	1670	0.099	8		
	над 35 mm	450	1670	0.093	6		
	над 50 mm	400	1670	0.081	5		

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2. Специфичният топлинен капацитет (коефициент на топлопоглъщане) на материалите с повишена топлоизолационна способност има по-ниски стойности и топлоакумулиращата им способност е по-малка.

3. От друга страна, цените на материалите с повишена топлоизолационна способност са по-високи.

Описаните взаимовръзки към настоящия момент не са били обект на взаимно изследване, с оглед получаването на съответни индекси за степента на промяна на геометричните размери и обемите, на акумулирането на топлина, на цената на вариантите при избора на изолационни материали и въвеждането им в технико-икономическите модели при проектирането на обектите.

Моделиране влиянието на дисконтирания паричен поток, генериран от икономията на енергия

Инвестиционните решения, които се вземат при саниране на сградите, се опират на базовата концепция за произтичащите икономии на енергия. Вследствие на тази икономия става възможно частично или пълно погасяване на финансовия ресурс, вложен в повишаването на енергийната ефективност на сградите. Предсрочното изплащане на вложените средства в случаите, когато имат характер на заемни средства, се очаква да бъде съпроводено с прилагането на дисконт (отбив) [13]. В този аспект възниква и необходимостта от изследване нивата на дисконта, който ще характеризира инвестиционния процес при реализация на проектите за саниране на сградите чрез топлоизолация. Към настоящия момент не са известни изследвания, касаещи влиянието на дисконта върху съкращаването сроковете на изплащане на кредитите, отпускани за санирането на сградите.

От значение е да се моделира и изследва дисконта, съобразно промяната на часградусите през отоплителния период и нивата на изменение на съпротивленията на топлопреминаване вследствие на санирането.

Дисконтът (сумата на отбива) $Д_{e_i}$, който се приема, че ще се приспада от задължението, вследствие на икономията на енергия за даден интервал от време (месец) $И_{e_i}$ се изразява посредством зависимостта

$$(2.26)\quad Д_{e_i} = \frac{И_{e_i}.\tau_i.d}{36000},$$

където $И_{e_i}$ е постигната (очаквана) икономия на енергия, лв;

τ_i - дисконтовият срок на предсрочното изплащане на частта от задължението, бр. дни;

d - нормата на дисконта(отстъпката), която се прави при предсрочното изплащане на 100 лв. дължима сума.

В стойностно изражение икономията на енергия се определя съгласно формулата (27), с отчитане на спецификата на процеса на изпълнение на топлинната изолация:

$$(2.27)\quad И_{e_i} = \sum_1^n \left[\frac{\left(t_i - t_{0_i}\right).\tau_{0_I}}{R} - \frac{\left(t_i - t_{0_i}\right).\tau_{0_i}}{R_c} \right].S_e.10^{-3},$$

където R е съпротивлението на топлопреминаване на стената (ограждението) преди санирането, $m^2.K/W$;

R_c - съпротивлението на топлопреминаване на стената (ограждението) след санирането, $m^2.K/W$;

S_e - цената на икономисаната енергия, $лв/kW.h$;

t_i - поддържаната отоплителна температура в сградата, ${}^0C$;

$t_{0_{ij}}$ - стойностите на атмосферния въздух през отоплителния сезон, ${}^0C$;

$\tau_{0_{ij}}$ - часовете на задържане на стойностите на температурите на атмосферния въздух през отоплителния сезон по месеци, h.

След преобразуването на уравнение (27) и въвеждането на данните за величините $t_{0_{ij}}$ и $\tau_{0_{ij}}$ [14], за очакваното ниво на икономия на енергия се получава зависимостта, изведена по-горе (22).

Получените модели (22),...,(27) представят връзката на дисконта $Д_{e_i}$ с очакваната икономия на енергия вследствие на санирането $И_{e_i}$ във функция от доминиращите фактори - дисконтовият срок на предсрочното изплащане на частта от задължението (τ_i), дисконтовият процент(отстъпката)(d), дебелината на изолационният слой (δ_{u_i}), специфичният коефициент на топлопроводност на изолационния материал (λ_{u_i}), съпротивлението на топлопреминаване на стената (ограждението) преди санирането (R_c), цената на икономисаната енергия (S_e), поддържаната отоплителна температура в сградата (t_i), влиянието на климатичните райони ($t_{0_{ij}}$).

Моделиране влиянието на минималните специфични приведени годишни разходи

Минималните специфични приведени годишни разходи (МСПГР) се формират като сума от паричната стойност на годишните загуби на енергия за отопление и отчисленията за връщане на кредита. Редуциране на МСПГР се постига чрез стойността на икономията на енергия и евентуалното приложение на дисконт. Освен това, полагането на изолацията е едноактен процес на усвояване на инвестициите и протича в течение на кратки срокове - дни, месеци. Това дава основание функцията на МСГПР при двата варианта за изпълнение на санирането да се изрази, както следва:

- при външно полагане на изолацията

$$(2.28) \quad з_{вн} = \left[W_{заг} - \left(И_e + Д_e\right)\right] + E.K_{вн}$$

- при вътрешно полагане на изолацията

$$(2.29) \quad з_{вт} = \left[W_{заг} - \left(И_e + Д_e\right)\right] + E.K_{вт},$$

където $з_{вн}, з_{вт}$ са минималните специфични годишни приведени разходи, съответно при външно и вътрешно полагане на изолацията, $лв/m^2.год$;

$W_{заг}$ - разходите за отоплението при отсъствието на изолация, $лв/m^2.год$;

E - коефициентът на отчисление за възстановяването на кредита, $1/год$.

Минималните приведени разходи са често използван в топлотехниката критерий, за изчисляването накойто се използва зависимостта П = Е + Ен.К, където Е съответно сагодишните експлоатационни разходи в лв., К - капиталните

вложения, а Ен енормативният коефициент на ефективност. Получените на базата на тази зависимост резултати за различните варианти на изпълнение се сравняват, като за по-изгоден логично се приемавариантът с по-ниски приведени разходи [15].

Коефициентът на отчисленията за възстановяването на кредита Ен,използван като нормативен коефициент за икономическа ефективност, вече следва да се разглежда в смисъла на променлив параметър при определяне на икономически ефективния срок за възстановяване на финансовия ресурс, вложен в санирането.

Уравненията (28) и (29), след като се въведат в тях зависимостите (22),...,(26) и преобразуват, придобиват вида:

- при външно полагане на изолацията

$$(2.30)\quad з_{вн} = \left(1 - \frac{\delta_u}{R.\lambda_u + \delta_u}.F\right).J + H_{вн}.E.S_u.\delta_u + L_{вн}.E + Z_{вн}.E$$

$$(2.31)\quad F = 1 - \sum_{1}^{k} \frac{\tau_i.d}{36000}$$

$$(2.32)\quad J = \frac{Д_e.S_e.10^{-3}}{R}$$

$$(2.33)\quad H = (1 + n_{пч})(1 + n_M)$$

$$(2.34)\quad L_{вн} = (1 + n_{пч})(1 + n_M)T_{вн} + Д_{вн}$$

$$(2.35)\quad Z_{вн} = (1 + n_{пч})(1 + n_M).E.M_{допвн}$$

- при вътрешно полагане на изолацията

$$(2.36)\quad з_{вт} = \left(1 - \frac{\delta_u}{R.\lambda_u + \delta_u}.F\right).J + H_{вт}.E.S_u.\delta_u + L_{вт}.E + Z_{вт}.E$$

$$(2.37)\quad L_{вт} = (1 + n_{пч})(1 + n_M)T_{вт} + Д_{вт}$$

$$(2.38)\quad Z_{вт} = (1 + n_{пч})(1 + n_M).E.M_{допвт}$$

След диференциране на уравненията (30) и (36), приравняването им към нула и преработване на равенствата, за оптималните дебелини на изолацията при външно и вътрешно полагане, се получава

$$(2.39)\quad \delta_{u_{opt_{вн}}} = \delta_{u_{opt_{вт}}} = \sqrt{\frac{R.F.J.\lambda_u}{H.E.S_u}} - R.\lambda_u,$$

където $\delta_{opt_{вн}}, \delta_{opt_{вт}}$ са дебелините на изолацията, съответно при външно и вътрешно полагане, при които сумарните специфични годишни разходи ще имат минимални стойности, m.

Въвеждайки уравнението (39) в зависимостите (30) и (36), за минималните специфични годишни приведени разходи се получава:

- при външно полагане на изолацията

$$(2.40)\quad з_{вн_{\min}} = \frac{R.\lambda_u}{\sqrt{A}} + H.S_u.\left(\sqrt{A} - R.\lambda_u\right) + L_{вн}.E + Z_{вн}.E$$

$$(2.41)\quad A = \frac{R.F.J.\lambda_u}{H.E.S_u}$$

- при вътрешно полагане на изолацията

$$(2.42)\quad з_{вт_{\min}} = \frac{R.\lambda_u}{\sqrt{A}} + H.S_u.\left(\sqrt{A} - R.\lambda_u\right) + L_{вт}.E + Z_{вт}.E$$

Началната стойност на функциите на приведените разходи (уравнения (30) и (36) ще се равнява на разходите за отоплението ($W_{заг}, лв/m^2.год$) при отсъствието на топлоизолация.

Индексация на технико - икономическите показатели на изолационните материали

Постигането едновременно натехническа и икономическа ефективност на инвестициите в саниране изисква наред с разработените дотук модели да се разработят методи, целящи оптималния избор на изолационните материали. Определящите технико – икономически показатели на изолационните материали са плътността ($\rho, kg/m^3$), коефициентът на топлопроводност ($\lambda, W/m.K$), специфичният топлинен капацитет (с, $J/(kg.K)$) и цената (Ц, $лв/m^3$). Нивата на тези три показателя се диктуват от съпротивлението на топлопреминаване $R, (K.m/W)$, което се цели да бъде обезпечено като резултат от санирането на сградите. От значение е да се индексира влиянието на всеки от тези показатели върху икономическата ефективност на проектите за саниране на сградите.

Коефициентът на топлопроводност влияе върху дебелината на изолационните слоеве, вследствие на което частично се намалява обема на помещенията - при вътрешно полагане на изолацията, а при външно полагане се променят габаритните размери на сградата. От плътността зависи в каква степен ще нарастне масата на ограждащите стени на сградата, специфичният топлинен

капацитет определя количевото топлина, която ще се акумулира в стените на сградата. Цената на изолационните материали е свързана с всяка от топлофизичните им характеристики. Като правило, индустриалните продукти с по-добритоплоизолационни характеристики са по-скъпи и обратно. Това налага търсенето на разделителната линия между ниво на инвестицията в саниране, вида и дебелината на топлоизолационния материал, респективно качеството на проекта. Съобразно изложените изходни условия са дефинирани и синтезирани съответните идекси както следва:

Индекс за дебелина на топлоизолационния слой ($i_\delta, m/m$) и увеличение на заемания обем от изолацията ($i_v, m^3/m^2$). Дебелините на изолационните слоеве са пропорционални на коефициентите на топлопроводност. Като се приеме за базисен материалът с най-ниска топлопроводност, по отношение на индекса за дебелина на слоя се получава:

$$(2.43)\quad i_{\delta_j} = \frac{\lambda_{uj}}{\lambda_{u\min}} = \frac{\delta_{uj}}{\delta_{u_{\min}}},$$

където $\lambda_{u\min}$ е коефициентът на топлопроводност на най-добрия изолационен материал (базисния), $W/m.K$;

λ_{uj} - коефициентът на топлопроводност на съответния изолационен материал, $W/m.K$, за който се прави преценката;

$\delta_{u\min}$ - дебелината на най-добрия изолационен материал (базисния), m;

δ_{uj} - дебелината на съответния изолационен материал, m.

Индексът за увеличаването на обема i_v е бъде равен числено на индексът i_δ, но с димесия m^3/m^2, като:

$$(2.44)\quad i_{v_j} = \frac{\lambda_{uj}}{\lambda_{u\min}}.$$

Индекс за степента на увеличаване на масата на сградата от изолацията i_ρ. Определя се като отношение на плътностите на изолационните материали $\rho_j, kg/m^3$ към плътността на материала с минимален коефициент на топлопроводност $\rho_{\lambda_{u\min}}, kg/m^3$, или:

$$(2.45)\quad i_{\rho j} = \frac{\rho_j}{\rho_{\lambda_{u\min}}},$$

където $\rho_{\lambda_{u\min}}$ е плътността на най-добрия изолационен материал (базисния), kg/m^3;

ρ_j - плътността на съответния изолационен материал, kg/m^3.

Индекс за степен на акумулиране на топлина i_Q. Определя се като отношение между специфичните топлинни капацитети на материалите, а именно:

$$(2.46)\quad i_Q = \frac{c_j}{c_{min}},$$

където c_j е специфичният топлинен капацитет на съответния материал, $J/(kg.K)$;

$c_{\min}$ - специфичният топлинен капацитет на материала с минимална топлопроводност, $J/(kg.K)$.

Дебелините, обемите и масата на изолационните слоеве се свързват чрез индексите посредством зависимостите, представени в *табл.3*.

Индекс за цените $i_Ц, лв/m^3.m^2$. Формира се като се преобразува цената за изолационния материал в лева за 1 куб. метър ($Ц_j$, $лв/m^3$). Базисна е цената на изолационния материал с най-нисък коефициент на топлопроводност $Ц_{u_{\lambda_{\min}}}, (лв/m^3)$). Образуват се произведенията $Ц_{u_{\lambda_{\min}}}.\delta_{u_{\min}}$ и $Ц_j.\delta_j$. Отношението между тях представлява индекса за цените на изолационните материали, или:

$$(2.47)\quad i_{Ц_j} = \frac{Ц_j.\delta_j}{Ц_{u_{\lambda_{\min}}}.\delta_{u_{\min}}} = \frac{Ц_j}{Ц_{u_{\lambda_{\min}}}}.i_{\delta_j} \lesseqgtr 1.$$

Таблица 3

Връзки между индексите на изолационните материали			
Изолационен материал	Дебелина на слоя, m	Заеман обем върху 1 m^2	Маса на слоя, kg/m^2
1. Материал с минимален коефициент на топлопроводност, $\lambda_{u_{\min}}, W/m.K$	$\delta_{u_{\min}}$	$\delta_{u_{\min}}$	$\rho_{\lambda_{u\min}}.\delta_{u_{\min}}$
2. Материал с по-висок коефициент на топлопроводност, $\lambda_j, W/m.K$	$i_{\delta_j}.\delta_{u_{\min}}$	$i_{v_j}.\delta_{u_{\min}}$	$i_\delta.\rho_j.\delta_{u_{\min}}$

Когато $i_{Ц_j} > 1$, разходите за закупуването на изолационния материал с най-нисък коефициент на топлопроводност ще бъдат най-малки. При условие, че $i_{Ц_j} < 1$, предимството е за изолационния материал спо-висок коефициент на топлопроводност, а при $i_{Ц_j} = 1$ вариантите са равнопоставени. В*табл.4* са дадени индексите на основните изолационни материали, получени посредством формулите (43),...,(46), като се приема, че $\delta_{u_{\min}} = 0.01 \ \ m$.

Таблица 4

Материал	$\lambda_j, W/m.K$ $\rho_j, kg/m^3$	$i_\delta, m/m$	$i_v, m^3/m^2$	i_{ρ_j}	Дебелина на слоя, m	обем върху 1 m^2	Маса на слоя, kg/m^2
Полиуретан	0,017;30	1	1	1	0,01	0,01	0,3
Стиропор	0,037;20	2,17	2,17	0,67	0,0217	0,0217	0,434
Мин. вата	0,047;10	2,76	2,76	3,30	0,0276	0,0276	2,76

Данните от *табл.4*имат примерен характер и показват, че на 1 сантиметър дебелина на изолацията от полиуретан еквивалент са 2,17 и 2,76 сантиметра стиропор и вата. Идентично е увеличението на обема на стената върху 1 кв.м. площ. Увеличението на масите върху 1 кв.м. площ е 1 : 1,447 : 9,2 пункта спрямо полиуретана.

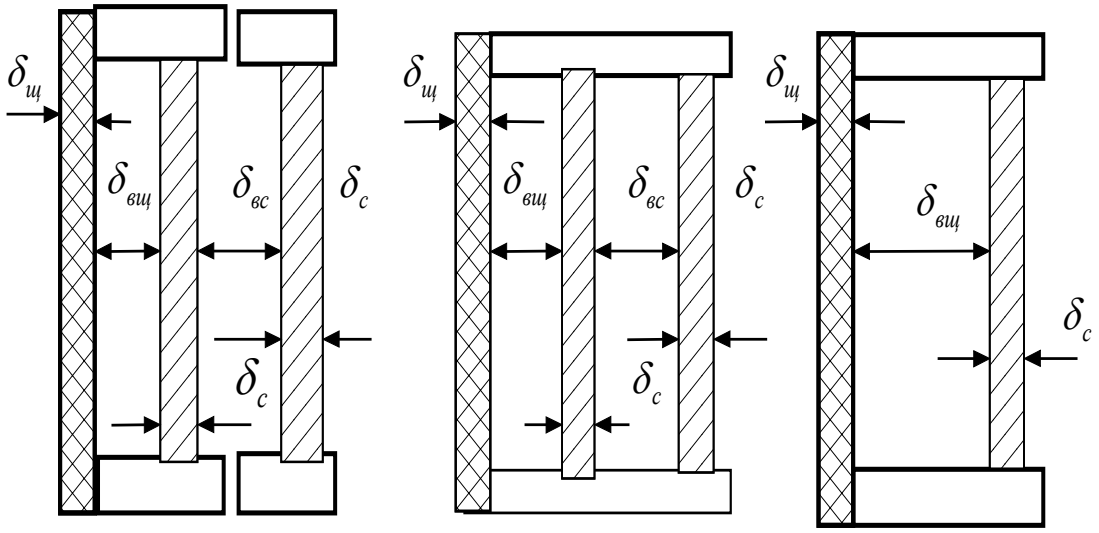
При сега действащите цени, например при полистирола, който е базисен материал - $Ц_{u_{\lambda_{\min}}}$ = 475 $лв/m^3$, на стиропора - $Ц_j$ = 210 $лв/m^3$ и на минералната вата - $Ц_j$ = 160 $лв/m^3$,чрез зависимостта за ценовия индекс (2.47) се установява, че по-евтина ще е изолацията за полистирола при индекс за дебелината <2.26 спрямо стиропора и <2.98 спрямо минералната вата.

Моделиране влиянието на ролетните щори върху икономическата ефективност от санирането на сградите

Площта на прозорците спрямо тази на стените достига до 30% и повече проценти. Коефициентите на топлопреминаването на външните прозорци, балконските врати и покривните прозорци достигат до 6.66 $W/m^2.K$, на външните врати до 5.88 $W/m^2.K$. Коефициентите на топлопреминаването на външните и преградни стени, подове, тавани топли покриви и пр. са в диапазона от 0,35 до 1,6 $W/m^2.K$. Следователно от прозорците се губи от 1,4 до 7 пъти повече топлина от

1 m^2. Често се внушава, че подмяната на прозорците води до икономия на топлина. Успоредно със санирането на сградите широко се монтират ролетните щори. Възниква въпросът, дали санирането да се съпроводи с поставянето, например на ролетни щори, без смяна на дограмата, съчетано с уплътнение на съществуващите прозорци. Наличието на щорите при спуснато състояние променя многократно коефициентите на топлопреминаване на външните прозорци, балконски врати и пр. Следователно, допринася за значителен енергетичен ефект. От значение е да се установи енергетичния и икономически ефект от поставенето на ролетни щори.

Изходното начало за провеждането на изследването са вариантните схеми на съчетаване на ролетните щори с основните видове прозорци (*фиг.5*). Определящите размери са посочени на фигурата. Стойностите, интервалите и границите, в които всеки от размерите варира, са представени в *табл.5*.



Фиг. 5. **Вариантни схеми на съчетаване на щорите с прозорците**

(1- с двойни стъкла и двойни рамки; 2 – с двойни стъкла в единична рамка;

3 – с единично стъкло и единична рамка)

Таблица 5

Стойности на определящите размери между щорите и прозорците								
	Размер	Мярка, *m*						
	Дебелина на щората, $\delta_{щ}$	0,005						
	Въздушна междина щора-	0,01	0,02	0,03	0,05			

	прозорец, $\delta_{вщ}$							
	Въздушна междина между стъклата, $\delta_{вс}$	0,01	0,03	0,05	0,07	0,09	0,011	0,013
	Дебелина на стъклото, $\delta_{с}$	0,02	0,03	0,05				

Поставянето на ролетна щора променя съпротивлението на топлопреминаване. Съгласно схемите от *фиг.5*, разликите се изразяват чрез зависимостите, представени в *табл. 2.5*. Изведени са по вече известна и демонстрирана в настоящото изследване методика. В уравнения (48),…,(53) означенията са:

α - коефициентите на топлопредаване от въздуха в стаята към стъклото на прозореца, $W/m^2.K$;

α_0 - коефициентите на топлопредаване от стъклото на прозореца към външния въздух, $W/m^2.K$;

$\lambda_с$ - коефициентите на топлопроводност на стъклата, $W/m.K$;

$\lambda_в$ - коефициентите на топлопроводност на въздуха, $W/m.K$;

$\lambda_щ$ - коефициентите на топлопроводност на щорите, $W/m.K$;

$\delta_с, \delta_{вс}, \delta_щ, \delta_{вщ}$ - дебелините, съответно на стъклата, въздушната междина между стъклата, на щорите и въздушната междина между стъклата и щорите, m;

R_1, R_2, R_3 - съпротивленията на топлопреминаване на прозорците преди поставянето на щорите, съответно с двойни стъкла и рамки, с двойни стъкла в единична рамка,с единични стъкло и рамка, $K.m^2/W$;

$R_{1щ}, R_{2щ}, R_{3щ}$ - съпротивленията на топлопреминаване на прозорците след поставянето на щорите, съответно с двойни стъкла и рамки, с двойни стъкла в единична рамка,с единични стъкло и рамка, $K.m^2/W$.

Коефициентите на топлопреминаване на прозорците, балконските врати и горно осветление са представени в *табл.6*. За да се постигне дълбочина и представителност на изследването, данните са систематизирани, като са обхванати характерните и конкретни елементи и варианти на изпълнение:единично остъкляване; двойно остъкляване; единични прозорци и

горно остъкляване; двускатни прозорци и горно остъкляване; балконски врати. Това като цяло изчерпва всеки възможен случай при поставянето на щорите.

Таблица 6

Зависимости за определяне промяната на съпротивлението на топлопреминаване след поставяне на ролетни щори			
№	Тип прозорци	Зависимости	
		Преди поставянето	След поставянето
1	С двойни стъкла и рамки	$(2.48)\ R_1 = \frac{1}{\alpha} + \frac{2.\delta_c}{\lambda_c} + \frac{\delta_{вс}}{\lambda_в} + \frac{1}{\alpha_0}$	$(2.51)\ R_{1щ} = \frac{1}{\alpha} + \frac{\delta_{щ}}{\lambda_{щ}} + \frac{2.\delta_c}{\lambda_c} + \frac{\delta_{вс}}{\lambda_в} + \frac{\delta_{вс}}{\lambda_в} + \frac{1}{\alpha_0}$
2	С двойни стъкла в единична рамка	$(2.49)\ R_1 = \frac{1}{\alpha} + \frac{2.\delta_c}{\lambda_c} + \frac{\delta_{вс}}{\lambda_в} + \frac{1}{\alpha_0}$	$(2.52)\ R_{2щ} = \frac{1}{\alpha} + \frac{\delta_{щ}}{\lambda_{щ}} + \frac{2.\delta_c}{\lambda_c} + \frac{\delta_{вс}}{\lambda_в} + \frac{\delta_{вс}}{\lambda_в} + \frac{1}{\alpha_0}$
3	С единични стъкло и рамка	$(2.50)\ R_1 = \frac{1}{\alpha} + \frac{\delta_c}{\lambda_c} + \frac{1}{\alpha_0}$	$(2.53)\ R_{3щ} = \frac{1}{\alpha} + \frac{\delta_{щ}}{\lambda_{щ}} + \frac{\delta_{вщ}}{\lambda_в} + \frac{\delta_c}{\lambda_c} + \frac{1}{\alpha_0}$

Таблица 7

Коефициенти и съпротивления на топлопреминаване на прозорци, балконски врати и горно осветление			
№	Тип на стъклото, прозореца, вратата и горното осветление	Коефициент на топлопремина-ване, $W/m^2.K$	Съпротивление на топлопреми-наване, $K.m^2/W$
	Единично остъкляване		
1	Чисто	5,88	0,17
2	Отразяващо	6,25	0,16
3	Абсорбиращо топлина	6,25	1
4	Ниско емисионен филм	4	0,25

	Двойно остъкляване		
1	Чисто + чисто	3,33	0,3
2	Отразяващо + чисто	3,33	0,3
3	Абсорбиращо топлина + чисто	3,45	0,29
4	Стъклопакет	2,5	0,40
	Единични прозорци		
1	От дървесина	5,88	0,17
2	От дървесина, остъклен със стъклопакет	2,63	0,38
3	Със слепени крила	2,63	0,38
4	С метална рамка	6,66	0,15
5	Горно осветление, единичен, мет. рамка	6,66	0,15
	Двукатни прозорци		
1	От дървесина	2,33	0,42
2	От поливинилхлоридни рамки	2,63	0,38
3	С метална рамка	3,22	0,31
4	Тройно остъкление в дър. рамка	1,92	0,52
5	Горно осветление в мет. рамка	2,08	0,48
	Балконски врати		
1	Единична, от дървесина	5,88	0,17
2	От дървесина, със съединени крила	2,63	0,38
3	Остъклена със стъклопакет	2,63	0,38
4	От поливинилхлоридни рамки, дв. ост.	2,63	0,38

Синтез на икономически ефективни схеми за саниране на сградите

Изходните предпоставки за построяването на икономически ефективни схеми за санирането на сградите са:

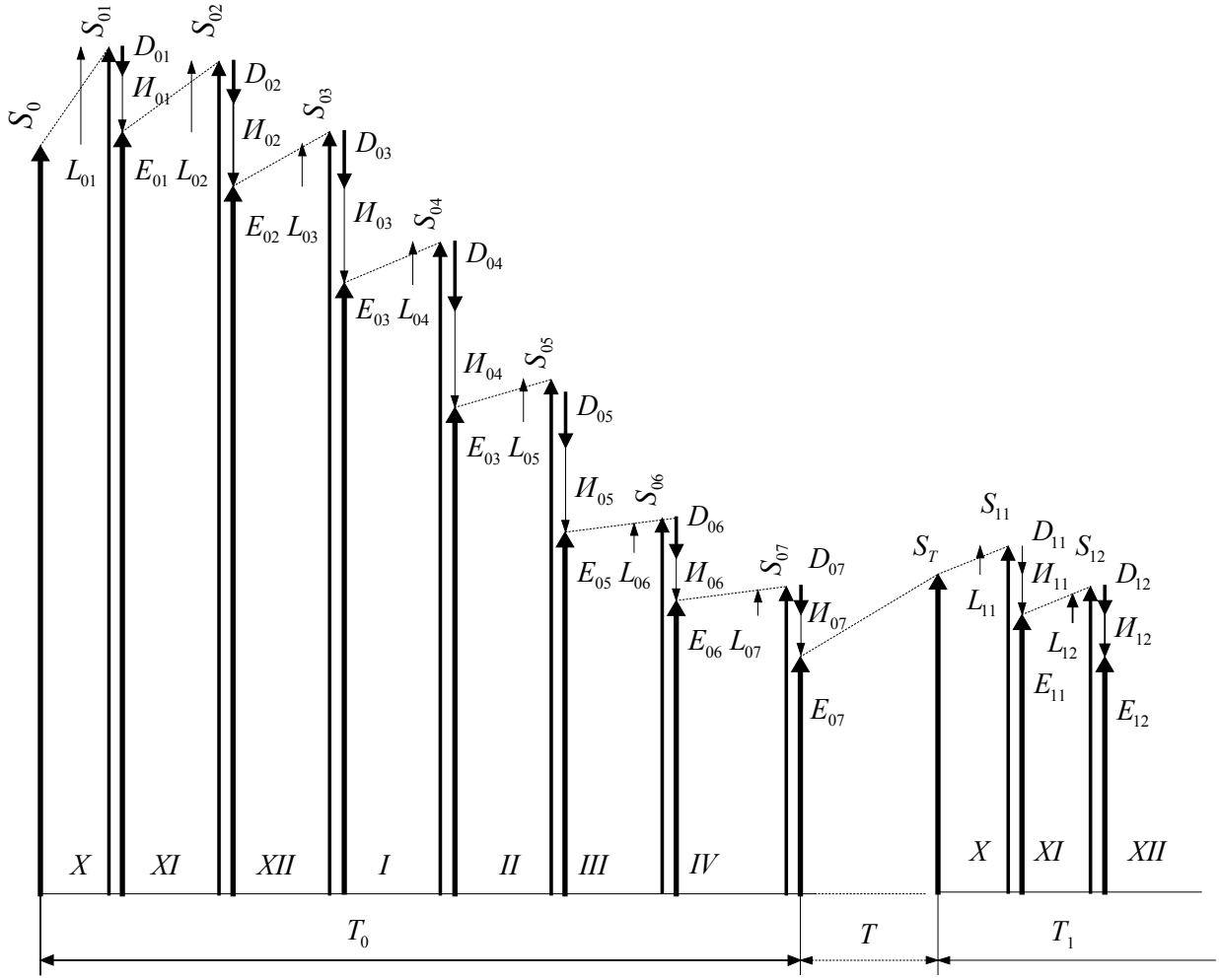
• полагането на изолацията да бъде в кратки срокове и да приключва към началото на отоплителния сезон (началото на октомври месец);

• да се оползотворяват реализираните икономии на енергия за ускоряване сроковете на възстановяване на инвестициите;

• да се отчита влиянието на климатичните райони, дисконта от икономията на енергияи пр.

Осъществен е синтез на схемите в три варианта:

• първи - възстановяване на кредита *е само за сметка* на намаляване плащането за енергия вследствие на санирането и породения от ефекта дисконт;

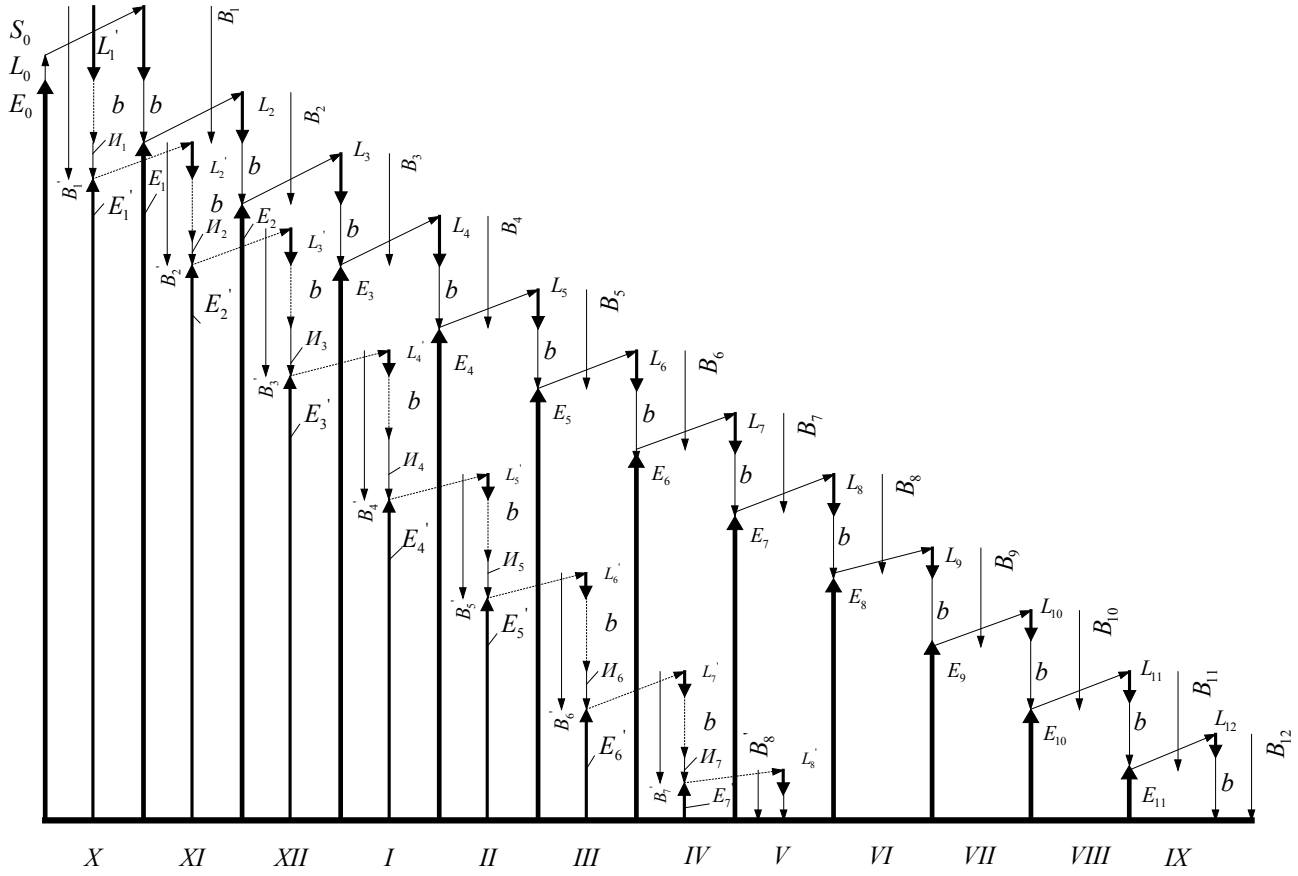


Фиг. 6. Икономически ефективна схема за възстановяване на инвестицията в санирането*само за сметка* на икономията на енергия и дисконта

• втори - погасянето на кредита в договорирания с банката срок *без отчитане* икономията и ефекта от дисконта;

• трети - погасянето на кредита в договорирания с банката срок *с отчитане* икономията и ефекта от дисконта.

Отоплителният сезон обхваща седем месеца. Икономически ефективно е полагането на изолацията да приключва в началото на отоплителния сезон. Срокът на възстановяване на инвестицията в саниране следва да започва от началото на октомври, като в края на всеки месец има погасяваща сума. Съобразно приетите условия, са синтезирани икономически ефективни схеми, като на *фиг.6*е представена схемата с отчитане само на енергетичния ефект (вариант 1), на *фиг.7* са съвместени схемите в договорен с банката срок без (вариант 2) и с отчитане енергетичния ефект за възстановяването на кредита (вариант 3).



Фиг. 7. Икономически ефективна схема за възстановяване на инвестицията в саниране по договорен с банката срок *без и с отчитане* на икономията на енергия и дисконта

Въз основа на синтезираните схеми са изведени обобщени аналитични зависимости за моделиране процесите на възстановяване на кредита за всеки от вариантите. Стартира се с нарастнала сума S_0 , като в края на сезона по първия

вариант се очаква остатъчна сума E_{07} (*фиг.6*). Ежемесечно се отчитатвъзможните или постигнати икономии на енергия, както и на дисконта и се отразява тяхното влияние върху сроковете на възстановяване на инвестициите. До началото на отоплителния сезон за сметка на лихвата сумата ще нараства до ниво S_T.

Следващият цикъл обхваща новия сезон. Схемата на приходите от икономията на енергия ще се повтаря. В случай, че се договори срок за въстановяването на инвестицията (вариант 2 и 3), тогава процесът се прекратява в края на угорения срок или по-рано, щом икономията на енергия и дисконта подпомогнат покриването на сумата.

Цялостно процесътна ефективно възстановяване на инвестицията в саниране при различните варианти се описва чрез зависимостите:

$(1)\ \ S_0 = K + L_0 = E_0 + L_0.$

$(2)\ \ L_{01} = L_1 = L_1^{'} = p.n_1.S_0.$ $(4)\ \ S_{01} = S_1 = S_1^{'} = S_0 + L_{01}.$

$(3)\ \ B_{01} = L_0 + L_{01} + И_1.$ $(5)\ \ E_{01} = E_0 - И_1.$

$(3a)\ \ B = b + L_0 + L_{01}.$ $(5a)\ \ E_1 = E_0 - b.$

$(3b)\ \ B = b + L_0 + L_{01} + И_1.$ $(5b)\ \ E_1^{'} = E_0 - (b + И_1).$

$(6)\ \ L_{02} = p.n_2.E_{01}.$ $(7)\ \ S_{02} = E_{01} + L_{02}.$ $(8)\ \ B_{02} = L_{02} + И_2.$ $(9)\ \ E_{02} = E_{01} - И_2.$

$(6a)\ \ L_2 = p.n_2.E_1.$ $(7a)\ \ S_2 = E_1 + L_2.$ $(8a)\ \ B_2 = b + L_2.$ $(9a)\ \ E_2 = E_1 - b.$

$(6b)\ \ L_2^{'} = p.n_2.E_1^{'}.$ $(7b)\ \ S_2^{'} = E_1^{'} + L_2^{'}.$

$(8b)\ \ B_2^{'} = b + L_2^{'} + И_2.$ $(9b)\ \ E_2^{'} = E_1^{'} - (b + И_2).$

$(10)\ \ L_{03} = p.n_3.E_{02}.$ $(11)\ \ S_{03} = E_{02} + L_{03}.$ $(12)\ \ B_{03} = L_{03} + И_3.$ $(13)\ \ E_{03} = E_{02} - И_3.$

$(10a)\ \ L_3 = p.n_3.E_2.$ $(11a)\ \ S_3 = E_2 + L_3.$ $(12a)\ \ B_3 = b + L_3.$ $(13a)\ \ E_3 = E_2 - b.$

$(10b)\ \ L_3^{'} = p.n_3.E_2^{'}.$ $(11b)\ \ S_3^{'} = E_2^{'} + L_3^{'}.$ $(12b)\ \ B_3^{'} = b + L_3^{'} + И_3.$

$(13b)\ \ E_3^{'} = E_2^{'} - (b + И_3).$

$(14)\ \ L_{04} = p.n_4.E_{03}.$ $(15)\ \ S_{04} = E_{03} + L_{04}.$ $(16)\ \ B_{04} = L_{04} + И_4.$ $(17)\ \ E_{04} = E_{03} - И_4.$

$(14a)\ \ L_4 = p.n_4.E_3.$ $(15a)\ \ S_4 = E_3 + L_2.$ $(16a)\ \ B_4 = b + L_4.$ $(17a)\ \ E_4 = E_3 - b.$

$(14b)\ L_4^{'} = p.n_4.E_3^{'}.\ (15b)\ S_4^{'} = E_3^{'} + L_4^{'}.\ (16b)\ B_4^{'} = b + L_4^{'} + И_4.$

$(17b)\ E_4^{'} = E_3^{'} - (b + И_4).$

$(18)\ L_{05} = p.n_5.E_{04}.\ (19)\ S_{05} = E_{04} + L_{05}.\ (20)\ B_{05} = L_{05} + И_5.\ (21)\ E_{05} = E_{04} - И_5.$

$(18a)\ L_5 = p.n_5.E_4.\ (19a)\ S_5 = E_4 + L_5.\ (20a)\ B_5 = b + L_5.\ (21a)\ E_5 = E_4 - b.$

$(18b)\ L_5^{'} = p.n_5.E_4^{'}.\ (19b)\ S_5^{'} = E_4^{'} + L_5^{'}.\ (20b)\ B_5^{'} = b + L_5^{'} + И_5.$

$(21b)\ E_5^{'} = E_4^{'} - (b + И_5).$

$(22)\ L_{06} = p.n_6.E_{05}.\ (23)\ S_{06} = E_{05} + L_{06}.\ (24)\ B_{06} = L_{06} + И_6.\ (25)\ E_{06} = E_{05} - И_6.$

$(22a)\ L_6 = p.n_6.E_5.\ (23a)\ S_6 = E_5 + L_6.\ (24a)\ B_6 = b + L_6.\ (25a)\ E_6 = E_5 - b.$

$(22b)\ L_6^{'} = p.n_6.E_5^{'}.\ (23b)\ S_6^{'} = E_5^{'} + L_6^{'}.\ (24b)\ B_6^{'} = b + L_6^{'} + И_6.$

$(25b)\ E_6^{'} = E_5^{'} - (b + И_6).$

$(26)\ L_{07} = p.n_7.E_{06}.\ (27)\ S_{07} = E_{06} + L_{07}.\ (28)\ B_{07} = L_{07} + И_7.\ (29)\ E_{07} = E_{06} - И_7.$

$(26a)\ L_7 = p.n_7.E_6.\ (27a)\ S_7 = E_6 + L_7.\ (28a)\ B_7 = b + L_7.\ (29a)\ E_7 = E_6 - b.$

$(26b)\ L_7^{'} = p.n_7.E_6^{'}.\ (27b)\ S_7^{'} = E_6^{'} + L_7^{'}.\ (28b)\ B_7^{'} = b + L_7^{'} + И_7.$

$(29b)\ E_7^{'} = E_6^{'} - (b + И_7).$

$(30)\ И_1 = Д_{01} + И_{01}.\ (30a)\ И_2 = Д_{02} + И_{02}.\ (30b)\ И_3 = Д_{03} + И_{03}.$

$(30c)\ И_4 = Д_{04} + И_{04}.$

$(30d)\ И_5 = Д_{05} + И_{05}.\ (30e)\ И_6 = Д_{06} + И_{06}.\ (30f)\ И_7 = Д_{07} + И_{07}.$

$(31)\ L_8 = p.n_8.E_7.\ (32)\ S_8 = E_7 + L_8.\ (33)\ B_8 = b + L_8.\ (34)\ E_8 = E_7 - b.$

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$(35)\ L_9 = p.n_9.E_8.\ (36)\ S_9 = E_8 + L_9.\ (37)\ B_9 = b + L_8.\ (38)\ E_9 = E_8 - b.$

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$(39)\ L_{10} = p.n_{10}.E_9.\ (40)\ S_{10} = E_9 + L_{10}.\ (41)\ B_{10} = b + L_{10}.\ (42)\ E_{10} = E_9 - b.$

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$(43)\ L_{11} = p.n_{11}.E_{10}.\ (44)\ S_{11} = E_{10} + L_{11}.\ (45)\ B_{11} = b + L_{11}.\ (46)\ E_{11} = E_{10} - b.$

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$(47)\ L_{12} = p.n_{12}.E_{11}.\ (48)\ S_{12} = E_{11} + L_{12}.\ (49)\ B_{12} = b + L_{12}.\ (50)\ E_{12} = E_{11} - b.$

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$(51)\quad S_T = p.n_T .E_{07}.$

$(52)\quad L_{11} = p.n_{11}.S_T.\ (53)\quad S_{11} = S_T + L_{11}.\ (54)\quad B_{11} = D_{11} + И_{11}.$

$(55)\quad E_{11} = S_{11} - (D_{11} + И_{11}).,$

където K са вложените средства за направа на изолацията, $лв/m^2$;

S_0 - нарастналата сума към началото на отоплителния сезон, $лв/m^2$;

p - лихвеният процент;

$n_1, n_2, ..., n_{12}, n_T, n_{11}, ..., n_{17}, n_{T_2}, ...$ броят на дните за всеки от периодите (месеца), *бр*;

$L_{01}, L_{02}, ..., L_{07}, L_T, L_{11}, ..., L_{17}, L_{T_2}, ...;\ L_1, L_2, ..., L_{12};\ L_1', L_2', ..., L_8'$ - размерът на лихвата в края на всеки от периодите (месеца) по варианти при възстановяване на кредита, съответно само от икономията на енергия и дисконта, само според договорената схема с банката, според договорената схема и отчитане икономията на енергия и дисконта, $лв/m^2$;

$S_{01}, S_{02}, ..., S_{07}, S_T, S_{11}, ...;\ S_1, S_2, ..., S_{12};\ S_1', S_2', ..., S_8'$ - размерът на сумите в края на всеки от периодите (месеца) по варианти при възстановяване на кредита, съответно само от икономията на енергия и дисконта, според договорената схема с банката, според договорената схема и отчитане икономията на енергия и дисконта, $лв/m^2$;

$E_0;\ E_{01}, E_{02}, ..., E_{07}, E_{11}, ...;\ E_1, E_2, ..., E_{12};\ E_1', E_2', ..., E_8'$ - размерът на остатъчните суми (главницата) в края на всеки от периодите (месеца) по варианти при възстановяване на кредита, съответно само от икономията на енергия и дисконта, според договорената схема с банката, според договорената схема и отчитане икономията на енергия и дисконта, $лв/m^2$;

$B_{01}, B_{02}, ..., B_{07}, B_T, B_{11}, ...;\ B_{01}, B_{02}, ..., B_{12};\ B_1', B_2', ..., B_8'$ - размерът на вноските в края на всеки от периодите (месеца) по варианти при възстановяване на кредита, съответно само от икономията на енергия и дисконта, според договорената схема с банката, според договорената схема и отчитане икономията на енергия и дисконта, $лв/m^2$;

$D_{01}, D_{02}, ..., D_{07}, D_{11}, ..., D_{17}, D_{T_2}, ...$ - размерът на дисконта в края на всеки от периодите (месеца), $лв/m^2$;

$И_{01}, И_{02}, ..., И_{07}, И_{11}, ..., И_{17}, И_{T_2}, ...$ - размерът на печалбата от икономия на енергия в края на всеки от периодите (месеца), $лв/m^2$;

$И_1, И_2, ..., И_7$ - сумарният приход от дисконта и икономията на енергия, $лв/m^2$;

b - размерът на вноската за погасяне на главницата, $лв/m^2$;

ЗАКЛЮЧЕНИЕ

В обобщение могат да се формулират следните изводи:

• При моделиране процеса на повишаване енергийната ефективност на сградите в частта саниране чрез топлоизолация изходна **база за построяване на първичния модел** се явяват технически възможните варианти за саниране – външно и/или вътрешно полагане на изолацията.

• Пълноценното построяване наикономически ефективен модел за саниране на сгради изисква да се отчете **влиянието на редица-взаимнообусловени фактори**: минималното ниво на инвестицията в саниране; очакваната икономия на енергия вследствие санирането; размера на дисконтирания паричен поток, формиран чрез остойностяване на очакваната икономия на енергия по текущата цена на използвания енергоизточник; обема на минималните специфични приведени годишни разходи, свързани с експлоатацията на изпълнената топлоизолация; специфичния индекс на избрания индустриален продукт за топлоизолация, формиран на база неговите топлоизолационни свойства и актуална цена; приложението на ролетни щори, като индустриален продукт, който способства ограничаване загубите на енергия от прозоречните ограждащи елементи на сградите.

• Влиянието на всеки от идентифицираните фактори, имащи въздействие върху базовия модел на саниране, може да бъде моделирано и количествено измерено, което позволява съчетаването им в **цялостен концептуален модел за саниране на сгради**.

• **Индексацията на индустриалните продукти за топлоизолация**, изведена въз основа на техните цени и коефициент на топлопроводност позволява нова класификация на тези продукти вече не само въз основа на техническите им характеристики, но и при съобразяване на тяхната актуална

стойност. Още повече, специфичният индекс за всеки топлоизолационен продукт не е фиксирана величина, а има способността да отчита подобренията на продукта и изменението в неговата цена. В допълнение, индексацията създава предпоставки за **оптимален избор на изолационен материал** в процеса на саниране.

• Синтезираният **концептуален модел за икономически ефективна схема на саниране на сградите** може да бъде окачествен като **динамичен**, тъй като отчита едновременно температурните особености на климатичния район, спецификата на ограждащите конструктивни елементи на сградата – обект на саниране, топлотехническите свойства и текущи цени на индустриалните продукти за топлоизолация (вкл. нововъведени), и цената на използвания енергоизточник. От тази гледна точка, приложението на концептуалния модел не е ограничено във времево и пространствено отношение.

• Получените модели са **предпоставка за разработването на програми и системи за управлението на процесите на саниране на сградите**, както от фирмите - проектанти и изпълнители, така и от съответните институции на държавно и местно ниво.

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технология и организация на процесите при използваните тогава материали и технологии. Същите са групирани и публикувани в институционално утвърдени сборници под наименованието "уедрени сметни норми" (УСН). Либерализацията на строителните цени след 1991г. води до отмяна на задължителното прилагане на тези разходни норми, вследствие на което те добиват препоръчителен характер. Проектантите ги възприемат като разчети, а инвеститорите и възложителите на обществени поръчки с договорна клауза често ги използват като база за разплащане с изпълнителите на СМР. Немалка част от УСН са осъвременени с използваните към днешна дата материали съобразно предписаната от производителя разходна норма. Понастоящем едно от утвърдените в сектор „строителство" издателства, които предлагат на пазара нови, актуализирани разработки на сборници с разходни норми и ежегодни справочници за анализни цени на СМР, е „Стройексперт-СЕК" ООД, които са използвани за целите и на настоящото дисертационно изследване.

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Guidelines for development of military education system in Bulgaria

Abstract. The report represents all current challenges which the Bulgarian military-educational system is facing in the context of the basic features of the security environment and trends for the first half of XX-thcentury, by identifying the main problem areas in its functioning. The status and the capabilities of the military – educational system of the Republic of Bulgaria are discussed on the bases of concluded analysis about key strategic documents in the sectors of education, security and defence as well as the current state of the military and civil education and the inherent activitiesof the training institutions. Outlined are the basic principles of construction and operation of the military - educational systems and the fundamental strategic goals and tasks according to modern strategic security environment and dynamically changing conditions in NATO and the EU. Described are the main elements of the military - educational system as a complex, adaptive and flexible system that develops in unity and complementarity with the system of civil education in Bulgaria. Guidelines are formulated for improving the military – educational system in relation to its contribution of strengthening national security and defence of the country in three directions – conceptual, organizational and technological improvement.

Key words: education, military education, training, civil rights, security.

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Насоки за развитие на военнообразователната система на България

Резюме: Докладът представя съвременните предизвикателства пред военнообразователната система на Република България в контекста на основните характеристики на средата за сигурност и тенденциите за първата половина на XX-ви век, като идентифицира основните проблемни области в нейното функциониране. Състоянието и възможностите на военнообразователната система на Република България са дискутирани на база направения анализ на основни стратегически документи в секторите образование, сигурност и отбрана и настоящото състояние на военното и гражданското образование и присъщите дейности на обучаващите институции. Изведени са основните принципи на изграждане и функциониране на военнообразователната система и основните стратегически цели и задачи съобразно съвременната стратегическа среда за сигурност и динамично променящите се условия в страните от НАТО и ЕС. Описани са основните елементи на военнообразователната система като комплексна, адаптивна и гъвкава система, която се развива в единство и с взаимно допълване със системата на гражданското образование в България. Формулирани са насоки за усъвършенстване на военнообразователната система във връзка с приноса й за укрепване на националната сигурност и отбраната на страната в три направление - концептуално, организационно и технологично усъвършенстване.

Ключови думи: образование, военно образование, обучение, граждански права, сигурност.

ВЪВЕДЕНИЕ

Съвременният свят признава важността на качественото образование. В Лисабонската стратегия Европа декларира необходимостта от дългосрочни инвестиции в образованието. Всяка държава се нуждае от достатъчно и добре образовани и обучени човешки ресурси като фундаментална предпоставка за повишаване на националната сигурност. Концепцията за национална сигурност определя националната сигурност като динамично състояние, при което за държавата и обществото не съществува пряка опасност от въоръжено нападение, политически натиск или икономическа принуда, така че те да могат свободно да осъществяват развитието и прогреса си. За националната сигурност на страната са присъщи специфични проблемни области с политически, икономически, социални, етнически, духовни, военни, информационни и екологични компоненти. Всеки един от тези компоненти, самостоятелно или в съчетание с другите, както и с редица странични (вторични) фактори, може да се окаже критичен за националната сигурност, а за всички тях е характерно, че са зависими по един или друг начин от равнището на образование на човешките ресурси. Големият проблем на нашето общество днес е формирането на ясна и правилна политика в областта на образованието и науката, като се отчитат и изискванията на системата за национална сигурност. Работещите в сферата на сигурността и отбраната притежават специфични знания и умения, придобити чрез специално обучение, практически опит, умения и индивидуално усъвършенстване в дейността. Това определя образованието като фундаментален елемент от подготовката на човешките ресурси, който осигурява подходящите знания, умения и компетенции. В този контекст можем да кажем, че образователната система на страната има важен принос за националната сигурност, допринасяйки за повишаване на образоваността, компететността, формиране на подходящи умения и способностти, придобиване на адекватна квалификация, както и особено значение в чисто личностно развитие. Образователната система следва да се разглежда като подсистема на системата за национална сигурност, а военнообразователната система (ВОС) е неин основен елемент.

Насоки за усъвършенстване на военнообразователната система и приноса й за укрепване на националната сигурност и отбранатана страната

Анализирайки състоянието на основните елементи на военно-образователната система (личен състав, учебно-материална база, организация и

технология на обучението) и отчитайки необходимостта от пълно хармонизиране на военното образование с изискванията на европейските директиви и директивите на НАТО, можем да очертаем основните направления и възможности за усъвършенстване на българската военнообразователна система, в концептуално, организационно и технологично отношение.

Концептуално усъвършенстване на военнообразувателната система

От членството на Република България в НАТО и ЕС произтича необходимостта в средносрочен план за *пълно хармонизиране на военното образование с военното образование, предоставяно от аналогични колежи и академии в съюзните страни, за повишаване конкурентоспособността на системата за военно образование и квалификация на оперативно и стратегическо равнище*. В изпълнение на подписаните международни договорености и приетите национални стратегически документи, със заповед на министъра на отбраната №ОХ-249/18.04.2011г. е създадена организация за развитие на ВОС в съответствие с Бялата книга на отбраната и ВС, и Плана за развитие на ВС на Република България до 2020г. Предвидено е системата за придобиване на военно образование и квалификация да се актуализира в съответствие със стратегическите доктрини и директивите на НАТО от Лисабонската стратегия за изграждането на европейско образователно пространство и европейската квалификационна рамка, и свързаните с тях изисквания към висшето военно образование и професионалното обучение.

Дейността по развитието и привеждането на системата за придобиване на военно образование и квалификация в съответствие със съюзните стратегически документи се провежда в следните направления:

1. По-нататъшно усъвършенстване на военнообразователната система съобразно националното и европейското законодателство и директивите на НАТО за постигане на качествена индивидуална подготовка на личния състав от въоръжените сили;

2. При добиване на знания и повишаване на уменията с цел изграждане на необходими способности и компетентности за постигане на съвместимост със страните-членки на НАТО при участие в многонационални мисии, учения и операции;

3. Осъществяване на тясна и непрекъсната връзка между образователните и обучаващи институции и потребителите/заявителите на кадри;

4. По-пълно използване на информационните технологии, базирани на WEB-обучението, симулатори и тренажори и въвеждане на съвременни технологии на преподаване и учене;

5. Осигуряване на качеството на висшето образование и на професионалното обучение в квалификационни курсове;

6. Привеждане и обвързване на националната квалификационна система с Европейската квалификационна рамка (ЕКР);

7. Създаване на нови и промяна на съществуващите курсове за придобиване и повишаване на квалификация с цел осигуряване на кариерното развитие на сержантския състав;

8. Всички сертификати за придобита квалификация, дипломи и други документи, издавани от висшите военни училища да показват ясно основаване на съответното ниво от ЕКР;

9. Подобряване подготовката на сержантския състав, както в професионалните сержантски (старшински) колежи, така и чрез създаване на възможност за присвояване на военно звание „младши сержант" след преминаване на обучение в учебен център на вида въоръжена сила;

10. Осигуряване на обучение през целия период на военна служба и използване на възможностите на информационните и комуникационни технологии за достъп до обучение по всяко време;

11. Повишаване на инвестициите във военното образование и квалификация и стремеж към осъвременяване и модернизиране на материалната и учебна база [11].

Към настоящия момент са изпълнени голяма част от планираните конкретни мероприятия по посочените направления за усъвършенстване на ВОС и процесът продължава планомерно, като се поддържа готовност за незабавна реакция при промени в европейските директиви и директивите на НАТО. По този начин нормативната база за функционирането на българската военно-образователна система се синхронизира с националното и европейското законодателство и директивите на НАТО, с което се уеднаквяват националните програми за обучение и оперативната подготовка със стандартите на Съюза, както и изискванията и критериите за качество към висшето военно образование и професионалното обучение.

Необходимо е да се направи преглед и да се актуализира приетата през 2006 г. Стратегия за развитие на системата за образование и квалификация на кадровите военнослужещи от Въоръжените сили на Република България, като се отчетат настъпилите промени в концептуален, доктринален, организационен и терминологичен аспект.

Освен това, споменатите вече проблеми със застаряващия хабилитиран академичен състав, наличието на голям брой вакантни преподавателски места и липсата на система за мотивация на офицерите от щабовете и формированията на ВС да се реализират като преподаватели, могат да се разрешат чрез:

- разработване на нови концептуални документи или промени в съществуващите, които да се превърнат в мощен инструмент, с който да се промени статуквото. Само така може да се осигури самостоятелност и по-висока автономност на военните училища и академиите, подобно на останалите в страните от НАТО и ЕС. В сегашния си вид системата на военното образование е твърде централизирана, откъсната от живота на войските и щабовете и невинаги гъвкава и адекватна на променящите се условия;

- промяна в някои от стратегическите организационни регламентиращи документи - ЗОВС, ППЗОВС, Стратегията за развитие на системата за образование и квалификация на кадровите военнослужещи от Въоръжените сили на Република България и др., в които да се даде възможност за по-добри финансови условия и да бъде гарантирано кариерното развитие на офицера-преподавател. Освен това да се обезпечи обвързването на теоретичната подготока на офицерите преподаватели с практическо изпълнение на задачи в щабовете и войските чрез стажове, участия в учения иротация;

- за да придобие привлекателност длъжността на преподавател във висшето военно учебно заведение, следва длъжностите в тях да бъдат равни, или по-високи, от тези,които са аналогични във военните формирования или съответните щабове. Няма друг известен и успешен мотив за привличане на преподавателска работа, освен по-високата длъжност и съответното заплащане;

- да се заложи като задължително условие при назначаването на определени длъжности на оперативно и стратегическо ниво в МО преминаването през академична длъжност за 2-3 години и др.

Организационно усъвършенстване на военнообразователната система

Организационното усъвършенстване на ВОС обхваща елементите *личен състав* и *организация на обучението*, тъй като този процес се отнася за взаимовръзките между академичния състав, обучаемите, административния и обслужващ персонал на военноучебните заведения, а освен това оказва влияние върху организационната структура, отговорностите и взаимодействието между заведенията, провеждащи обучението и организациите, потребители и заявители на кадри.

- Прегледът на структурата на въоръжените сили и приетата от Народното събрание Бяла книга за отбраната и ВС са реализиране до 2014 година, а с приетия План за развитие на Въоръжените сили до 2020г. е направен анализ и са набелязани съответните дейности за осъществяване на промяна.

В изпълнение на Плана за развитие на ВС на РБ, в раздела „Образование, наука и обучение", е предвидено висшите военни училища да поддържат институционалната си и програмна акредитация, да оптимизират структурите си главно чрез редуциране на административния и осигуряващ състав и създават нови възможности за максимален обхват на кандидати за обучение в тях [5].

За да могат висшите военни училища да реализират приоритетите от способности, като развиват съществуващите и придобиват нови, се извършват следните дейности: *вътрешно оптимизиране на структурите на военните висши училища с цел намаляване на административния и осигуряващия състав; актуализиране на изискванията за придобиване на ОКС „бакалавър" и „магистър" по специалностите от професионално направление „Военно дело"; разработване на нова учебна документация за обучение на курсанти и цивилни лица със срок на обучение 3г. и 1,5г.; преминаване към 14-месечно обучение на слушатели - редовна форма; по-пълно използване на възможностите за интеграция с други висши училища („Еразъм" и „Военен Еразъм"); поставяне на по-високи критерии при подбора на научните кадри – военнослужещи и цивилни служители: доказани професионални качества, владеене на чужд език на ниво, не по-ниско от 2-2-2-2 по STANAG, практически и боен опит от участие в съюзни и коалиционни мисии и операции (само за военнослужещите); разкриване на длъжност „инструктор" за военноприложно, професионално и практическо обучение във военните академии и висшите военни училища с цел тясно*

обвързване на обучението с практическата подготовка на курсантите и слушателите [5].

Голямата част от описаните дейности са изпълнени, а относно длъжността *„инструктор"* задачата е реализирана, но както вече бе посочено, ефективността на тази институция все още е твърде ниска. Това е така, защото вместо завърналите се от международни длъжности офицери да споделят своя опит във ВА, НВУ или ВВМУ за 1-2 години, те се изпращат в Щат 916 на МО, а на тези длъжности са назначени офицери без такъв опит.

- Другото направление за организационно усъвършенстване на ВОС е интердисциплинарно съвместно обучение на стратегическо и на оперативно равнище на офицера (служителя) от системата за сигурност и отбрана, както и образование, позволяващо му израстване в националната йерархия и в международните организации.

Съвместното обучение и подготовка на военни и цивилни специалисти за работа на различните управленски равнища придобива все по-важно значение в обществото пространство. Обучението на това ниво (съвместно на военни и граждански специалисти) се осъществява от подбрани преподаватели с привличането на експерти от министерства, ведомства и други граждански структури, в групи не повече от 14-16 души, позволяващи по-пълноценни дискусии с използване на най-съвременни средства за онагледяване и анализ. Освен това съвместното обучение на офицери от видовете въоръжени сили и родовете войски е от първостепенна важност за трансформацията във военното образование и постигането на целите по ***оперативната съвместимост.*** Образованието по съвместни програми има съществен принос за изграждането на нова военна култура и манталитет и гарантира максимално използване на специфичните способности за постигане на бърз и решителен ефект в операциите.

От друга страна, съвместното обучение е едно от основните направления в процеса на трансформация на военните способности на НАТО. Това изисква както координация и обединяване на индивидуалното и колективното обучение и оперативната подготовка в НАТО, така и уеднаквяване на националните програми за обучение и оперативната подготовка със стандартите на Съюза. Ето защо, ключов подход в реализацията на политиката в областта на военното образование и квалификация трябва да бъде усъвършенстване на съвместността

на обучение на стратегическо равнище и нейното разширяване и утвърждаване на оперативно и тактическо равнище.

- От особена важност за организационното усъвършенстване на ВОС и повишаване качеството на обучение е ефективното участие на потребителите/заявителите на кадри, т.е. МО, ЩО и видовете въоръжени сили в изработването на квалификационните характеристики, както и разширяване на сътрудничеството между ВА и висшите военни училища, Българската академия на науките, университетите и други институции и висши специализирани училища в България, и особено международното сътрудничество. Активното включване и участие в инициативата „Военен Еразъм" все повече допринася за сближаване на стандартите в подготовката на бъдещите офицери във военните училища на страните-членки на Европейския съюз.

- Благоприятна възможност за всяко висше военно учебно заведение да повиши качеството на обучение е *подобряване организацията на планиране, провеждане и отчитане на учебния процес*. Това е съвкупност от конкренти дейности, съобразно спецификата на всяко висше военно училище, и има обособени органи и методика за дейността по места.

- Освен това, организационното усъвършенстване може да бъде изключително полезно за преодоляване на всеобщия проблем с недостатъчните финансови и материални ресурси за осигуряване дейността на ВА, НВУ и ВВМУ, като чрез находчиви организационни решения се ограничават разходите и се осигуряват допълнителни приходи в бюджета на съответното училище. Например - оптимизиране процеса на планиране, програмиране и бюджетиране; финансово осигуряване по приоритети; увеличаване на собствените приходи чрез организиране провеждането на курсове за обучение и квалификация, участие в научни проекти и проекти за енергийна ефективност; тясно взаимодействие и сътрудничество с видовете въоръжени сили и бизнеса по съвместни проекти и др.

- Свръхнормативното натоварване на преподавателския състав също може да се облекчи чрез организационни мерки, като целенасочено планиране, обединяване на няколко групи обучаеми в по-големи потоци по еднакви дисциплини, електронно изпитване и др.

Като цяло, тези направления не изчерпват всички възможности за оптимизиране на дейността, но дават насока за преодоляване на затрудненията и

възможност на ВОС да отговаря по-пълно на повишените изисквания и предизвикателства, произтичащи от средата за сигурност.

Технологично усъвършенстване на военнообразователната система

Технологичното усъвършенстване на ВОС обхваща елементите *личен състав, учебно-материална база* и *технология на обучението*, тъй като този процес изисква повишаване на подготовката на академичния състав, усъвършенстване на учебно-материалната база и прилагане на съвременни форми на методи на обучение, както и система за управление на качеството на обучение.

За да бъде адекватна на широкото приложение на информационните технологии в сферата на образованието, ВОС е необходимо:*първо* да осигури добра подготовка както на академичния състав, така и на обучаемите и на екипа по експлоатация и поддръжка на КИС, тренажорите, симулаторите; *второ* - да осигури съвременна учебно-материална база, оборудвана с качествена техника и лицензирани програмни продукти и софтуер; и *трето* - да осигури стриктно спазване изискванията на ЗЗКИ, ЗЛД и други нормативни документи в процеса на работа.

- Високите изисквания към военното образование и квалификация наложиха *широкото внедряване в обучението на информационните технологии, моделирането и симулациите и изграждане на съвременно уеб-базирано обучение*. Виртуалният свят на моделирането и симулациите е съвременната среда на военното образование и военнонаучните изследвания. Новите национални и съюзни мисии и задачи изискват подготовка за водене на операции във всякакви географски и климатични условия, които могат виртуално да бъдат възпроизведени само с моделиране и симулации.

- Новите реалности изискват от ВОС *повишаване на качеството и ефективността в процеса на обучение на кадри за сектора на сигурност и отбрана чрез прилагане на нови интерактивни методи и технологии на преподаване,*налагат повишени изисквания към професионалната компетентност на завършващите военноучебни заведения и към подготовката на преподавателите за по-пълно използване на информационните технологии, базирани на WEB-обучението, симулатори и тренажори и въвеждане на съвременни технологии на преподаване и учене, както и осигуряване на достъп до обучение по всяко време.

- Чрез прилагането на най-новите постижения на науката, техниката и технологиите в сферата на военното образование и квалификация се постига оптимизиране на елемента *технология на обучението и* чувствителна модернизация на самия учебен процес в няколко насоки: повишена ефективност и ефикасност, обхват на по-големи групи обучаеми, уплътняване на учебното време и обучение по всяко време, дистанционно обучение и по индивидуален план, съвместно/кооперирано обучение с други академии, училища и институции в реално време, повишаване цялостната подготовка на академичния състав и др. Това все повече допринася за сближаване на стандартите в подготовката на бъдещите офицери във военните училища на страните-членки на НАТО и Европейския съюз и постигане на ***висока степен насъвместимост***.

Обобщавайки данните за реалното състояние с основните направления и възможности за усъвършенстване на българската военнообразователна система, могат да бъдат направени следните изводи:

1. Влиянието на процесите, протичащи в НАТО и Европейския съюз по отношение на образованието и обучението, са основният благоприятен фактор за бъдещото развитие и усъвършенстване на военнообразователната система на Република България. Всичко това налага непрекъснато усъвършенстване на системата за военно образование и квалификация в поне три насоки – ***организационно, технологично и концептуално***.

2. Главните моменти в *концептуалното усъвършенстване*на военно-образователната система са привеждане и поддържане на нормативната база в съответствие с националното и европейското законодателство и директивите на НАТО и създаване на благоприятни условия за привличане на млади офицери за преподавателската дейност, а в *организационно отношение*- вътрешно оптимизиране на структурите на висшите военни училища; намаляване на административния и осигуряващия състав; промяна на формите и сроковете за обучение; разширяване съвместното обучение на стратегическо и на оперативно равнище; тясно взаимодействие и сътрудничество с видовете въоръжени сили по съвместни проекти; международно сътрудничество и обмяна на опит с научнообразователните и научноизследователските институции в страната и др.

3. Възможностите за *технологично усъвършенстване* включват широкото внедряване на информационните технологии, моделирането и симулациите, изграждане на нова информационна среда на обучение и прилагане на нови

интерактивни методи и технологии на дистанционно преподаване в реално време и обучение на военнослужещите и цивилните служители през целияживот.

ОБЩИ ИЗВОДИ

1. Промените в стратегическата среда в началото на XXI век, равноправното членство на страната в НАТО и в ЕС, измененията в нормативни актове, касаещи колективната сигурност и отбрана, преминаването към професионална армия, създаването на нова структура на въоръжените сили, редуцирането на личния състав, въоръжението и техниката, участието на формирования от БА в международни мисии и многонационални щабове, наложиха нови изисквания, предизвикателства и насоки за развитие и усъвършенстване на военнообразователната система за изграждане на боеспособни въоръжени сили, адекватни на динамично променящите се условия в средата за сигурност.

2. Военнообразователната система на Република България се гради на исторически корени, опит и традиции, разполага с висококвалифициран академичен, научен и експертен личен състав, развита учебно-материална, документална и научна база, поддържане и усъвършенстване на информационен и учебен фонд, правила, процеси и процедури, организация и технология на обучението и други активи, осигуряващи към момента високо качество на придобиваните образование и квалификация, в съответствие с държавните образователни и квалификационни изисквания, националната квалификационна рамка, европейските директиви и директивите на НАТО.

3. В условията на динамично променяща се среда, сложните процеси, протичащи в НАТО и ЕС по отношение на образованието и обучението, и ограничените ресурси, отделяни от държавата за сектора на сигурност и отбрана, ВОС е изправена пред нови изисквания, които очертават насоките за нейното развитие и усъвършенстване в съвременните условия. Същевременно пред ВОС стоят за разрешаване редица несъответствия и проблеми, а именно: свръхнормативно натоварване на преподавателския състав, застаряващ хабилитиран академичен състав, липса на мотивация за нови преподаватели, ограничени финансови ресурси за поддръжка и модернизиране на учебно-материалната база и инфраструктурата.

4. НАТО и Европейският съюз са благоприятен фактор за бъдещото развитие и усъвършенстване на военнообразователната система на Република България. Това обаче налага непрекъснато усъвършенстване на системата за военно образование и квалификация в три насоки - ***организационно, технологично и концептуално***. В *концептуално отношение* се налага привеждане и поддържане на нормативната база в съответствие с националното и европейското законодателство и директивите на НАТО, за привличане на млади и перспективни офицери за преподаватели, а в *организационно* - оптимизиране на структурите; намаляване на административния и осигуряващия състав; промяна на формите и сроковете за обучение; съвместно обучение; успешен финансов мениджмънт; взаимодействие и сътрудничество с видовете въоръжени сили; международно сътрудничество и обмяна на опит в страната и др. Възможностите за *технологично усъвършенстване* включват широкото внедряване на информационните технологии, моделирането и симулациите и прилагане на нови интерактивни методи и технологии на дистанционно преподаване в реално време и обучение на военнослужещите и цивилните служители през през целия живот.

5. В променената среда за сигурност системата на подготовка на човешките ресурси за въоръжените сили (индивидуална и колективна) включва дейности и процеси, които изискват време и ресурси за обучаване на военнослужещите за достигане на определени стандарти. Независимо къде и на какво ниво се подготвя военнослужещият, трябва да му се осигури целенасочена, реалистична, предизвикателна и ресурсно осигурена подготовка. Тези изисквания към военнообразователната система са основата, необходима за изграждане на способни и адаптивни към ситуацията военнослужещи, щабове и формирования.

ЗАКЛЮЧЕНИЕ

Състоянието на ВОС към момента на изследването се намира в обективна връзка и зависимост от средата за сигурност в страната и процесите, протичащи в НАТО и ЕС по отношение на образованието и обучението. Системата функционира в условията на недостатъчно финансови, материални и човешки ресурси за изпълнение на своята мисия и задачи и се развива за привеждане в пълно съответствие с държавните образователни и квалификационни изисквания,

националната квалификационна рамка и европейските директиви и директивите на НАТО.

Военнообразователната система разполага с утвърдени национални стратегически документи за бъдещото си развитие в средносрочен план и има потенциал да изпълнява планираните мероприятия за усъвършенстване и принос в укрепването на националната сигурност и отбраната на страната.

Синхронизирането на българското военно образование и квалификация с това на страните от ЕС и НАТО в концептуален, организационен и технологичен аспект е от първостепенна важност за трансформацията във военното образование и постигането на целите по оперативната съвместимост между въоръжените сили.

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Deinstitutionalisation of children as part of the development of social services in Bulgaria

Abstract: Development of social services in Bulgaria is predetermined by the policies of last decades of the last century and is characterized by a number of features arising from the difficult transition to a market economy and modern challenges of dynamic social and economic environment. Social services are activities targeted at supporting assisted persons to conduct a complete way of life and full inclusion in society. Social services are aimed mainly at social integration of people, giving them the opportunity to lead an independent life and not to be dependent on the service or the institution. Development of social services in community is the key to effective social inclusion, poverty alleviation and participation in society of all vulnerable groups. In recent years, policy in the sphere of social services in Bulgaria is directed to development of services in community and home to replace the institutional model of care. Planning and implementation of national policy of reforms in child care is directly related to children at risk and better recognition of their problems and needs. Purposeful activities are carried out and programs are being implemented to achieve one of the main objectives of this policy - deinstitutionalization of children. Based on European practices and models activities and methods of child careare successfully realized. Presented study on the development of social services for children, with a special emphasis on deinstitutionalization, makes analyses of the system of social services for children as set in main strategic documents and statistical data. The aim is to identify key processes, trends and issues and to make recommendations for policy improvements. Main results emphasize that in order to achieve the desired effects new

approaches and measures are needed in application of running strategies. Main recommendations are defined for implementation of social policies for children and a conceptual framework of child care is proposed. It is important and necessary to develop a policy that will not only offer appropriate care for children at risk in the short term, but will also to prevent possible problems in the future.

Keywords: social services, children, institutional care, deinstitutionalization.

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Процесс вывода детей из учреждений интернатного типа, как часть процесса развития социальных услуг в Болгарии

Резюме*:* Развитие социальных услуг в Болгарии предопределено проводимыми в последние десятилетия прошлого века политиками и характеризуется рядом особенностей, связанных с трудным переходом к рыночной экономике, а также с современными проблемами развития динамической социально-экономической среды. Социальные услуги являются мероприятиями, направленными на поддержку лиц с целью ведения ими полноценного образа жизни и полноценного включения в общество. Социальные услуги направлены в основном на социальную интеграцию лиц, предоставляя им возможность вести самостоятельный образ жизни, а не быть зависимыми от услуг, соответственно от учреждений. Развитие социальных услуг в обществе является ключевым фактором для эффективного социального включения, борьбы с бедностью и участия в жизни общества всех уязвимых групп. В последние годы политика в сфере социальных услуг в Болгарии была направлена на развитие

услуг в обществе и в домашней среде, которые должны заменить модель воспитания ребенка в учреждениеинтернатного типа. Планирование и реализация национальной политики реформ в области ухода за детьми, напрямую связано и с детьми, находящимися в рисковой среде, учитывая их проблемы и потребности. Целенаправленно проводятся мероприятия и реализуются программы для достижения одной из главных целей этой политики - деинституционализации детей (вывода детей из учреждений интернатного типа). Основываясь на европейскую практику и модель, успешно реализуются мероприятия и применяются соответствующие методы воспитания детей. Представленное исследование развития социальных услуг для детей ставит акцент на деинституционализацию детей, проведение анализа системы социальных услуг для детей, заложенной в основные стратегические документы и статистические данные. Цель заключается в определении основных процессов, тенденций и проблем, формулировке рекомендаций для улучшения данной политики. Основные результаты подчеркивают, что для постижения желанных результатов необходимо использование новых подходов и мер в применении действующих стратегий. Определены основные рекомендации для реализации социальной политики для детей и утверждены концептуальные основы воспитания детей. Важно и необходимо развивать политику, которая не только предложит надлежащую заботу о детях в рисковой среде в краткосрочной перспективе, но и позволит предотвратить возможные проблемы в будущем.

***Ключевые слова**:* социальные услуги, дети, воспитание в учреждениях интернатного типа, деинституционализация (вывод детей из учреждений интернатного типа).

ВВЕДЕНИЕ

Во многих странах воспитание детей в учреждениях интернатного типа рассматривается как контра мера бедности и как частичные меры по поддержке семьи. Это приводит к ненужным переселениям, часто, когда биологические родители живы и могут ухаживать за детьми, если им предоставить должным образом поддержку. Вот почему эта политика должна сосредоточиться на профилактике отказа от детей и на поселении детей, лишенных родительской заботы, у воспитателей. Это должно сопровождаться национальной системой мониторинга и стандартизированными индикаторами. Однако, есть слабое

желание инициировать политические реформы, или из-за слабой доказательной базы, инертности существующей системы отделения ресурсов, отсутствия четкого стратегического планирования применения и часто из-за страха от увеличения расходов.

Затраты на воспитание детей в учреждениях выглядят различно от расходов на воспитание и проживание у близких и родственников, во всех рассматриваемых странах. Резидентный тип воспитания в обществе является более дорогим, чем приемный и воспитание в учреждении; но тем не менее, если начальные расходы хоть раз амортизируются, они могут быть меньше, чем текущие расходы в крупных учреждениях, кроме того предлагают более высокое качество ухода. В многих случаях предлагается направлять ресурсы на услуги в обществе, через изменения финансовых потоков на поддержку семей в риске.

Воспитание в детских учреждениях интернатного типа применяется в большинстве стран восточной Европы. Существуют различия в доступности приемного ухода и резидентного ухода в обществе, в качестве альтернативы воспитанию в учреждениях; в некоторых государствах вообще не используется забота в приемных семьях, в то время, как в других используют, преимущественно, эти подходы по отношению к рисковой группе детей.

Все варианты показывают абсолютное преимущество результатов социальных услуг в обществе над воспитанием в учреждениях. Преимущество является очевидным по всем аспектам (физическим, психическим, социальным, образовательным и др.) и не может быть оспорено даже в сравнении с самыми лучшими услугами по воспитанию в учреждениях. Действительно, воспитание в учреждениях часто описывается как само обслуживающее и, таким образом, трудно способствующее реализации принципиальной цели защиты наилучшим образом интересов детей.

СИСТЕМА ПРЕДОСТАВЛЕНИЯ СОЦИАЛЬНЫХ УСЛУГ ДЛЯ ДЕТЕЙ

Виды социальных услуг в Болгарии делятся на два типа, в зависимости от среды, в которой они предоставляются - социальные услуги, которые предоставляются в обществе, и социальные услуги, предоставляемые в специализированных учреждениях.

Социальные услуги, предоставляемые в обществе, следующие: личный помощник, общественный помощник, домашний помощник, домашний социальный

патронат; Дневной центр, Центр социальной реабилитации и интеграции, Центр временного поселения, Приемные семьи, Кризисный центр, Центр для поселения семейного типа, Защищенные виды жилья, общественные столовые;

Специализированные учреждения: дома для детей и молодежи с ограниченными возможностями, дома для пожилых людей с ограниченными возможностями, социальные учебно-профессиональные заведения, дома для престарелых, приюты, дома для временного проживания.

Социальные услуги, которые предоставляются в обществе, следующие:

- Социальные услуги в обществе - Дневной центр (дневной центр для детей и/или взрослых людей с ограниченными возможностями; дневной центр для пожилых людей с ограниченными возможностями – недельного ухода; дневной центр для детей с ограниченными возможностями – недельного ухода; дневной центр для пожилых людей); центр социальной реабилитации и интеграции; социальный учебно-профессиональный центр; звено „Мама и малыш”; центр общественной поддержки; центр по работе с детьми на улице; приемное воспитание; общественные столовые.

- Социальные услуги в обществе резидентного типа - центр для поселения семейного типа (центр для поселения семейного типа для детей/молодежи без инвалидности; – центр для поселения семейного типа для детей/молодежи; – центр для поселения семейного типа для пожилых людей с психическими расстройствами или слабоумием; центр для поселения семейного типа для пожилых людей с ограниченными физическими возможностями; – центр для поселения семейного типа для пожилых людей с умственной отсталостью; – центр для поселения семейного типа для пожилых людей); центр временного поселения; кризисный центр; временное жилье; защищенное жилье (защищенное жилье для людей с психическими расстройствами; защищенное жилье для людей с умственной отсталостью; защищенное жилье для людей с ограниченными физическими возможностями); наблюдаемое жилье; приют.

В Болгарии существуют следующие виды воспитания детей:

- Воспитание детей в учреждениях (132 учреждения с вместительностью 6 254 детей по данным в конце 2010 года): учреждения являются частью социалистического наследия, доминирует мнение, что государство является более способным заботиться о детях, чем их семей. Для системы воспитания детей в учреждениях характерны давно созданные структуры и огромная инерция,

которая понимает „реформу” и „перестройку”, как ремонт существующей инфраструктуры без значительного изменения в образе ухода за детьми.

- Приемное воспитание и проживание у близких и родственников (12 664 детей с момента запуска реформы к концу 2010 г.): под воспитанием и проживанием у близких и родственников понимается воспитание ребенка в доме сертифицированного государством лица (профессиональное или добровольное приемное воспитание) или членами биологической семьи, кроме родителей (поселение у близких и родственников). Поселение у близких и родственников хорошо развито, причем в период 2000-2010 г. так поселены 12 105 детей. Приемная забота также развивается, как ожидается, она станет ключевым элементом, особенно в процессе реинтеграции (переселения) детей из учреждений в их биологические семьи. Общее число детей в приемных семьях с начала реформы к концу 2010 года. - 559, из которых 221 поселены в 2010 г.
- Резидентный уход в обществе (72 центра с вместительностью 831 детей к середине 2011 г.): резидентный уход в обществе может быть рассмотрен как промежуточное звено между воспитанием в учреждениях и приемным воспитанием / проживанием у близких и родственников. При резидентном уходе дети проживают в „близкой к семейной” среде, хотя и в более крупных в разделенных группах с высоким процентом соотношения персонал-ребенок. В Болгарии дольше всего работающим поставщиком социальных услуг, предоставляемых в обществе резидентного типа, является организация „SOS детские поселения”; однако в последнее время начали работать несколько новых социальных услуг резидентного типа. Значительные усилия были предприняты всеми участниками с целью обеспечения качественного и эффективного процесса деинституционализации (вывода детей из учреждений интернатного типа). Ресурсы в этой области болгарского правительства и европейских фондов используются для поддержки этого процесса. Настоящее исследование может быть использовано как вспомогательное средство для принятия обоснованного решения о финансовых аспектах деинституционализации.

В 2008 году в Болгарии была принята Национальная стратегия для детей 2008 – 2018, а в 2010 году была принята Национальная стратегия „Видение на деинституционализацию детей в Республике Болгария”, согласно которой „...деинституционализация является процессом замены воспитания детей в учреждениях резидентным уходом в обществе, в семье или близкой к семейной

обстановке. Это процесс предотвращения поселения детей в учреждения, путем создания новых возможностей для детей и их семей получить поддержку в обществе...”.

Одной из основных проблем в этом процессе является перенаправление ресурсов из старой системы воспитания детей в учреждениях к услугам в обществе по принципу „деньги следуют за ребенком”, т. е. ресурсы ориентированы на услуги для удовлетворения конкретных потребностей детей и семей.

ЗАДАЧИ, СТОЯЩИЕ ПЕРЕД СИСТЕМОЙ СОЦИАЛЬНОГО ОБСЛУЖИВАНИЯ ДЕТЕЙ

Процесс вывода детей из учреждений интернатного типа стоит в основе Национальной стратегии о ребенке, и Национальной стратегии „Видение на деинституционализацию детей в Республике Болгария” и процесса замены воспитания детей в учреждениях заботой в семейной или близкой к семейной среде в обществе, причем данный процесс не ограничивается только выводом детей из учреждений. Это процесс предотвращения поселения детей в учреждения, создание новых возможностей для детей и семей получить поддержку в обществе [1].

Одна из целей этого вида услуг направлена на обучение детей с целью создания навыков для самостоятельной жизни и способствование социальной интеграции. Другая цель заключается в специализированной работе с детьми, которые собираются вернуться в семейную среду; предотвращение отказа от ребенка и консультирование родителей. В течение многих лет обеспечена устойчивость, причем все затраты на социальные услуги были оплачены из республиканского бюджета как специализированные расходы.

Учреждения для воспитания детей являются частью тяжелого наследия, оставшегося от тоталитарной системы страны, в которой проводилась политика, основанная на идее, что государство в состоянии заботиться лучше о воспитании и заботе за детьми, чем их семьи. Эта политика проводилась в течение более чем 40 лет и оставила следы в общественных отношениях и менталитете людей в стране. Воспитание детей в учреждениях в Болгарии остается нерешенной проблемой, которая не может быть объяснена только тоталитарным прошлым. Отсутствие четкой политической воли закрытия домов привела к их

„реформированию” и „реструктуризации”, что часто воспринимается как ремонт здания, и не влечет за собой фундаментальных изменений в способах ухода и жизни детей.

Экономические, политические и социальные изменения, сопутствующие переходу, приводят к возникновению новых проблем и усугубляют существующие проблемы. Некоторые из основных факторов, которые влияют на воспитание детей в учреждениях, следующие:

- Недостаточное количество услуг для детей и семей, которые отвечают комплексным потребностям и неравномерному распределению по территории страны.
- Нехватка финансовых ресурсов, что часто становится причиной социального отчуждения семьи и поселения детей в учреждение.
- Отсутствие развитой системы альтернатив воспитанию детей в учреждениях на базе общества.
- Преимущественно медицинская модель в отношении детской инвалидности, в соответствии с которой учреждение предлагает лучший уход за детьми.
- Отсутствие приобщающей социальной и архитектурной среды.
- Изменение модели семейного поведения, что приводят к увеличению внебрачных детей и родителе, которые воспитывают детей сами.

Поселение детей в учреждения интернатного типа нарушает их права, гарантированные международными конвенциями, по которым Республика Болгария является стороной (Конвенция ООН о правах ребенка, Конвенции ООН о правах людей с ограниченными возможностями) и приводит к созданию дискриминационных моделей в отношении образования и доступа к качественному воспитанию, уходу и услугам.

Независимо от вложенных ресурсов, жизнь детей в учреждениях интернатного типа не становится лучше, а услуги более качественными. Воспитание в учреждениях для организации жизни не подразумевает наличие доверительной связи с одним постоянным взрослым, индивидуального воспитания, ухода, внимания и личного пространства для ребенка. Такой тип воспитания не может удовлетворить основные потребности детей и оказывает негативное влияние на их развитие и поведение. Это, в свою очередь, приводит к дополнительной экономической и социальной цене для всего общества.

В этой связи, осуществление эффективной политики деинституционализации (вывода детей из учреждений) требует изменения философии организации ухода за детьми с акцентом на:

- предотвращение рисков,
- раннее вмешательство,
- поддержку семьи и обеспечение семейной или близкой к семейной среды.

Эти мероприятия проводятся на основании политики в лучших интересах ребенка, направленной на поддержку семей и создания лучших условий для развития детей и реализации их полного потенциала. Эта политика проводится на основании уважения прав ребенка, норм, стандартов и принципов универсальности, неделимости и не дискриминации, и при этом характеризуется высокой чувствительностью, гибкостью и готовностью решения проблем.

ОСОБЕННОСТИ ПОЛИТИКИ ДЕИНСТИТУЦИОНАЛИЗАЦИИ ДЕТЕЙ

Вывод детей из учреждений это процесс замены воспитания в учреждениях воспитанием в семейной или близкой к семейной среде в обществе, что не ограничивается лишь выводом детей из учреждений. Это также и процесс предотвращения поселения детей в учреждения, создание новых возможностей для детей и семей получить поддержку в обществе, который протекает на многих уровнях:

- работа с семьями, проводимая специалистами в социальной и близких к ней областях в отношении предотвращения отказа от ребенка и воспитания детей в учреждениях с целью ограничить и постепенно прекратить поступление детей в учреждения, а также для поддержки реинтеграции детей в их родные семьи;
- реформа и работа в системе социальной помощи для осуществления программ социальной поддержки и защиты в поддержку родной и расширенной семьи с целью профилактики отказа и воспитания детей в семейной среде;
- создание альтернативных услуг и форм ухода с тем, чтобы создать возможность для вывода детей из учреждений или предотвратить их поселения в них;
- содействие развитию усыновление и воспитания с акцентом на развитие услуг для детей 0-3 лет;
- привлечение общественности в поддержку детей, выпускников учреждений, для их социального включения;

- поставить ребенка и семью в центре деятельности всех, работающих с детьми.

Основные принципы связаны с:

- Действия в защиту наилучших интересов ребенка в соответствии с Конвенцией ООН о правах ребенка - это руководящий принцип, согласно которому интересы ребенка нужно ставить выше интересов всех других, включая родителей, потенциальных усыновителей, приемных родителей или сотрудников учреждения.
- Семья это лучшая среда для развития ребенка - все работающие в сфере деинституционализации должны иметь одинаковое понимание негативного влияния, которое оказывают учреждения интернатного типа на воспитание детей и того, насколько важно воспитание ребенка в семейной обстановке.
- Социальное включение детей имеет первостепенное значение - оно должно осуществляться путем обеспечения возможностей для всех детей участвовать во всех аспектах жизни общества, в том числе, посещать местные детские сады и школы и пользоваться местными услугами здравоохранения, транспорта и другими общественными услугами.

Подходы в процессе деинституционализации:

- Для каждого ребенка необходимо сделать оценку его потребностей, которая включает в себя оценку родительского потенциала и возможность воспитания ребенка в родной семье.
- Ни одного ребенка нельзя выводить из учреждения интернатного типа без плана действий по его уходу и воспитанию, разработанному в сотрудничестве с людьми, которые в настоящее время и в будущем будут заботиться о нем, и с участием его родиной семьи, когда это возможно.
- Поддержание контакта и эмоциональной связи между родной семьей и ребенком, когда это возможно, должно быть важным элементом в обеспечении постоянной заботы для каждого ребенка, независимо от того существует или не существует возможность будущей реинтеграции.
- Для всех детей из учреждений в случае закрытия должно быть обеспечено проживание в семейной или близкой к семейной обстановке, и при этом ни один ребенок не должен быть пропущен.
- Учреждения интернатного типа не закрываются путем перемещения детей из одного учреждения в другое.

- Обеспечивается преимущество для поселения в семейную среду - при чем подбираются услуги, альтернативные проживанию в учреждениях, в первую очередь, прилагают все усилия для реинтеграции ребенка в его родную семью, когда это уместно и не угрожает здоровью и жизни ребенка. Когда это не возможно, ищется возможность долгосрочного решения в интересах ребенка, причем сначала ищется возможность поселения в семью близких или родственников, а затем - усыновителей или приемных родителей.
- Дети поселяются в условия резидентного типа для небольшого числа детей только тогда, когда не возможно организовать проживание в семье, но поиск семейной среды системой защиты интересов детей не останавливается для их поселения.
- Поиска постоянного решения для каждого ребенка является ключевой частью плана действий для того, чтобы свести к минимуму его перемещение из одной формы воспитания в другую.
- Дети должны быть включены, насколько это возможно, в процессе принятия решения о форме их воспитания, которая будет выбрана.
- Братья и сестры должны проживать в одном месте, если это уместно и возможно.
- После вывода детей из учреждений, их количество должно быть уменьшено с целью их окончательного закрытия.
- Приоритет будет отдан закрытию учреждений для детей с ограниченными возможностями на ряду с домами медико-социальной помощи для детей в возрасте от 0 до 3 лет, так как пребывание детей в учреждениях такого рода, особенно в этом возрасте является наиболее губительным для их развития.
- Активное включение персонала учреждений в процесс деинституционализации, разработки и реализации программ переподготовки и направления персонала на альтернативные социальные услуги, с целью использования существующего потенциала и человеческих ресурсов.

Главной целью является гарантирование прав детей на воспитание в семейной обстановке (среде) и доступ к качественной заботе и услугам в соответствии с их индивидуальными потребностями.

Конкретные подцели связаны с:

1. законодательным регулированием, финансовым обеспечением и предоставлением персонала для оказания широкого спектра услуг для детей и

семей в обществе, опираясь на лучшие практики и используя инновационные подходы;

2. повышением потенциала в системе защиты детей путем четкого разграничения и эффективного распределения полномочий и ответственностей органов защиты детей, поставщиков услуг и обеспечением надлежащего профессионального потенциала для эффективного функционирования системы;

3. закрытием 137 детских учреждений интернатного типа в течение 15 лет, с момента принятия документа;

4. не допущением воспитания и проживания детей в возрасте от 0 до 3 лет в резидентных условиях любого типа после завершения реформы.

Достижение этих целей требует проведение интегрированной комплексной политики в отношении детей и семей, а также и изменений следующих секторных политик:

- Принятие широкой концепции по вопросу благополучия всех детей и всестороннего обеспечения их прав.
- Услуги по поддержке родителей в помощь выполнения их обязанностей к детям, а не чтобы государство брало на себя эти обязанности, а также и повышение качества и эффективности альтернативных форм воспитания, ухода и услуг.
- Современный подход к медицинскому обслуживанию в отношении помощи мамам до, во время и после рождения детей и не допускает, чтобы больные дети и дети с особыми потребностями жили отдельно от их родителей в течение длительных периодов времени.
- Образовательная система, которая имеет потенциал и ресурсы для поддержания различных потребностей всех детей.
- Система защиты детей, которая ясно определена в различие от системы социальной помощи.
- Благоприятная и подходящая для ребенка судебная система, при которой каждый ребенок, который явился в суд - независимо от того, как жертва преступления или по обвинению за участие в совершении преступления - должен рассматриваться, прежде всего, как ребенок.
- Внедрение нового подхода финансирования услуг для детей, при котором ресурсы направлены на услуги для удовлетворения конкретных потребностей детей и семей и их эффективности, а не к зданиям, где они предоставляются.

Финансовые средства, предназначенные для удовлетворения потребностей детей, должны следовать пользователей, которые были успешно выведены из учреждения, и соответственно, уменьшает возможности и финансирования учреждения с каждым вышедшим ребенком.

КОНЦЕПТУАЛЬНЫЕ РАМКИ ВОСПИТАНИЯ ДЕТЕЙ

Рассматривая процесс в целом, а также и дифференциацию типов воспитания, то можно сделать следующие обобщения и выводы:

• С точки зрения вложения:

Резидентный тип воспитания в обществе исследован на основе выпускников „SOS детских поселений”. Однако ожидается, что большинство результатов будут применяться для всех соответствующих услуг. Они имеют самые высокие, но наиболее четкие и объяснимые текущие расходы в отношении „поселения ребенка на год”.

Воспитание в приемных условиях является наиболее дешевым с точки зрения соотношения „поселение ребенка на год”, когда при соотношении учитывать только расходы из государственного бюджета и является сопоставимым с расходами воспитания в учреждениях, при котором принимаются во внимание общие затраты. Поселение у близких и родственников на данный момент это наиболее перспективное с точки зрения затрат. Однако, учитывая децентрализованный подход, обеспечение качества и стандартов услуг является значимым.

Воспитание в учреждениях интернатного типа демонстрирует относительно низкий расход с точки зрения соотношения “поселение ребенка на год”. Хотя структура расходов государственных учреждений не отражает общую стоимость, можно утверждать, что воспитание ребенка в учреждениях может быть значительно дороже, если не принимать во внимание экономию размера.

Свидетельством качества вложенных ресурсов, все выходящие из учреждений более или менее удовлетворены основными услугами системы. В отношении усовершенствования услуг, резидентный тип воспитания в обществе и воспитание в приемных условиях почти одинаково хороши, в то время как воспитание в учреждениях отстает.

• С точки зрения результатов:

Выходящие из резидентного типа воспитания в обществе имеют относительно высокий образовательный результат с ориентацией на средне специальное образование. Они, как правило, находят работу после окончания обучения и не продолжают дальше своего образования. Они имеют независимый образ жизни, справляются с повседневными задачами, воздерживаются от злоупотребления алкоголя и наркотиков или рискованного поведения. Они имеют относительно наиболее стабильные условия работы и общаются в широкой социальной сети. Чувствуют себя на уровне своих сверстников и, как правило, довольны своей жизнью.

Выходящие из условий приемного воспитания /проживание у близких и родственников/ ведут себя подобным образом как и выпускники резидентного ухода в обществе. Тем не менее, они достигают более высокий образовательный уровень и продолжают свое обучение после школы, придерживаясь модели образования большей части населения и следуют общепринятые пути развития. Это может быть связано с более высоким уровнем образования, более численными социальными контактами, наличием трудящихся среди окружающих их лиц, в качестве модели для подражания, и относительно простым использованием каналов для обеспечения занятости, из-за их воспитания в „обычных” социальных условиях. В некоторых случаях выпускники приемной системы воспитания демонстрируют более незрелое поведение в сравнении с выпускниками резидентного типа воспитания в обществе и воспитания в учреждениях.

Выпускники учреждений интернатного типа воспитания имеют самый низкий достигнутый образовательный уровень и работают в более нестабильных условиях. В результате, как правило, зарабатывают меньше, чем другие две группы, и полагаются на социальную помощь. Они имеют менее развитые социальные связи, и часто общаются в основном с другими выпускниками учреждений интернатного типа. Их образ жизни менее здоровый, а с другой стороны, они выражают мнение, что находятся в более хорошем состоянии здоровья что, по всей вероятности, связано с необходимостью адаптироваться к более плохим условиям жизни (“выживание”), низкая восприимчивость проблем здоровья и трудностей в доступе к медицинским услугам. Наблюдается тенденция, что более взрослые выпускники учреждений интернатного типа демонстрируют более хорошую адаптацию к самостоятельный жизни в плане

жилья, работы, дохода, зрелого поведения, по сравнению с более молодыми. При этом, они проявляют себя хуже по вопросам, касающимся психического здоровья и курение. В конце концов, цена, которую оплачивают выпускники учреждений интернатного типа за успешную интеграцию в жизнь общества, является увеличенный риск для здоровья. Этот вывод нуждается в дальнейшем исследовании, с точки зрения ожидаемых затрат на психические и физические проблемы.

В отношении качества полученных „результатов" выпускниками резидентного типа воспитания в обществе и воспитания в приемных условиях имеют более высокие преимущества для общества в отношении дохода, занятости, здоровья и уголовного досье.

С точки зрения соотношения затрат и выгод воспитание в приемных условиях /проживание у близких и родственников/ является бесспорным „победителем". Резидентный тип воспитания в обществе дает подобные высокие результаты, однако этот тип воспитания препятствуют высокие затраты на ребенка.

Воспитание в учреждениях интернатного типа не обеспечивает качественных результатов, но имеет низкий уровень затрат на ребенка, и в некоторых случаях работает лучше, только в сравнении с резидентным типом воспитания в обществе.

На основании сделанных анализов могут быть определены такие предложения (Таблица 1) и утверждена общая концептуальная рамка воспитания детей (Таблица 2) [2].

Таблица 1. Определение рекомендаций

Тема	Временное измерение	Адресаты
Исследование		
Активное распространение результатов данного исследования для информирования общественного мнения о преимуществах и стоимости каждой системы воспитания детей, которые могут быть полезными в процессе принятия политических решений	Краткое до средне-срочного	Государственные учреждения
Презентация новой парадигмы анализа потребностей детей и всесторонняя разработка	Краткое до средне-	Поставщики услуг, академические и

ответа на них	срочного	научно-исследовательские учреждения
Создание системы долгосрочного сбора и анализа данных о ходе развития детей в процессе их воспитания и долгосрочные последствия различных видов воспитания для детей/молодежи в их взрослой жизни	Средне-срочное	Государственные учреждения, поставщики услуг, академические и научно-исследовательские учреждения
Внедрение методологии анализа затрат и выгод/возможность для ex-ante и ex-post оценки настоящей и реформированной системы воспитания детей	Среднее до долго-срочного	Государственные учреждения, поставщики услуг, академические и научно-исследовательские учреждения
Политика		
Разработка политики, способствующей приоритетной поддержке биологической семьи перед принимающей семьей и перед резидентным типом воспитания в обществе	Краткое до средне-срочного	Государственные учреждения
Концептуализация широкого спектра услуг, связанных с поддержкой семьи и заместительным воспитанием	Краткое до среднес-рочного	Государственные учреждения, поставщики услуг
Повышение осведомленности и способствование участию выпускников системы воспитания, получающих уход, и поставщиков системы воспитания в процессе принятия политических решений	Среднее до долго-срочного	Национальные и местные учреждения, научно-исследовательские НПО в обществе
Увеличение финансирования воспитания приемного типа /проживание у близких и родственников/ и резидентного типа воспитания в обществе	Постоян-ное	Государственные учреждения
Операции по услугам		
Определение стандартов качества,	Кратко-	Государственные

финансирования и отчетности, принимая во внимание удовлетворение потребностей детей	срочное	учреждения, поставщики услуг
Определение особенностей "интеллигентного поселения"), т.е. для подходящего поселения детей в соответствии с их потребностями по логике политики "приоритетной поддержки биологической семьи, принимающей семьи и резидентного типа воспитания в обществе"	Краткое до средне-срочного	Государственные учреждения, поставщики услуг
Разработка системы мониторинга, которая отслеживает путь каждого ребенка в подходящей системе воспитания.	Краткое до средне-срочного	Поставщики услуг
Повышение квалификации и обучение воспитателей с целью внедрения новых методов работы	Средне-срочное	Поставщики услуг

Таблица 2. Концептуальная рамка воспитания детей

1.Потреб-ности	**2.Услуги**	**3.Вложения**	**4.Результаты**	**5.Воздействие**
1.1.Физические потребности	2.1.„Физические" услуги	3.1.Финансо-вые ресурсы; 3.2.Материаль ные ресурсы; 3.3.Кадровые ресурсы; 3.4.Дополните-льные ресурсы (пожертвова-ния); 3.5.Скрытые расходы (инвестиции, связанные с "социальными" услугами).	4.1.Результа-ты, связанные с личной устойчивостью; 4.2.Результа-ты, связанные с общитель-ностью; 4.3.Результа-ты, связанные с личностью/ зрелостью; 4.4.Горизон-тальный результат. Навыки в	5.1.„Прямые” выгоды: 5.1.1.Источники доходов; 5.1.2.История занятости; 5.1.3.Экономичес-кая активность; 5.1.4.Уголовные деяния; 5.1.5.Государстве нные трансферты; 5.1.6.Налоговый вклад; 5.1.7.Состояние здоровья;
Пища; Жилье; Сон и отдых; Здоровье; Сексуальное образование; Личное пространство	Обеспечение питания; Гигиена; Предоставление жилья; Медицинская помощь; Стоматологи-ческий уход; Обеспечение самостоятель-ности			
1.2.Эмоцио-нальные потребности	2.2 "Эмоциональ-ные" услуги			

Удовольствие; Безопасность; Эмоциональ-ное развитие; Личные вещи; Личный успех; Любить и быть любимым	Спорт; Игры; Развлечения; Отношения с наиболее важным человеком; Страхование личного имущества; Личное общение		жизни	5.2.*Дополнитель-ные воздействия (дополнительные прямые выгоды): 5.2.1.Образова-тельные постижения; 5.2.2.Рисковое поведение; 5.2.3.Семейный статус; 5.3.Воздействия в отношении: 5.3.1.Жилищных условий; 5.3.2.Социальной деятельности в свободное время; Качества жизни*.
1.3.Когнитивны е потребности Когнитивное развитие; Уверенность; Разнообразие стимуляции; Обучение; Самостоятель-ность Быть важным для кого-то.	2.3.„Когнитивные" услуги Обучение; Доступ к разнообразным формам опыта; Развитие речи; Доступ к книгам, интернету, фильмам.			
1.4.Социальны е потребности	2.4 "Социальные" услуги			
Идентичность личности; Знание правил; Ощущение ценностей; Автономность; Чувство собственного достоинства; Самодостаточ-ность Духовное	Академическое образование; Общение со сверстниками; Свобода выбора и мнения; Сексуальное образование; Доступ к авторитетной личности; Развитие			

развитие; Связи	социальных навыков; Профессиональ-ное обучение; Религиозные/ культурные услуги			
	2.5 Администрация	3.5.1.Другие расходы, которые не могут быть выделены.		

ЗАКЛЮЧЕНИЕ

Создание и развитие качественно новой системы предоставления социальных услуг в Болгарии это процесс, который не может закончиться принятием набора стратегий, программ и проектов. Нормативное определение этого процесса не приводит к автоматическому получению хороших и четких результатов. Причины трудной реализации этого процесса имеют очень широкий и разный характер, но в любом случае они связаны с до сих пор существующими видами деятельности и услуг, обусловленными потенциалом болгарских социальных служб, а также - не в последнюю очередь - настроениями общества. Общественное мнение, как корректив социальных интересов, принимает не всегда однозначно конкретные действия социальных государственных служб, придает высокую социальную значимость определенным явлениям и конкретным случаям. Отсутствие детального перманентного анализа процессов по оказанию различных видов социальных услуг затрудняет их эффективное управление, а также управление рисковыми ситуациями. Несомненно, это представляет собой сложный процесс, и его оценка только по количественным показателям, которые наиболее часто использует Национальное агентство социальной помощи и Министерство труда и социальной политики, оказывается недостаточной в качестве информационного ресурса для принятия правильных четких решений в этом направлении. Статистические данные представляют собой хорошую основу лишь для первичного анализа, но не они не достаточны для более подробной обработки этих процессов.

ЛИТЕРАТУРА

1. Национална стратегия „Визия за деинституционализация на децата в Република България" приета с Протокол №8.2 на Министерския съвет от 24.02.2010 г.
2. Сравнителен анализ на разходите и ползите от системите за грижа за детето CCI 2010.CE.16.0.AT.076, Поръчан от Европейската комисия (Главна дирекция „Регионална политика").

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Research of the value orientation and structural peculiarities of management activitiesofcadets in the course of military professional training

Abstract: The specific features of the military professional activity of logistics officers is characterized by a high level of responsibility and decision making with limited time and material resources. They brought a defined requirement for professional training of future logistics officers.

Everyone is an organic system in which interacting genetic and social factors and his behavior is the result of this interaction. In each individual, this interaction is different in their particular manifestations and this leads to the formation of differences between people and uniqueness of each person. Value orientation determines the vital concept and philosophy of the individual reflects his attitude towards yourself to the outside world and other people and formed the core of his motivation. Value system of man is strictly individual and specific. Each individual ranking their values in order of importance and arranges them in a hierarchy. Value orientation implies the ability to evaluate every human activity. Exactly it implies the choice of specific life goals and means of achieving them and determines the outcome of this choice for each individual.

Object of the survey is a military professional training of future logistics officers and the subject of the survey is the formation of the values orientation and structural features management activities in the course of their military professional training.

The aim of the survey is to reveal condition of the value orientation and structural features management activities for future logistics officers.

Keywords: military professional training, training of cadets.

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Изследване на ценностната ориентация и на структурните особености на управленската дейност на курсантите в хода на военнопрофесионалната подготовка

***Резюме**:* Специфичните особености на военнопрофесионалната дейност на логистичните офицери се характеризира с високо ниво на отговорност и вземане на управленски решения при ограничени времеви и материални ресурси. Тепредявяват определени изисквания към професионалната подготовка на бъдещите логистични офицери.

Всеки човек представлява органична система, в която си взаимодействат генетичните и социалните фактори и неговото поведение е резултат от това взаимодействие. При всеки индивид това взаимодействие е различно в конкретните си прояви и това води до обособяването на различия между хората и до уникалността на всяка личност. Ценностната ориентация определя жизнената концепция и философия на индивида, отразява отношението му към себе си, към външния свят и към други хора и формира ядрото на неговата мотивация.Ценностната система на индивида е строго индивидуална и специфична. Всеки индивид ранжира ценностите по важност и ги подрежда в някаква йерархия. Ценностната ориентацияпредполага способност за оценяването навсяка човешка дейност. Именно тя предполага и изборът на конкретни жизнени цели и средства за постигането им и предопределя резултатите от този избор за всяка личност.

Обект на изследването е военнопрофесионалната подготовка на бъдещите логистични офицери, а предмет на изследването е формирането на ценностната ориентация и структурните особености на управленската дейност в хода на тяхната военнопрофесионална подготовка.

Цел на изследването е да се разкриятсъстоянието на ценностната ориентация и структурните особености на управленската дейност на бъдещите логистични офицери.

Ключови думи: професионално военно обучение, обучение на курсанти.

ВЪВЕДЕНИЕ

Спецификата в дейността на логистичните офицери поставя завишени изисквания към техните управленските качества и умения и свързаната с тях управленска ефективност. Във връзка с това разкриването на притежаваните от курсантите тилов профил ценностна ориентация и структурни особености на управленската дейностсе явява актуално направление за разкриване на пътищата и способите за усъвършенстване на военнопрофесионалната подготовката за управленска дейност и формирането на готовност за своевременно и качествено вземане на управленски решения[6].Всеки човек представлява органична система, в която си взаимодействат генетичните и социалните фактори и неговото поведение е резултат от това взаимодействие. При всеки индивид това взаимодействие е различно в конкретните си прояви и това води до обособяването на различия между хората и до уникалността на всяка личност.

Индивидуалните, групови и организационни **ценности** са от голямо значение за управлението, защото са в основата на разбирането на личностните нагласи и мотивация. Ценностите влияят върху цялостното поведение на хората, както и върху реакциите им в определени ситуации. Изучаването и изследването им помага за разбирането и въздействието върху вътрешноличностните и междуличностните конфликти, както и на конфликтите между ценностите на индивида и тези на организацията. Според Милтън Рокич **ценността** е трайно убеждение, че даден специфичен начин на държане или представата за смисъла на съществуването са лично или социално предпочитани пред противоположния или обратен начин на държане или представа за смисъла на съществуването.

Ценностите влияят върху цялостното поведение на хората, както и върху реакциите им в определени ситуации [4].

Ценностната система на индивида може да се определи като "съвкупност от устойчиви убеждения, че определен начин на поведение или статус на съществуване са по-добри от други". Тя е строго индивидуална и специфична. Всеки индивид ранжира ценностите по важност и ги подрежда в някаква йерархия. И докато ценностната система е съгласуван набор от етични ценности, които могат да служат като стандарт за насочване на човешкото поведение във всички ситуации, то **ценностната ориентация** предполага способност за оценяването навсяка човешка дейност [1]. Именно тя предполага и изборът на конкретни жизнени цели и средства за постигането им и предопределя резултатите от този избор за всяка личност.

При изясняване на връзката цел-средство-резултат следва да се има предвид, че **целта** е отражение във вид на представа за възможен, бъдещ резултат от действие, към чието постигане са насочени усилията на човека. Тя е желан, очакван и идеално предвиждан резултат, към който човек, група или колектив съзнателно се придвижва по силата на определена мотивация. **Средството** е похват, начин на действие, чрез който се постига някаква цел. То е способ, прийом, маниер, приспособление, предмет, необходими за осъществяването на определена дейност, докато **резултатът** е това, което се получава в края на някакво действие, процес, събитие. Той е последица от поведението на индивида [1].

Обща постановка на изследването

Изследователската работа се проведе във факултет „Общовойскови" на Национален военен университет „Васил Левски" в периода от 2014 до 2017г.

Изследването обхвана курсантите от специалности „Организация и управление на тактическите подразделения за логистично осигуряване" със специализации „тилови войскии гориво-смазочни материали (ГСМ)" и „придвижване и транспорт" и „Организация и управление на военните формирования на тактическо ниво" и специализация „материални средства, придвижване и транспорт".

Проучваната група е 49 души от общо 49 които са разделени на следните подгрупи (ПГ): ПГ1 - 9 курсанта, ПГ2 - 6 курсанта, ПГ3 - 7 курсанта, ПГ4 - 7

курсанта, ПГ5 - 11 курсанта, ПГ6 - 9 курсанта. Обобщаващи данни за проучваната група са показани в Таблица 1.

Таблица 1. Обобщаващи данни за проучваната група.

Под-група	Военна специализация	Година на обучение	Брой обучаеми
1	тилови войски и ГСМ	5-та	9
2	придвижване и транспорт	5-та	6
3	тилови войски и ГСМ	4-та	7
4	материални средства, придвижване и транспорт	2-ра	7
5	материални средства, придвижване и транспорт	3-та	9
6	материални средства, придвижване и транспорт	2-ра	11

Изследването се проведе на три етапа:

- първи етап – проучване на литературата и избор на методики за изследване.
- втори етап – провеждане на изследването. Емпиричната информация бе събрана чрез анкетният метод под формата на пряка групова анкета, обхващащ всички членове на изучаваната общност.
- трети етап – анализ на получените резултати и формулиране на изводи.

Изследване на ценностната ориентация

Ценностната ориентация определя жизнената концепция и философия на индивида, отразява отношението му към себе си, към външния свят и към други хора и формира ядрото на неговата мотивация. Използваната методиката на Милтън Рокич се основава на ранжиране на списък от ценности [5]. М. Рокич разграничава два класа ценности. В първия клас включва ценности, които са важни за човешкия живот като цяло. Това са главните, крайни цели на съществуването на индивида, т.е. „ценности-цели". Вторият клас се състои от

ценности, предпочитани от човек в различни жизнени ситуации. Това са „ценности-средства" [2].

Класирането на всяка ценност от курсантите е според значението, което и придават в живота в сравнение с другите. Въпроса: „До каква степен е важна и значима тази ценност в моя живот?" дава допълнителна информация за да се направят повече обосновани изводи. Анализа на йерархията на ценностите позволява чрез „ценностите-цели" да се определят ценностите в бъдещата професионална дейност и в личния живот на проучваната група, а чрез „ценностите-средства" да се определят професионално-личностните качества на проучваната група.

Анализа на резултатите от прилагането на методиката „Ценностна ориентация" дава възможност да се направят следните изводи за всички проучвани лица:

1. Първите пет ценности-цели посочени от бъдещите тилови офицери са: здраве, обич, финансово осигурен живот, щастлив семеен живот и добри верни приятели.

2. Последните три предпочитания от ценностите-цели са: щастието на другите, творчество и на последно място - обществено признание.

3. Първите пет ценности-средства посочени от бъдещите тилови офицери са: възпитание, отговорност, изпълнителност, самоконтрол и търпимост. Те дават представа за изградените водещи професионално-личностните качества на проучваната група, а именно чувсто за дълг, отстояване на дадената дума, дисциплинираност, самодисциплина, търпимост към възгледите и мнението на другите, способност да се прощава за грешки и добри маниери.

4. Последните три предпочитания от ценностите-средства са: състрадание, непредубеденост и на последно място - непримиримост към недостатъците.

На Фиг. 1 и Фиг. 2 е показано ранжирането на ценностите-цели и ценностите-средства на проучваната група, като в процентно изражение е посочен най-големият избор на съответната ценност по който тя е класирана.

Идентифицирайки ключовите „ценности-цели", стремежа на проучваната група е да постигне здраве, обич и финансово осигурен живот чрез реализирането на „ценностите-средства" възпитание, отговорност и изпълнителност



Фиг. 1. Ранжиране на „ценностите-цели" на проучваната група.



Фиг. 2. Ранжиране на „ценностите-средства" на проучваната група.

Изследване на структурните особености на управленската дейност

Изследването на структурните особености на управленската дейност се постига чрез методиката „Цел - Средство - Резултат", разработена от А. Карманов. Основана е на връзката при управлението на мотивацията за труд между поставената цел, необходимите средства и очакваният резултат, отразяващи основните характеристики на всяка дейност. Всяка дейност може да се разглежда като съставена от три компонента:

• в началото на всяка дейност изпълнителят синтезира голямо количество информация и поставя собствени цели, като започва да изгражда определена представа за желаното крайното състояние на дейността си;

• на по-късен етап изпълнителят се нуждае от ресурси и средства за постигане на целите си;

• крайният измерител от всяка дейност е получения резултат - ползата, която реализира индивида [3].

Методиката се състои от въпросник с 32 въпроса, в които се съдържат твърдения свързани с характера и поведението на проучвания и обработка на отговорите чрез пресмятане и тълкуване на резултатите. В съответствие с посочен ключ се определя сумата на получените точки. В Таблица 1 са посочени резултатите от проведеното изследване.

Таблица 1.Ниво на компонентите от методиката „Цел - средство - резултат"

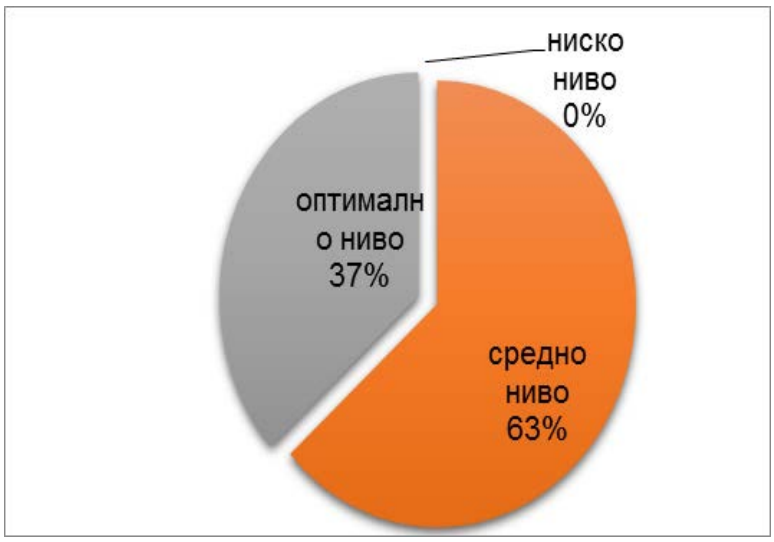
Подгрупа / Компоненти и нива	ПГ 1	ПГ 2	ПГ 3	ПГ 4	ПГ 5	ПГ 6
Компонент „Цел"						
ниско ниво	-	-	-	-	1	-
средно ниво	4	4	5	6	6	5
оптимално ниво	5	2	2	1	4	4
Компонент „Средство"						
ниско ниво	-	1	-	-	2	1
средно ниво	7	4	4	3	4	7
оптимално ниво	2	1	2	4	1	3

високо ниво	-	-	1	-	2	-
Компонент „Резултат“						
ниско ниво	-	1	-	-	-	-
оптимално ниво	9	5	7	7	8	11
високо ниво	-	-	-	-	1	-

Данните от проведеното проучване върху компонента „Цел“ показват, че:

- В по-голямата си част (63%) за курсантите поставените цели са необосновани и нестабилни. Не всички действия са целесъобразни и понякога са несъдържателни. Те са податливи на вземане на решения под въздействие на външен натиск. За да се подготвят за изпълнението на дадена дейност им е необходима силна воля.
- От анкетираната група няма лица, които да не могат да си поставят конструктивни, добре формулирани и постижими цели. Проучваните се характеризират с множество бариери, в т.ч. страх от себеизразяване и липса на мотивация.
- От проучваната група 37% демонстрират отимален резултат. Те си поставят реални цели, подготвени са да ги постигнат, мотивите им са целесъобразни и тяхната дейност е систематична и приоритизирана.

Данните от проучването на компонента „Цел“ са показани на Фиг.3.

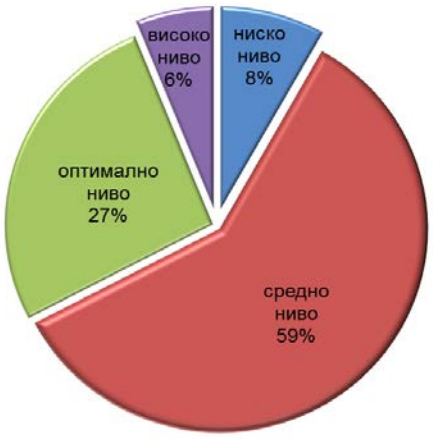


Фиг. 3. Обобщени резултати за компонент „Цел“

Данните от проведеното проучване върху компонента „Средство" демонстрират, че:

- Със ниско ниво на проявление са 8% от проучваните. Те изпитват липса на средства за постигане на поставените цели. Техни типични проявления са: ниската притежавана потенциална енергия, силната зависимост от ситуацията, силната зависимост от други хора, силната зависимост от мнението на околните, наличие на комплекси, които възпрепятстват да се използва пълноценно вътрешния си потенциал.
- Средно ниво са демонстрирали 59% от проучените курсанти. Те периодично срещат трудности при избора на средства за постигане на целите си.
- Оптимален резултат показват 27% от бъдещите тилови офицери. Те са свободни в избора си на средства, тяхното поведение е в зависимост от изискванията на ситуацията. Налице е адекватна потенциална енергия и няма промяна в тъхното поведение или убеждения в резултат на групов натиск. Поведението им не предизвиква комплекси, мнителност и негативизъм.
- Високо ниво показват 6%, като тяхното поведение е твърде спонтанно. Те не търсят помощ от други членове на екипа и предпочитат да бъдат начело на хора и ситуации. В своите действия не зачитат съществуващите стандарти на поведение и често действа срещу тях. Налице е повишена агресивност, приемаща различни преки и косвени форми.

Данните от проучването на компонента „Средство" са показани на Фиг.4.

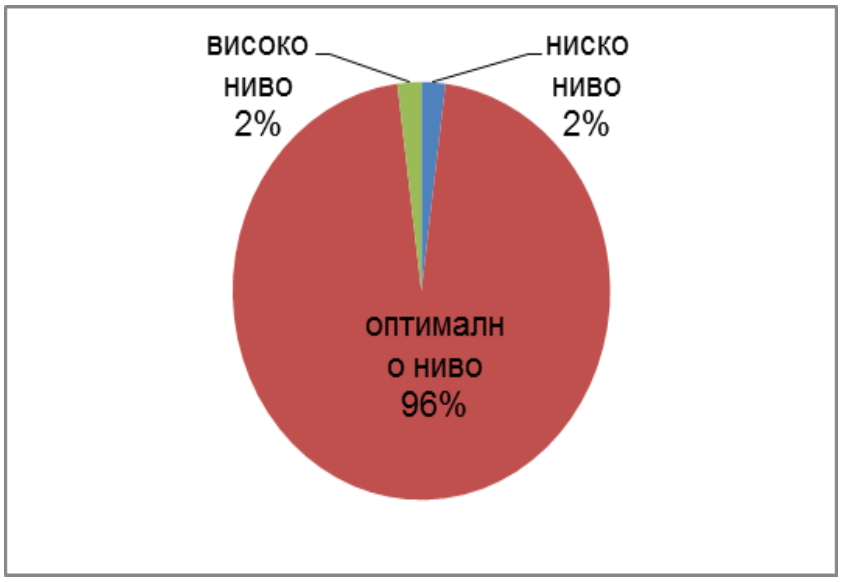


Фиг. 4. Обобщени резултати за компонент „Средство"

Данните от проведеното проучване върху компонента „Резултат“ показват, че:

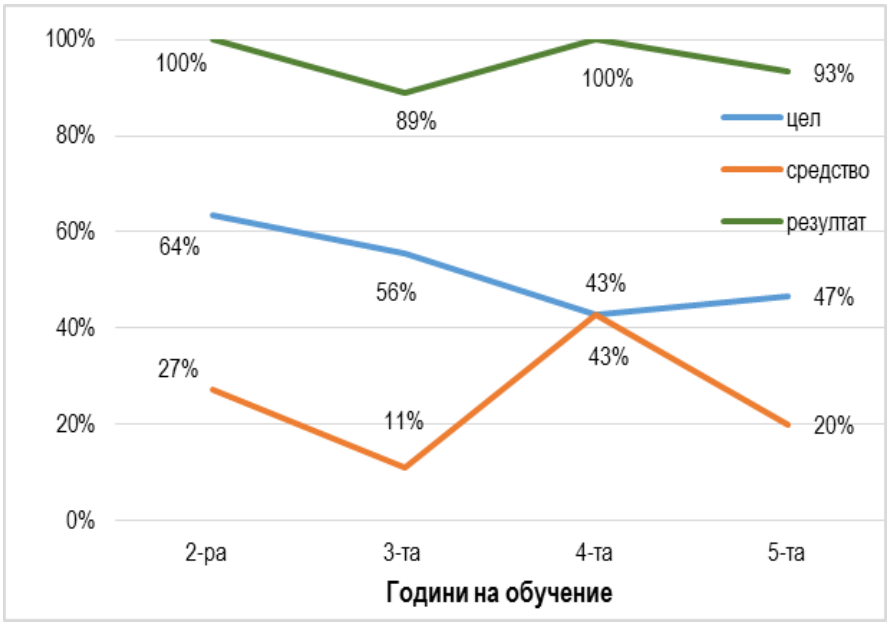
- - По един един обучаем (2%) от проучваните бъдещи тилови офицери попадат в диапазона на ниско и на високо ниво. При ниското ниво изпълнителят е склонен да надценява резултатите от своята дейност, като успехът причинява пристъпи на силно веселие, а неуспехът провокира неадекватна тъга. При високотониво изпълнителят подценява силно резултатите от своята дейност, склонен е към излишна критичност, в оценките си за поведението на другите хора преобладава неодобрението.
- Оптимално ниво показват 96% от проучените. За това ниво е характерно, че изпълнителят оценява адекватно резултите от своята дейност. Не подценява и не надценява резултата. Оценките му за други хора и събития са сравнително безпристрастни. Личностното му израстване е нормално динамично. Данните от проучването на компонента „Резултат“ са показани на Фиг.5.

Анализа на оптималните нива на проявление по отделни компоненти на структурните особености на управленската дейност показва, че учебните планове формират в курсантите едва 27% от компонента „Средство“ и 37% от компонента „Цел“. На другия полюс е формирането на компонента „Резултат“, който достига 96%.



Фиг. 5. Обобщени резултати за компонент „Резултат“

Интерес за научното изследване представлява формирането на отделните компоненти по години на обучение. На Фиг.6 са посочени обобщаващи данни за процеса на формиране на оптимални нива на проявление на компонентите цел, средство и резултат по години на обучение.



Фиг. 6. Формиране на оптимални нива на проявлениена отделните компоненти по години на обучение

Получените резултати по години на обучение свидетелстват, че обща закономерност и за трите анализирани компонента се явява по-ниските нива от средните такива в края на подготовката - за компонента „Резултат“ отклонението е 0% (средна стойност 96%), за компонента „Средство“ е -5% (средна стойност 25%) и -5% за компонента „Цел“ (средна стойност 52%). Военнопрофесионалната подготовка дава отлични възможности за формирането на реална оценка на резултатите в обучаемите. Съществени изменения се наблюдават във формирането на реални цели и на адекватен избор на средства. По компонентите „Средство“ и „Резултат“ учебните планове като цяло трудно формират и постепенно намаляватформирането на оптимални нива в обучаемите.

ЗАКЛЮЧЕНИЕ

В заключение следва да се подчертае, че съществуващата система за професионална подготовка дава възможност за формиране на реална оценка на резултатите в обучаемите от Национален военен университет „Васил Левски“.

Съществени негативни изменения се наблюдават във формирането на реални цели и на адекватен избор на средствав обучаемите от Национален военен университет „Васил Левски".

В резултат на проведеното проучване се установи, че стремежа на значителна част от курсантите е да постигне здраве, обич и финансово осигурен живот чрез възпитание, отговорност и изпълнителност.

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Research of the motivation for management activities of cadets in the course of their military professional training

Abstract: At the terms of improvement of the Armed Forces of the Republic of Bulgaria, the commissioning of new military equipment and armaments, optimize the organizational structure of military units, and increase the quality requirements for training of cadets of higher military schools. The graduates from the Vasil Levski National Military University is necessary to prepared to fulfill their functional duties and have positive motivation for continuous improvement of professional qualifications, for improvement of military professional activities in accordance with dynamically changing security environment and for solving the multi tasks. The readiness of the future officers for such activities is based on the acquiring of depth military professional knowledge and skills and the formation of appropriate levels of motivation for management activities.

As future officers present cadets should know the needs of their subordinates, they can use and apply different motivational techniques to increase the their own level of motivation and the motivation of their subordinates, and in order to reach highly professional competences. In connection with the successful implementation of the profession „officer" should clarify what are the main motivating factors encouraging individuals to work, how they are achieved in the course of training and the role of personal effort for the individual and collective training.

Object of the survey is a military professional training of future logistics officers and the subject of the survey is the formation of motivation to achieve positive results

and avoiding failures and the fear of failure in the course of their military professional training.

Aim of the survey is to reveal the condition of motivation to achieve positive results and motivation of avoiding failure and the fear of failure in military professional training for the implementation of management activities of future logistics officers.

Key words: military professional training, training of cadets.

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Изследване на мотивацията за управленска дейност на курсатите в хода на тяхната военнопрофесионална подготовка

Резюме: В условията на усъвършенстване на въоръжените сили на Република България, въвеждането в експлоатация на нова военна техника и въоръжение, оптимизиране на организационно-щатната структура на военните формирования, нарастват и изискванията към качеството на подготовка на курсантите от Висшите военни училища. Випускниците на Национален военен университет „Васил Левски" е необходимо да бъдат подготвени за изпълнение на техните функционални задължения и да имат положителна мотивация за постоянно повишение на професиналната квалификацията, за усъвършенстване на военнопрофесионалната си дейност в съответствие с динамично променящата се среда на сигурност и за решаване на многопластови задачи. Готовността на бъдещите офицери за подобна дейност се основава на придобиването на задълбочени военнопрофесионални знания и умения и на формирането на подходящи нива на мотивация за управленска дейност.

Като бъдещи офицери настоящите курсанти трябва да познават потребностите на подчинените си, да могат да използват и прилагат различни мотивационни методи, с оглед повишаване нивото на собствена мотивация и мотивация на техните подчинени, и с цел достигане на високо професионално представяне. Във връзка с успешното усвояване на професията офицер би следвало да се изяснят кои са основните фактори мотиватори, подтикващи индивида към дейност, как те се постигат в хода на обучението и каква е ролята на личното усилие за индивидуалното и колективно представяне на обучаемите.

Обект на изследването е военнопрофесионалната подготовка на бъдещите логистични офицери, а предмет на изследването е формирането на мотивация за постигане на положителни резултати и за избягване на неуспехи и на страха от провал в хода на тяхната военнопрофесионална подготовка.

Цел на изследването е да се разкрият състоянието на мотивация за постигане на положителни резултати и на мотивация за избягване на неуспехи и на страха от провал при военнопрофесионалната подготовка за осъществяване на управленска дейност от бъдещите логистични офицери.

Ключови думи: професионално военно обучение, обучение на курсанти.

ВЪВЕДЕНИЕ

Мотивацията е процес, който подтиква индивида да се държи по определен начин и определя до голяма степен поведението на хората, неговите форми, посоки, интензивност и продължителност. Традиционно мотивацията се разглежда под две основни форми - вътрешна и външна [7]. Под понятието „вътрешна мотивация" се разбират тези вътрешноприсъщи личностни фактори, които влияят на индивида да се придържа към определено поведение. Докато вътрешната мотивация винаги е резултат от прекия интерес на заинтересованите в дейността на организацията лица и зависи персонално от личността, с понятието „външна мотивация" се определя системата от въздействия за мотивиране на хората за постигане на определена цел. Външната мотивация се генерира от елементи, принадлежащи към работната среда или външни фактори, поради което тя се превръща в тип отношения човек-организация, които са определящи дали дадено лице ще положи някакви усилия и получи определени резултати.

Като бъдещи офицери настоящите курсанти трябва да познават потребностите на подчинените си, да могат да използват и прилагат различни мотивационни методи, с оглед повишаване нивото на собствена мотивация и мотивация на техните подчинени, и с цел достигане на високо професионално представяне. Във връзка с успешното постигане на целите на индивидуалното и колективно военно обучение, както и във връзка с успешното усвояване на професията офицер би следвало да се изяснят кои са основните фактори мотиватори, подтикващи индивида към дейност, как те влияят върху обучението, как се прилагат в обучението и каква е ролята както на личното усилие, така и на външните фактори върху индивидуалното и колективно представяне на обучаемите [6].

Мотивиращите фактори са въздействия, които мениджмънтът използва и прилага върху поведението на хората в труда. Те са сложна комбинация от икономически, организационно-управленски, социални, психологически и психически фактори, като посоченото единство от фактори влияе върху трудовото представяне на персонала и резултатите от неговата дейност.

Чрез извършване на анализ върху мотивацията и удовлетвореността се изготвя комплексна картина, характеризираща състоянието на удовлетвореност и неудовлетвореност на потребностите на индивида. С изследването и анализирането на които могат да се диагностицират наличните проблеми и да се разработи реална и обоснована програма от практически действия за подобряване на мотивацията в организацията. Това дава възможност не само да се прогнозира характера и посоката на поведение на личностите в дадената организация, но и да си усъвършенстват елементите на организационната култура и насочат към постигане на максимални резултати от обучението в специфичната среда на Национален военен университет „Васил Левски" .

В основата на активността на човека стоят надеждата и потребността от успех. Успехът може да се дефинира по различни начини: постигането на дадена цел, прогрес, сполука; обществено признание и одобрение; степен на овладяване на знания, изразена в оценки.

Хората ориентирани към успех обикновено са уверени в себе си, в собствените си сили, отговорни, инициативни и активни. Те се отличават с целеустременост и постоянство при постигане на поставената цел. Мотивът за достижения, като устойчива характеристика на личността, е описана за първи път от Х. Мърей и се

разбира като устойчив стремеж да се направи нещо бързо и добре, да се постигме определено равнище при изпълнението на някаква задача. Достижението е нещо, постигнато в някаква област; висок резултат, успех. В процеса на по-нататъшно изследване на този мотив се разграничават две независими мотивационни тенденции: стремеж към успех и стремеж да се избягва неуспеха.

При анализ и оценка на потребността от достижения и избягване на неуспеха интерес представлява зависимостта на личноста от други хора или ситуации. Това е властта и влиянието, които приемаме и допускаме другите да имат над нас. Противоположно на зависимостта, независимостта изразява самостоятелност, рядко търсене на покровителство от другите и инициативност и силно изявена потребност от достижения.

Доминантността е присъща на потребността от достижения. Тя е израз на стремежа на индивида да подчини другите. При успех той изпитва задоволство и се самоутвърждава. При неуспех емоциите са негативни.

Съвременното управление счита, че ключът към мотивиране на персонала е в разпознаване на индивидуалните потребности на отделните лица. Следователно мотивационната система изградена от организацията трябва да бъде гъвкава, за да отговаря на разнообразието им.

Потребността е „относително устойчиво психическо състояние на личността, което се характеризира с влечение към вещите и явленията, преживявани като необходимо условие за съществуването на личността", докато нуждата е обективната необходимост, която самият човек може да не преживява и да не осъзнава. Възникналите потребности подтикват личността да търси активно пътища за тяхното удовлетворяване, превръщат се във вътрешни подбудители на нейната дейност – в мотиви [1].

Отправният пункт на процеса на мотивация е незадоволената потребност. Недостигът на нещо вътре в индивида е първото звено във веригата от събития, водещи към определено поведение. Незадоволената потребност предизвиква напрежение (физическо или психическо) вътре в индивида, което го довежда до ангажиране с определен вид поведение с цел задоволяване на потребността и понижаване на напрежението. Следователно мотивацията можем да представим като процес, който подтиква индивида да се държи по определен начин и

определя до голяма степен поведението на индивидите по форма, посока, интензивност и продължителност, а както отбелязва английският специалист Майкъл Армстронг да мотивираш хората, означава да ги насочиш в определена посока и да предприемеш необходимите стъпки, за да стигнат те до там [1].

Стимулите са един от важните компоненти на мотивационния процес. Чрез тях човешкото поведение получава направление с оглед задоволяване на определени от потребности и интереси. Основна управленска задача в организацията е тази да се мотивира човешкия ресурс за ефективна работа и използване на собствения си потенциал ползотворно. Наличието на многообразни концепции и възгледи по този въпрос е свидетелството за голямата сложност на проблема за мотивацията на личността.

Изследване на мотивацията за постигане на положителни резултати

Мотивацията за постигане на положителни резултати е свързана със стремежа към подобряване на резултатите от обучението и труда, с намаляване на неудовлетвореността от постигнатите резултати, проявяване на упоритост в постигането на собствените цели и стремеж към самоутвърждаване. Тази мотивация се явява едно от главните свойства на личността, което оказва влияние на постигането на положителни резултати през целия съзнателен живот на даден човек.

Налице е тясна връзка между нивото на мотивация за постигане на положителни резултати и успеха в професионалната кариера. Хората притежаващи високо ниво на тази мотивация са уверени в успешният край на дадено начинание, търсят информация свързана със своите успехи, готови са да поемат отговорност, предприемат решителни действия в неясни ситуации, проявяват настойчивост в стремежа си към постигане на целите, получават удоволствие от справянето с интересни задачи, не се впускат в излишна конкуренция, показват по-голяма упоритост при среща на трудности и препятствия.

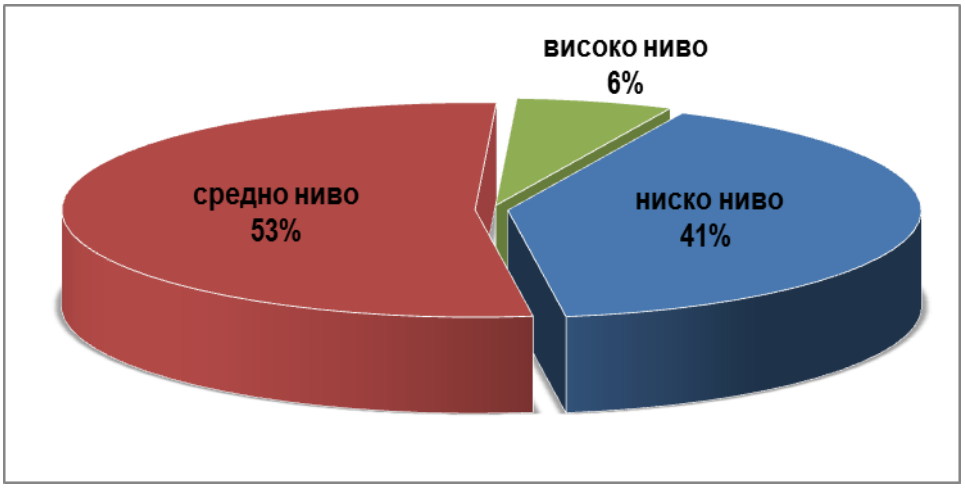
Измерването на нивото на мотивация за постигане на положителни резултати е възможно с теста на А. Карелин [3].

В Таблица 1. са посочени резултатите от проведеното проучване на мотивация за постигане на положителни резултати на изследваните курсанти.

Таблица 1.Ниво на мотивация за постигане на положителни резултати по проучвани подгрупи

Подгрупа / Ниво на мотивация за постигане на положителни резултати	ПГ 1	ПГ 2	ПГ 3	ПГ 4	ПГ 5	ПГ 6
ниско	2	5	3	3	3	4
средно	7	1	4	3	5	6
високо	0	0	0	1	1	1

Данните от проведеното проучване показват, че курсантите в по-голямата си част (53%) имат средно ниво на мотивация за постигане на професионални успехи. Много голяма част от проучените показват ниска мотивация за постигане на положителни резултати и успехи в професионалната кариера (41%). От анкетираната група само 6% показват високо ниво на мотивация за постигане на положителни резултати. Данните от проучването са показани на Фиг. 1.

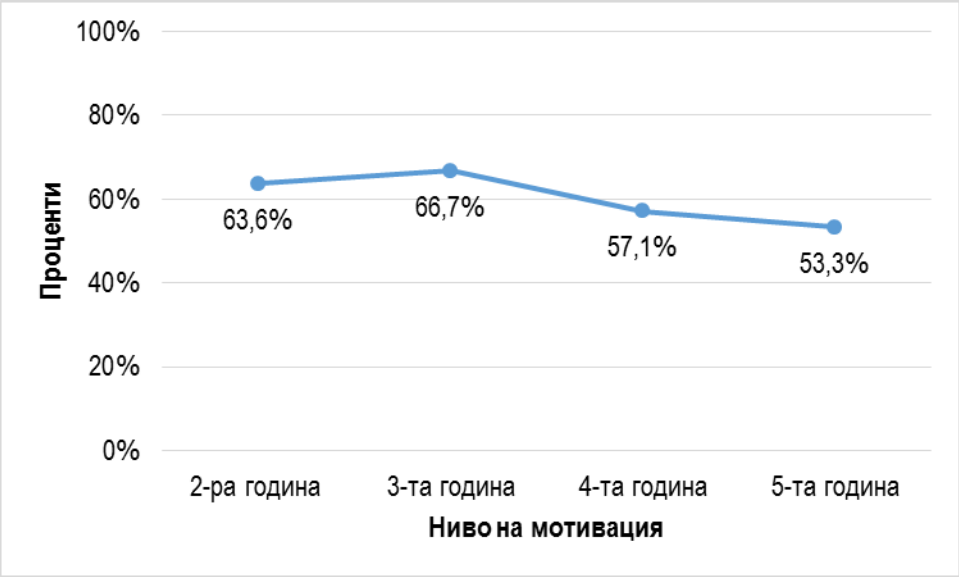


Фиг. 1. Потребност от постигане на положителни резултати

Основните процеси на формиране на средно и високо ниво на мотивация за постигане на положителни резултати на обучаемите по години на обучение в НВУ „Васил Левски" е показано на Фиг. 2.

Като цяло може да се направи извода, че учебените планове за подготовка на курсанти обучаващи се по военни специализации „тилови войски и ГСМ",

„транспорт и придвижване“ „материални средства, придвижване и транспорт“ предоставят добри възможности за формиране на подходящи нива на мотивация за постигане на положителни резултати сред бъдещите тилови офицери. Това е един от факторите за проявяване на упоритост в изпълнението на поставените задачи и стремеж към утвърждаване на воинските добродетели. Необходимо е усилията да бъдат насочени към доразвиване на мотивация за постигане на положителни резултати с цел преодоляване на намаляващата тенденция по години на обучение и в края на своето обучение нивото на мотивация да е най-високо.



Фиг. 2. Резултати за изследваните средно и високо ниво на мотивация за постигане на положителни резултати по години на обучение.

Изследване на мотивацията за избягване на неуспехи и на страха от провал

Теста е предложен от Т. Елерсом и позволява да се оцени мотивацията за избягване на неуспехи и на страха от провал [4]. Германският учен Ф. Буркард твърди, че следването на защитно поведение в работата зависи от три фактора: степента на предполагаемия риск; преобладаващата мотивация; натрупаният опит от неуспехи в работата. Приемането на защитно поведение се засилва от две обстоятелства: първо когато без поемане на риск се постига желаният резултат и второ когато рисковото поведение води до проблеми. Постигането на

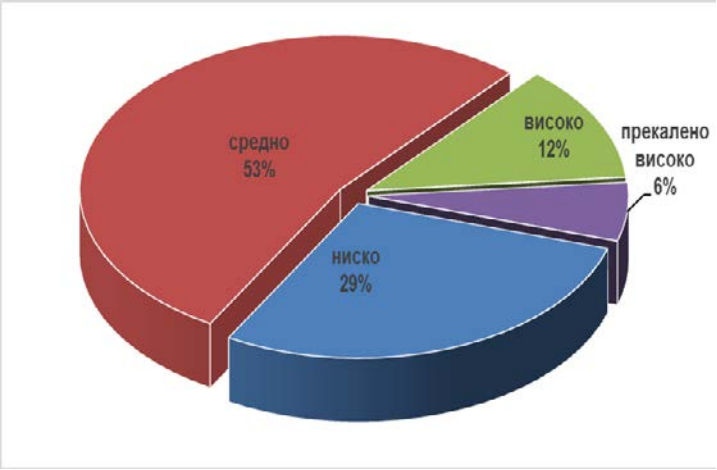
безопасен резултат при рисково поведение намалява приемането на защитно поведение, т.е. мотивация за преодоляване на неуспехи [5].

В Таблица 2 са посочени резултатите от проведеното проучване на мотивацията за избягване на неуспехи и на страха от провал на изследваните курсанти.

Таблица 2. Ниво на мотивация за избягване на неуспехи и на страха от провал

Подгрупа / **Ниво на мотивация за за избягване на неуспехи**	ПГ 1	ПГ 2	ПГ 3	ПГ 4	ПГ 5	ПГ 6
ниско	1	1	7	1	2	2
средно	8	2		5	5	6
високо		2			2	2
прекалено високо		1		1		1

Данните от проведеното проучване показват, че курсантите в по-голямата си част (53%) имат средно ниво на мотивация за избягване на неуспехи и на страха от провал. Много голяма част от проучените показват ниска мотивация за избягване на неуспехи и на страха от провал (29%). От анкетираната група само 6% показват високо ниво на мотивация за постигане на положителни резултати. Данните от проучването са показани на Фиг. 3.

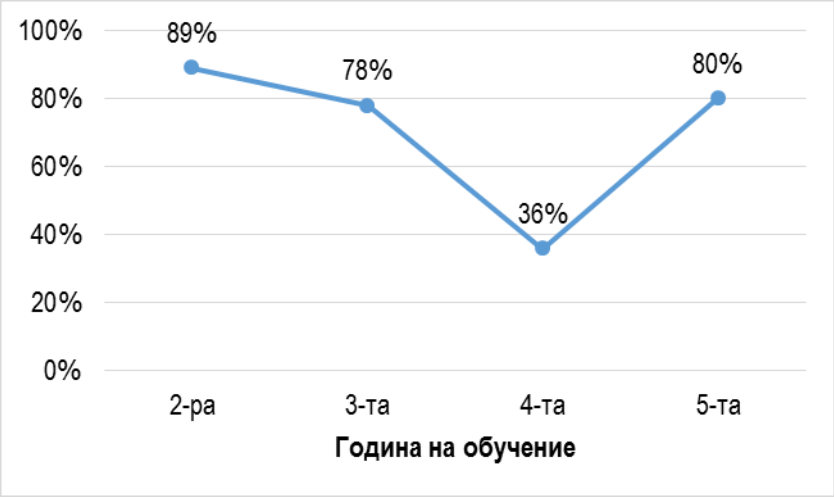


Фиг. 3. Резултати за нивото на мотивация за избягване на неуспехи и на страха от провал

Анализа на данните показва, че в повече от половината - 65% е формирано средно и високо ниво на мотивация. Безпокойство поражда малкият процент - 12% в които в формирано високо ниво на мотивация.

Формирането на средно и високо ниво на мотивация за избягване на неуспехи и на страха от провал в курсантите тилов профил по години на обучение в Национален военен университет „Васил Левски" е показано на Фиг. 4.

Получените резултати свидетелстват, че в началото на своето обучение бъдещите логистични офицери са високо мотивирани за избягване на неуспеха, но постепенно тази мотивация спада и в четвъртата година на обучение приема най-ниска стойност (36%). Намаляването на мотивацията е с 53% за две години, т.е много високи стойностти на загуба на мотивация. През петата година на обучение се забелязва тенденция на нарастване на мотивацията за избягване на неуспеха (80%), но тя не достига първоначалните нива.



Фиг. 4. Формиране на средно и високо ниво на мотивация за избягване на неуспехи и на страха от провал по години на обучение.

Интерес за научното изследване представлява съпоставянето на процесите на формиране на мотивациите за постигане на положителни резултати и за избягване на неуспехи и на страха от провал сред бъдещите логистични офицери. Обучението в Национален военен университет „Васил Левски" предоставят добри възможности за формиране на средни нива на мотивация и незадоволителни възможности за формиране на необходимите високи нива на мотивация. Ниските средни нива на мотивация имат високи стойности (29% и 41%) което не е добър индикатор за формиране на мотивационните нагласи на

бъдещите логистични офицери. Формирането на високите нива на мотивация има тенденция да намалява в годините на обучение и дори достига 0% в края на обучението за мотивацията за постигане на положителни резултати.

ЗАКЛЮЧЕНИЕ

Формирането на мотивация за постигане на положителни резултати и за избягване на неуспехи и на страха от провал в хода на военнопрофесионална подготовка на курсантите се явява основна задача на учебно-възпитателният процес в Национален военен университет „Васил Левски". Обучението в Национален военен университет „Васил Левски" предоставя добри възможности за формиране на подходящи нива на мотивация за постигане на положителни резултати сред бъдещите логистични офицери.

Учебените планове за подготовка на курсанти позволяват да се формират средни нива на мотивация и незадоволителни възможности за формиране на необходимите високи нива на мотивация. Усилията на академичният и командният състав е целесъобразно да се насочат за формиране на високи нива на мотивация за постигане на положителни резултати с цел преодоляване на намаляващата тенденция по години на обучение и в края на своето обучение нивото на мотивация да е най-високо.

Мотивацията за постигане на положителни резултати и мотивацията за избягване на неуспехи и на страха са основни фактори за проявяване на упоритост в изпълнението на поставените задачи, придобиването на задълбочени военнопрофесионални знания и умения, формирането на подходящи нива на мотивация за военнопрофесионална дейност и стремеж към утвърждаване на воинските добродетели.

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Formation of architecture and art expansion of art museums

Abstract: The article is dedicated to problem of formation of architecture and art expansion of art museums.

Key words: museum, Art museum, extention Art museum.

Feauture of formation of architecture and art expression in the expansion of art museums consist in need of perception of two, and more objects sometimes, that form a single museum environment. It should be noted that the aesthetics of the building will always differ one another, because they was formed in different historical period. For each of them will be its own views on architectural-artistic expression.

The expansion aims to improve functional-planning structure of museum, that requires the increasing of general building square. The existing building of museum and its expansion are located in a single area in most cases and have a direct impact on each other. The solution of question about interaction of the objects comes down to living conditions through harmonization or opposition.

From the history of architecture is known that in designing of the museum expansion in the late XX century there are two directions in creation of imaginative expression. On the one side it is expressive and deconstructive direction (arch. F.Gehry, D.Libesking, Z. Hadid), and on the other side it's minimalism and restraint, favoring functional direction (arch. Ludwig Mies van der Rohe, Andō Tadao, Alvar Aalto, J. Taniguchi) [1].

Consideration of modern architectural projects of art museums indicates that most of them consider the requirements of the relevant technology. At the same time, that the objects, in which advocated the supremacy of imaginative expression of the museum over its functional - planning structure, continue designing. Excessive capture in appearance of the museum building has led to a situation "using architecture as a

decoration(backdrop)", when the solution of financial problems becomes substantially higher of existence of the museum [2].

Based on the study of experience in designing and building museums and their expansion is determined that the rights to exist have as expressive and minimalist trends in the formation of architectural-artistic expression. Architecture-artistic expression is a membrane that surrounds the functional-planning museum solution, the significance of which is now less important. In all cases, the function must be solved in a professional maner, and ideology of creating shell is a question of taste, creative personality's outlook, financial capabilities.

The process of museum extension characteristic the buildings, which were built a few decades ago, or even centuries ago, their own architectural-artistic image that must be considered having. The task of architect consists of not only in fulfilled all conditions of function museum, but also architecture-artistic combination of different eras.

World experience shows that there are no examples of the expansion of the museum that bears the architectural-aesthetic creatures as the main museum building. Therefor, in the practice of expansion of art museums should be used modern vision of architecture.

During the interection of the analysis of the main building and its future expansion should be considered the following elements;

- the ratio of the volume of existing and new buildings;
- the ration of the high;
- using the items decoration surfaces.

The main principles, which formed the architectural-artistic expression of expanding of art museums, include: contrast, nuance, neutrality. The principle of contrast should be used in case of contrasting aesthetics of the main building and its expand. The nuance solutions should be used for extensions, where the aesthetics of the main building consistent with its extension. The neutral decisions should be conducted under the condition of ensuring the least possible impact on the main building and the environment. For it, it is necessary to use neutral forms and decoration of surface of the building.

On the basis of research and design search was identify methods of creation of architectural-artistic expression of museum expanding:

- contrasting architectural - artistic expression of the main building and its expansion;
- approval of architectural - artistic expression of the main building and its expansion;
- acquisitions original architectural - artistic expression of the main building of the extension;
- changing the original architectural - artistic image of the main building of a new architectural - artistic expressiveness expansion.

During contrasting architectural-artistic expression of the main museum building and its extension, the approval of the full or partial consideration existing architectural-artistic qualities are not happened. Typically. The main task is to identify the "dominance" of extension. The primary means of artistic expression should act "contrast" to the main museum building and environment situation, which was happened.

During work was identified areas for achieving "contrast" solution. First is achieved through a significant increase of the ratio of volumes and heights of buildings (more than twice). Second was achieved by solving of contrast decoration of surface of the building with the use of colors and architectural elements.

In some cases, in the absence of compositional unity of existing architectural-planning solution of urban environment, contrasting of architectural-artistic expression of the main building and its extension, namely "dominance" extension, can be used as a unifying element of composition in the same time.

The approval of architectural-artistic expression of the main building and its expansion is provided in case of saving the holistic perception of the architectural image of the museum and its expansion. To implement this technique should be used "nuance solutions", that don't involved "dominance" of one of the building, that will help preserve the ratio of volumes, heights, facades elements.

The reception of absorption architectural-artistic expression of the main building of its extension occurs in conditions of significant (200%) increase of the total area extensions and its using are typical for small museums. In this case, the building, that extends, is as one part of composition solution and doesn't play the role of main architectural-artistic factor, and save its own historical architectural-artistic expression. The overall architectural composition should be based on the "contrast" with dominate role of the extension. For architectural-artistic integrity of perception of small museums,

in case of their extension, should be used very large types of extensions of using absorption reception architectural-artistic expression of its own main building.

The changing of the original architectural-artistic expression of the main building to the new architectural-artistic expression of the extension occurs at the time of universal absorption of the main building of the museum, when it is placed in the middle of the extension and have no direct relation with environment. In this case, the main building museum becomes as a museum exhibit itself. Its facades is restored to its original appearance or is remained in the form that was before the extension. This method can be used for smaller historic building, which began the development of more powerfull museums. The expanding these museums can be more than 300% of the total area of the main building.

The urban planning component of influence on architectural-artistic expression of museum carried through the existence or absence of the land and the type of the extension that takes place on the existing side. In case of extension of the museum on the side, that it owns, is architectural-artistic interaction between the main building and its existence, because the both buildings are in a short distance in the cast majority. Their areas of visual perception overlap and impose, seeing as one.

In case of the extension, that is held outside the museum (adjacent to the existing site), the degree of interaction between the existing object and new construction is significantly weakened. The location of extension regarding the main building influences on the formation of the architectural-artistic features of the museum. The degree of influence is determined according to the type of extension. The closer the object of extension is located to the main building of the museum, the greater is an impact. Most of it concern the related extension and expansion of a distance connectivity buildings using transitions.

On the architectural-artistic expression of the extension affect functional-planning features of the museum. The study found that 50% of the museum area are the exhibition halls, which have different conditions of functional and operation parameters from the general. First of all it is geometric dimensions, height and the number of rooms. These facilities require large geometric dimension and minimize number of intermediate supports. These requirements can be implemented by using a large-span structures, which increases the height of the structure. This exhibition halls are critical in the formation volumetric - spatial composition, which directly affects its architectural - artistic expression.

From the experience of design are not only identified some areas of designing extensions, but also individual architectural - artistic tastes of individual architects that combines the personal perception of the world, the spiritual content, social demand and implementation methods.

Among the most famous architects working in designing museums and their extensions should be noted D. Libeskind, Hadid S., F. Gehry T. Ando, Y. Taniguchi. The architectural style of their works has a definite, personal vision on the enlargement process art museums, and has a significant influence on the modern architectural - artistic expression of the museum [3, 4].

The new methods of design and the use of new building materials opened the way to forming a new architectural - artistic expression of museums that can not be done with traditional materials. Thus, widespread dissemination become bionic forms for implementation of which is used modern materials. Instead of the traditional brick and concrete came to the light, robust, (with new aesthetic qualities) materials - metals, titanium, etc. Light weight, strength, flexibility make it possible to produce double curvature surface.

In the facade of the museum with continuous use of glass should be used sheets of perforated metal. This allows you to seeing the building in a distance as a whole neutral volume that has no windows. Imaginative solutions such buildings is easier to insert into the surrounding building. Simultaneously, perforated facade, that placed in a distance from the surface of the glass, partial diffuses daylight that promotes a comfortable environment exposure, and protects the room from overheating. In the evening light from the inside through the holes of perforated facade gets out, creating the effect of soaring property in the city.

In recent decades a great influence in shaping the aesthetics of museum buildings contributes to the development of innovative technologies. First, it is the use of alternative sources of energy, which contributes to implementation of their projects in areas of "ecological architecture" [5]. For installation of such devices should provide large flat horizontal surfaces of buildings. The optimum angle of the solar panel is 90 degrees to the sun. This position ensures maximum effectiveness of its work. In addition, there are allowable angles which are calculated by a special formula. In some cases it allows not only horizontal but also vertical plane. The presence of large surfaces of external walls allows the use of modern optical imaging performed at art festivals such as laser shows, optic installation.

The influence of light on the formation of architectural - artistic image of art museums extension is due to natural and artificial light. Natural light requires placing on the facades and roofs of building devices that facilitate the penetration of rays to provide lighting exhibits. The use of this element provides additional building qualities of artistic expression that distinguish it from surrounding buildings.

The using of styling decorative elements of the existing museum in the formation of architectural - artistic expression of extensions of art museums is one of the techniques of visual imagery solution of expansion. It identifies the most characteristic features of the main building of the museum in order to further expand use during construction of the museum. This feature of this principle should be used in expanding in the case of the principle "approval aesthetics of the main building and its expansion."

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Grotesque as an Antiform
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Гротеск как Антиформа
(на материале творчества Витольда Гомбровича)

Цель настоящего исследования представить гротеск как абразивно-трансформативную величину, ищущую и открывающую антиформальные ростки в поле Формально обремененных бытований. До сих пор в изысканиях ученых категория гротеск рассматривана прежде всего с литературно-исторической точки зрения, но как философско-эстетический, языковый, трансформативно-трансцендентный и антиформальный феномен, слишком мало исследована или вообще не исследована. Выбранный объект анализа ставит следующие задачи, которые ищут и надеюсь находят хотя бы в какой-то мере свое решение в ходе разработки:

1. Доказать как благодаря антиформально-деструктивной, мятежной стихии и эстетически конструктивной мощи гротеска преодоление антропологического кризиса и экзистенциальной травмы субъекта стается возможным.

2. Посредством гротеска открыть и мобилизировать необъятные возможности языка к его перевоплощениям и трансформациям.

3. Выявить анти-Формальную и хармонизирующюю специфику экзистенциальных и культурных антиномий в структуре гротеска, а также ее эффективность в человеческом существовании.

„Być człowiekiem to znaczy nie być sobą" – albowiem forma w której się obiawiamy, urabia się pomiędzy nami a innymi ludźmi, jest nam narzucona[1]."

Witold Gombrowicz, 1957

Своей изобретательной комбинаторикой, причудливой, но плотной когерентной сетью, своим внушительным репертуаром эстетико-экспрессивных „волшебств" гротеск в первую очередь выделяет антиномии, чтобы релятивизировать и смягчить Формальный контраст их элементов, а потом растворяет их в трансцендентном пространстве абсолютной гармонии, символизируемой преображенным третьим продуктом, который является одновременно Антиформой, Трансформой и Новоформием.

1.0. Экзистенциальная „рампа" Формы[2]

Форма - это наша „псевдо/идентичность", без которой мы не могли бы почувствовать себя людьми, не могли бы двигаться, функционировать, существовать. Ее необъятная палитра вариаций, однако, не „разноображает" наше бытие, или, может быть, дает только иллюзию разнообразия, за которую приходится платить слишком дорого – непосильным ощущением скованности и неаутентичности, подавляющей зависимостью от всевозможных стереотипов, ментальной демагогией и недостижимой индивидуальностью. Это издевательство со стороны Формы, без которого нам не обойтись, но и с которым тоже не можем, распустило свои щупальца повсюду: распознается как культурно-цивилизационная модель, как политико-экономическая конъюнктура и социальная маркированность, как психо-эмоциональная конструкция и поведенческий механизм. Она наш „кислородный аппарат", который, якобы поддерживая наше дыхание, вместе с тем душит и обезличивает нас. Человек не может избегнуть Формы, не может и обойти ее. Все его существование является непрерывным процессом генерирования Форм, обмена формами и неизбежной Формальной субординации.

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[1] „Быть человеком, означает не быть собой" – потому что форма, в которой мя, стры появляемсоится между нами и остальными, она нам навязана." Витольд Гомбрович, 1957 (Здесь и далее - перевод мой – Д. Х.)

[2] Подробнее по вопросу см. в статье *Философия на Формата в творчеството на Витолд Гомбрович* (Хамзе 2011) [1].

Амплитуда Семиотическое – Символическое в понимании Юлии Крыстевой [2] представляет наиболее адекватную иллюстрацию и наиболее проникновенный анализ непрерывного антропологического кризиса и экзистенциальной агонии субъекта в стальных „объятиях" Формы. Символическое (Символьное) является нашей культурной меткой, нашей культивированной жизнью в социуме. Наша жизнь пронизана Символом, но он есть и наше экзистенциальное увечье, потому что отдаляет нас от естества, от нас самих.

Семиотическое – это то Первичное, пред-эдипальное, протоязыковое, пред-дискурсивное, архетипное состояние всеединства, которое не нуждается в Форме, потому что оно - Всеформие. В своем желании оторваться от этого омниэкзистенциального симбиоза, обособиться и осознать себя как самостоятельный индивидуум, опьяненный открытием самого себя в зеркале, по иронии существования он навсегда теряет возможность добиться своей собственной индивидуальности и идентичности, будучи вовлеченным в круговорот Формы[3]. Обманутый в своем ожидании добиться подлинной субъективности, индивидуум продолжает колебаться между стремлением к Формальной непреодолимости и ностальгией по Первичной нерасчлененности, по исконному гетерогенному Целому.

2.0. „Антиформальное" наступление художественного языка

Язык в принципе есть социальное творение культуры – Форма par excellence.

Эта Форма раскрывает мучительную истину, что он может быть (и, наверное, чаще есть) тираническим, закрепощающим, антигуманным, антиэссенциональным, противоестественным, деперсонализирующим,... убийственным... При том как раз из-за принуждения, насилия Символа, Формы как Символа. Борьба против статускво, конечно, не может не принять определенную форму, но она есть Анти-форма, потому что взрывает шаблон. Запущенные основные функции языка: экспрессивная и миметическая (но не как слепая имитация чего-то, а как воссоздание Первичной целостности), должны быть не только реанимированы и реабилитированы, но и „превзойдены" его пересотворяющей, трансформативной функцией. Эта функция освобождает художественный язык от

[3] Больше о семантике Семиотического и Символического см. в исследовании *Лингвотрансформативная функция гротеска като стимул для развития межчеловеческих отношений* (Хамзе 2016) [3].

его стилистической детерминированности, или, может быть, „одержимости”, чтобы направить его антиформальное устремление на стилистическую униформенность как „номенклатурный” ультиматум во имя одной рекреативной стилистической флуктуации и полифонии. Стилистический „калейдоскоп” художественной литературы на самом деле является „антистилем”, потому что преследует каждое стилистическое самоопределение. Язык как система есть скорее всего система для синхронных и будущих трансформаций, которые не только допускают а-системность, но внедряют ее в канву системы и делают ее частью ее. Сама системность заставляет нас понимать ее не как сумму обязательных и непоколебимых инструкций по применению, а как открытую для изменений непрестанную динамику, как системную „а-системность”. Именно метаморфически-трансформативная природа языка снимает вуаль с гротесковой матрицы в самом языке, при том на всех его уровнях. В этой сущностной корреляции нужно искать не только условия для естественной перцепции и концептуализации гротеска, но и ее компенсаторно-креативную роль. То, чего не хватает языку, наверстывает гротесковая образность языковыми, надъязыковыми, параязыковыми и эпиязыковымие средствами, которые в конечном итоге опять сводятся к языку как необъятному полю возможностей для перемены и перевоплощения; „вливаются” в язык и строят его подвижную, многоликую, многозвучную, трансфигуративную и развивающуюся идентичность. Трансформативная природа гротеска толкает этот „чужой”, „неравностойный”, неполный и несовершенный язык на путь совершенства.

3.0. Знаковая трансформативность гротеска как Анти-Форма

Гротеск - динамическая образность, ритмично сочетающая дисгармоническое, чудовищное и кажущееся несочетаемым, причем чудотворно эстетическим и метафизическим образом, оттаивая границы между вещами, переворачивает иерархии; интронирует свободу, водворяет „положительное отрицание” и обес-Формляет канонические (и „клинические”) Формы. Эта способность гротеска обусловлена его философскими основаниями. По мнению польского теоретика литературы Михала Гловинского, он является тоже не только специфически художественным решением или особой артистической процедурой, а прежде всего концепцией мира и ценностной системой [4]. Его яркая оценочная функция превращает кажущиеся зрительно-зрелищные диссонансы в

рефлективные ассонансы, составляющие одну вутренне гармоническую и когерентную философско-эстетическую платформу. С помощью оксиморона М. Гловински подчеркивает, что эти диссонансы не только функционализированы, но и гармонизированы. Ссылается и на большой барокковый теоретик поэзии Мачей Кажимеж Сарбиевски, который использует определение „согласованная несогласованность” (*discordia concors*) [4]. Именно она подсказывает трансформативную, т.е. подчеркнуто анти-формальную функцию гротеска. Она возвращает к Семиотическому и вторично его *символизирует* – чтобы о нем напомнить и выдвинуть как альтернативу. Сам гротеск слишком много походит на Семиотическое с его основной характеристикой как знак Первичного, гетерогенного, нерасчленимого и неразгадаемого, невыразимого и необъяснимого. Гротеск совершает очередное чудо – мирит и гармонизирует принципиально (и исконно) непримиримые Символическое и Семиотическое, переобразуя Символическое в Семиотическое, а его снова в Символическое, но на более высокой степени – именно как Символика Семиотического. Так унимает боль от существования, испытываемая из-за вечной неудовлетворенности субъекта с его неутолимыми желаниями, с одолевающими его страстями. Неизбежная экзистенциальная зависимость индивидуума от Другого становится менее травматической, благодаря альтернативе, которую предлагает гротесковое изображение со всем своим трансформативным потенциалом. Вечная невозможность себяосуществления субъекта, о которой пишет Мариан Белецки, превращается в возможность (становится компенсируемой) посредством философско-эстетической функции гротеска, производной трансформативной функции, т.е. представляет собой функцию функции: „То, что было полной первичностью, возможно наиболее примарной потребностью и вместе с тем наиболее совершенным проявлением себя, вдруг становится желанием, выражаемым в языке Другого, т.е. несобственным, неовладенным, предлагающим всего лишь жалкие заместители безвозвратно потерянного и приговаривающим субъект к вечной жажде и вечной неудовлетвотенности” [5]. Эта вечная неудовлетворенность превращается в облегчающую удовлетворенность в эстетическом пространстве гротеска.

4.0. Экзистенциальные и культурные антиномии на гротесковой территории как трамплин для Формабразии[4]

„Wszystkie sprzeczności dają sobie we mnie rendez-vous – spokój i szał, trzeźwość i pijaństwo, prawda i blaga, wielkość i małość[5]”

W. Gombrowicz, 1953

Структурные антиномии в философско-мировоззренческой перспективе польского писателя В. Гомбровича: бином „Высшее – Низшее”, бином „элитарная – секундарная культура” (неравностойность национальных культур), бином „Зрелость – Незрелость” (био-психологическая диспропорция), бином „цивилизация – культурный регрес” (неравностойность эпох), бином „Старость – Молодость” (возрастное неравенство) [по 6], дополняющиеся психо-эмоциональными, историческими и социо-культурными антиномиями, выделенными в великолепной статье Стефана Хвина „Gombrowicz i Forma polska” [7], поддерживают трансформогенный баланс, воцаряющийся между двумя членами оппозиции в гротесковом пространстве, где их формальное уподобление, несмотря на их контрастную сущность, начинает эстетически и концептуально преображаться в анти-формальную тенденцию и антиципацию.

4.1. Бином „Малодушное отступление, игнорирование патриотического долга” – „Естественный рефлекс для нормального творческого себяосуществления”.

Конфузное „дезертирство” главного героя с полесражения в родной Польше (в романе „Транс-Атлантик”), из-за „телесной слабости”, а на самом деле, может быть, из „страха”, уравновешивается основаниями артиста творить нормально, хоть и вдали от родины, но достаточно ли „основательны” эти основания и не скрывают ли они высокомерную сущность „обнаглевшего творца”?! А, наоборот, творить нормально не означает ли держаться подальше от ядовитого воздуха закомплексованных из-за убийственного чувства неполноценности соотечественников, создавших облик душащей тебя, обреченной на провинциальность культуры? Ничто в „Транс-Атлантике”, как отмечает С. Хвин [7], не однозначно. И не случайно задает вопрос: В какой мере наше „я” принадлежит нам самим, и в какой мере мы принадлежим другим? Польский комплекс

[4] Сплошное разрушение Формы, Форморазложение, Формальный распад.
[5] „Все противоречия встречаются во мне – спокойствие и сумасшествие, трезвость и пьянство, правда и шутка, большое и малое” Витольд Гомбрович, 1953.

„периферийной”, „второстепенной”, „жалкой” нации и культуры сталкивается с высоким, но не менее формализированным, идеалом „избранной Богом” культурной модели, которому нет дела до того, как оценивают его другие, потому что тот, кто их оценивает, он сам. В своем стремлении догнать его мы сами ставим себя в позицию низших. И та, и другая крайности являются жертвами Формы. Спасение – в эстетико-экспрессивном розыгрыше в Межформальном гротесковом пространстве, где погибшие на двух полюсах Формальные „дистилляты” начинают расслабляться и с помощью неотступной автоиронии рассказчика переобразуются в Анти- и Транс-Формальные альтернативы. Поскольку, хотя и взаимно исключающие друг друга, и Старое и Новое являются Формальными „окаменелостями”, несмотря на то, что Новое хоть в начале создает видимость наступательной и радикальной Анти-Формы, из-за своей скрытой арбитральности и напористой иллюзии чего-то естественного и очевидного, чей невидимый Формальный деспотизм как-то оправдан, так как он предварительно „узаконен”.

4.2. Бином „Репрессивно-националистическая модель „примерного патриота” – ”Преданный анафеме” ренегат, родоотступник, дезертир”.

Неумолимое Формальное давление романтичных постулатов „велит” обязательное слияние индивидуальной судьбы с судьбой масс, что означает, что – как устанавливает С. Хвин – национальная идентичность личности не есть вопрос выбора. Ярмо Формы имеет в качестве подоплеки националистическую идеологию, проповедующую, что народность - это биологическая (или мистическая) суть человека, которую нельзя вырвать с корнем [по 7]. Очевидно, это биологически-мистическое принуждение является для В. Гомбровича одной из форм обезличения, угнетения и порабощения. Интерактивная концепция идентичности субъекта имеет тоже формальный облик, в то время как интерактивная природа гротеска имеет антиформальную стратегию и атакует эту Форму. Сама принадлежность к народности есть уже готовая духовная Форма поляка, русского или германца, выкованная в процессе межличностного общения, с помощью воспитательной дрессировки и диктатуры общественных конвенций. Нет никакой прочной этнической сути. Народная детерминированность всего лишь одна из форм, в которых человек является перед остальными. Определение „польская” или „немецкая душа”, согласно которому индивидуум, как биологически-мистическая частица народа, обречен на национальную

идентификацию волею судьбы, признает естественное и безусловное право массы иметь в своем распоряжении жизнь отдельного человека. Но что будет, если и индивидуум применит свое право ставить условия, если и он задастся вопросом заслуживает ли народ, к которому принадлежит, связать свою судьбу с его судьбой и посвятить ему жизнь? [по 7] Если ты будешь ставить условия с бутафорной высоты своей Формальной обремененности, как жрец или „образцовый” творец, то не избавишься от Формального издевательства; просто выйдешь из одной, чтобы закрыться в другой формальной капсуле. Но если ты доверишься гротеску как Антиформальной, изобразительной стихии, ты добьешься желанного освобождения.

Сама постановка темы свободного выбора национальной идентичности как открытого вопроса иллюстрирует гротесковое лабилизирование формальных императивов в рас-Формирующей осцилляции между одной и другой национальной моделью в антиромантичной постановке, в нарративной перспективе, в гротескотворном „автопортрете”, как и в универсализирующем ракурсе оценивания национальных типажей артистическими средствами художественного языка. Гротесковый фокус интерпретации, выдающий настрой типа Анти-Мицкевич, и точнее Анти-Пан Тадеуш и Анти-Дзяды[6], из-за массовизированной и навязчивой погони за химерами, как символ вообще „житья” поляка, не только обнаруживает, но и преодолевает фатализм отрыва поляков от реальности и забрасывание их в один выдуманный, галлюцинаторный мир сомнительных и искусственных стереотипов. Интерактивный Формообмен в Мицкевичьевой эпопее, сотворенной, с одной стороны, чтобы согреть сердца и поднять дух соотечественников после подавления национального восстания, а, с другой, чтобы понравиться Европе своей этнографической аттрактивностью и экзотическим обаянием (даже не намекая на поражение), становится мишенью для гротесковых парабол В. Гомбровича, который де-Формирует романтичное клише, стилизуя эмблематические персонажи как национальных мучеников – кандидатов в „святых” в смехотворно прозаических (злободневных) ситуациях.

Девиантно-самоубийственная жажда крови с целью искупления грехов, атакуемая В.Гомбровичем синтактическим гротеском – солидные линейные периоды, обильно насыщенные повторительными (анафорическими)

[6] Дзяды – польская реалия относительно Поминовения усопших, связана с особым патриотично-идеологическим и духовным ритуалом.

конструкциями – целостными или частичными, представленными синонимами или родственными словами:

Płyńcież do Szaleńca, Wariata waszego św. ach chyba Przeklętego, żeby on was skokami, szałami swoimi Męczył, Dręczył, was krwią zalewał, was Rykiem swym ryczał, wyrykiwał, was Męką zamęczał, Dzieci wasze, żony na Śmierć, na Skonanie sam konając w konaniu swoim Szału swojego was Szalał, Rozszalał! Z takim więc Przekleństwem od okrętu się odwróciwszy, do miasta wstąpiłem[7] (*TA*, 12 -13).

Патриотическая мотивировка перверзного „одаривания” мучениями попадает в метафорично-метонимичную гротесковую орбиту „Кавалеров Шпоры”. Это сообщество для самоистязания и для взаимного причинения боли с целью взаимного сочувствия и демонстрирования патриотизма высшего класса по отношению к утопающей в крови дальней Родине, как модель настоящего воевания, словно подавляет внутренние конфликты между „почетными” членами (новопосвященными) Ордена мученков (соотечественников):

„[...] *a wtenczas mnie Ostrogę Pyckal w łydkę wraził, ażem z Bólu strasznego, okropnego mało nie omdlał* [...] *-- Nie ruszaj, nie ruszaj, boli!...a on za całą odpowiedź Wrzasnął, Ryknął jak Szalony, jak Obłąkaniec jaki, Potępieniec, i nogą swoją gwałtownie pokręcił. Od czego Ból Bolesny, że mnie świeczki w oczach i zemdlałem*”[8] (*TA,* 98 – 99).

Мартирологические „карнавальные” сцены в „Транс-Атлантике” играют двузначную роль: с одной стороны, имеют целью показать монументальное самоистязание поляков, которое должно вызвать респект и преклонение, а, с другой, иронично „доказывают”, что болезненное актуализирование воспоминаний о неудаче восстаний, ссылках, депортировании, лагерях, разжигает польскую „яростность”, которая позволит народу победить и устоять в веках. Гротесковое изображение с помощью метафоры размывает Формальную остроту этих сцен и пересылает дело посвященных польских патриотов в пространство

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[7] „*Плавай к Сумасшедшему, Безумцу, вашему святому, ах, наверное, Проклятому, чтобы он на вас набросился, налетел, лишил вас ума своим сумасшествием, Замучил, Засверлил, залил кровью, оглушил вас своим Ревом, великой Мукой замучил вас, и Детей, и жен ваших до Смерти, до Умерщвления, чтобы сам он, умирая в своем умирании, своим Безумством вас Об-безумел, Раз-безумел! С таким Проклятием я повернулся спиной к кораблю и отправился к городу*” (*TA*, 12–13).

[8] „[…] *и тут же Пицкал забил Шпору в мою голень, да так, что от Боли страшной и жестокой я чуть не потерял сознание* […] *– Не трогай, не трогай, ой, больно!... а в ответ он Кричит, Орет как Безумец, как настоящий Сумасшедший, и ногу свою вдруг крутит. Последовала Боль Болетворная, перед глазами потемнело, и я упал в обморок*” (*TA*, 98–99).

трансцендентных частот, где они получают ноую квалификацию и новую перспективу для существования.

4.3. Бином „Низшая „периферийность” польской культуры” – „Элитарность западной культуры”.

Гротесковая антиформальная стратегия писателя в процитированном романе придает универсальные измерения проблеме самостоятельности и аутентичности существования. Польский духовный комплекс по отношению к культурному превосходству Запада становится эмблемой общераспространяющегося на всех провинциального синдрома в мировом масштабе – на определенный народ в определенный момент в определенном месте. Салонный поединок между „провинциалистом” Витольдом и фаворитом в лице триумфирующего аргентинского писателя, уравновешивается анархической эклектикой и беззабтной неряшливостью относительно плодов мирового культурного наследия в дворце аргентинского аристократа Гонзало. В этом контексте, однако, гротесковое глобализирование Формального стереотипа превращается одновременно в Форморазрушение конкретной Формальной модели и Формосозидание в другом измерении – как гармоническое сожительство эклектичных бытийностей – иллюстрация Новоформия в трансцендентном пространстве реминисценциии реактивации Семиотического.

Китчеобразное скопление ценных предметов со всего мира в роскошном доме аргентинского магната является примером не только „рафинированной” периферийности латиноамериканской культуры по отношению к европейской, как „идеальному центру”, но прежде всего деструктивной (анти-Формальной) и воскрешающей мощи гротескового пересоздания, которое, „сметая” часть этого материального богатства не только „сыгрывает” (и перформативно велит) „смену мест” культур, но прогнозирут ко-валентность этих на первый взгляд несочетаемых предметов в другом измерении – в зоне трансцендентного.

A jedno obok drugiego natłoczone, napchane, że nie daj Boże, że już głowa boli: bo to Amorek obok Maszkary, a tu na fotelu Madonna, tam na pasie Waza i jedno pod stołem, drugie za Wazonem, tam znowuż Kolumna nie wiedzieć skąd i po co, a obok Tarcza, albo i Półmisek. Wrzelako, widząc Tycjanów, Rafaelów, Murillów malowidła, a też i inne arcydzieła nadzwyczajne sztuki, z poszanowaniem to wszystko oglądaliśmy, i ja powiadam: -- Skarby to są, skarby! – A skarby – powiada – i właśnie dlatego ja, kosztu nie szczędząc, wszystko zakupiłem i tu do kupy zgromadziłem, żeby mi trochę

Potaniały. Owóż te arcydzieła, Malowidła, Posągi, razem tu zamknięte, jedno drugim taniejąc od nadmiaru swego, tak już tanimi się stały, że ja ten Wazon rozbić mogę (i Wazon Perski, astrachański, majolikowy, seledynowy, ażurowy nogą z podstawki zepchnął, że się ów Wazon na tysiąc kawałków rozprysnął)[9] (*TA*, 82).

4.4. Бином „Отвержение Сарматизма как культурного анахронизма и ретроградного самозабвения, как никудышной картины „глухой провинции" – „Слепое опьянение и экзальтация в результате его неподражаемой самобытности".

Совершенная гармония предметного сожительства в трансцендентных пределах напоминает Семиотическое как возвращение в „разноцветную", созвучную Целостность Материнской „обители". Благодаря гротескным трансформациям она дает силу субъекту, „слабому провинциалисту"; обеспечивает ему духовную независимость, помогает ему превратить слабость в силу, преодолеть провинциализм, при том неповторимым, самобытным очарованием того же самого „захолустного" провинциализма, артистически воплощенного, перемоделированного (переплавленного) и переосмысленного в причудливой жанрово-стилистической амальгаме Сарматизма.

Формодеструктивная функция гротеска показывает Сарматизм как „язык современности", как его называет С. Хвин в своем эссе. Расплавление Формального образца становится возможным благодаря гротескно окрашенным „разножанровости" и „разностилию" в романе „Транс-Атлантик":

„Bierze prowincjonalny, zalatujący polszczyzną pamiętników Jana Chryzostoma Paska, anachroniczny język szlacheckiej Polski z XVII wieku, miesza go z frazą Sienkiewicza, przyprawia romantyczno-mesjanistycznymi osobliwościami polszczyzny dziewiętnastowiecznej, dorzuca pokraczną frazeologię (i jeszcze dziwniejszą pisownię) z

[9] *А там нагромождены, навалены в одну кучу, Боже упаси, аж голова ломится, Ангелочек рядом с Сатаной, на кресле сидит Мадонна, там у двери Ваза для фруктов, одно под столом, другое за Вазой, там вдруг видна Колонна, неизвестно откуда и зачем, а рудом с ней Щит, или же Тарелка. Так или иначе, увидев картины Тициана, Рафаеля, Мурильо, а также другие головокружительные шедевры искусства, рассматриваем все это с уважением, и тогда я говорю: –Сокровища это, сокровища! – Да, сокровища, – отвечает он, – и именно потому, не жалея денег, я их все купил и устроил вот это гнездышко, чтобы хоть чуточку Дешевле они мне обошлись. И вот эти Шедевры, Картины, Статуи, запертые тут вместе, взаимно обессиливаются, обесцениваются в силу своего излишества, и настолько они лишились стоимости, что эту Вазу я могу разбить (и он Вазу персидскую, астраханскую, майоликовую, зеленоватую, ажурную, пнул ногой с подставки, и Ваза разбилась на тысячу осколков)* (*TA*, 82).

pamiętników chłopów-emigrantów i temu powiatowo-barokowo-wiejskiemu gadaniu Sarmaty nadaje postać… filozoficznej przypowiastki o wolności i życiu autentycznym[10]” [7].

Таким образом то, что „слабо”, „ничтожно” и отжившее, становится сильным, независимым и даже современным, продвинутым, современным. Снова баланс между двумя крайностями, достигнутый с помощью Формодеструктивной эстетической экспрессивности гротеска производит культурный перелом (преображение): язык „низших” становится языком свободы и победы над Западом, чья бледная и обескровленная речь лишена широты, пестроты и зрелищности польского барока. Гротесковая антиформальная трансформация делает из эпической шляхтишкой „болтовни” философскую историю, а оксиморонной матрицей в своей структуре показывает, что то, что унижает, на самом деле возвышает. Как подчеркивает С. Хвин, В. Гомбрович тешится польским, не для того, чтобы отвергнуть его, а для того, чтобы оценить по достоинству издалека как свободный субъект.

„Tylekroć ośmieszany szlachcic polski z epoki saskiej, poddany w powieści groteskowej hiperbolizacji, nagle okazuje się wzorem nowoczesnego sobiepańskiego stosunku do świata i duchowej suwerenności[11]!”.

Деконструкция Формальных стереотипов позволяет Витольду – герою-рассказчику реформировать польскую ментальность посредством гротесковой гипертрофии подавляющего чувства о „второкачественном” писательском труде, которое из устыжающего императива для подобающего себявосхваления с целью публичного признания трансформируется в „вакхическую” апологию романтично-сарматского колорита и грубой прелести польского бытия. Гротесковое эстетическое великолепие, его изобразительная пышность ломает Формальные шаблоны и освобождает стихийные порывы, порождающие особую праздничность – освобождающую, вдохновляющую и развлекающую, со всем ее театральным блеском: патриотические шествия запряженных лошадей (польский кулиг),

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[10] „Берет тот провинциальный, пропахший нафталином из дневников Яна Хризостома Пасека, анахронический польский язык аристократической Польши XVII века, смешивает его с фразой Сенкевича, заправляет его романтико-мессианскими „ароматами” польского языка XIX века, добавляет к ним уродливую фразеологию (с еще более странной орфографией) из дневников крестьян-эмигрантов, и всей этой уездно-бароково-деревенской болтливости Сармата придает вид... философской притчи о свободе и первозданной жизни” [7].

[11] „Постоянно осмеиваемый польский шляхтич саской эпохи, подверженный в романе гротесковой гиперболизации, вдруг оказывается образцом современного непокорного или современного самобытного отношения, как и духовного суверенитета!” [7].

охотничьи сцены, дуэли, экзотические перевоплощения польских эммигрантов-эксцентриков, торжественные присяги, сарматская патетика и высокопарная риторика, стремительная левитация романтических душ.

4.5. Бином „Эротическое целомудрие и сексуальная порядочность” – „Скандальная гомосексуальная распущенность” – и обе связанные с садистической жестокостью, в первом случае со стороны Отца, готового принести своего Сына в жертву на алтарь патриотической идеи, а во втором – с запланированным Гонзало отцеубийством, в результате которого аристократ беспрепятственно совратил бы Сына.

Очаровательная легкость гротесковой образности и вольное воображение героя-нарратора смягчают Формальные стандарты и дают волю катартичному Смеху, разгруживающему сгущенное до обморока напряжение и срывающему кровавый финал. Этот смех является и реабилитацией, восхвалением добровольно истерзанного, болезненного и самоотреченного польского Тела, символа национальной мартирологии. Смех в гротесковой зоне – взрывчатка для петрифицированной Формы и метафора движения и вечной открытости для перемен. Он наряду с этим и знак личности, ищущей свой путь мышления и жизни.

„To śmiech-tryumf nieskrępowanego ducha artysty, skłaniającego nas, byśmy się wzbili ponad sztywne przeciwstawienia i na całość spraw spojrzeli z nowej, wyzwalającej perspektywy[12]”.

Как литература, так и гротеск со своей антиформальной способностью не предлагать ответов, а задавать вопросы – скорее всего бросает вызов Читателю, ставит его в трудные, граничные и критические ситуации, чтобы заставить его действовать в рамках своих возможностей, самому искать выход и решение. Но самое главное – дает ему перспективу развития.

Краткий обзор проблематики наводит на следующие выводы:

1. Антиформальное волшебство гротесковой образности проявляется в плавном соединении диаметрально противоположных вещей путем размывания границ, разделяющих их и посредством эстетического визуализирования их конвергентности и трансформативности.

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[12] „Это триумфальный смех необремененного духа артиста, поощряющего нас устремиться и возвыситься над всеми искусственными противоречиями и посмотреть глобально на вопрос с новой, освобождающей перспективы” [7].

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2. Атакуя Формальность языковой материи, гротеск вливает Антиформальную струю в плоть языка, меняя само представление о системе, как о чем-то классически вечном; извлекает преобразовательную функцию языка и мобильный статус системы.

3. Гротеск слишком много напоминает Семиотическое с его Антиформальным „Всеформием”. Поэтому своим изобразительно-экспрессивным, философским резервом он воскрешает его, но в то же время эстетически символизирует, опровергая таким образом коллизионный характер оппозиции Семиотическое – Символическое, мирит два антипода, обеспечивает их беспрепятственный переход друг в друга и освобождает индивидуума от его мучительной неаутентичности.

4. Гротесковая негация иерархизирования и стагнирования сущностей и их предопределенных позиций в пространстве вызывает эрозию Формы и мыслительный подъем.

5. Даже в калейдоскопе интеракции как набора „предложений” для приобретения собственной идентичности, субъект не может добиться ее из-за „маскооборотного” ее характера, но может поддерживать динамику поиска, являющуюся частичным и поступательным себепознанием (автоидентифиакцией), благодаря Антиформальной, освобождающей стартегии гротеска.

6. С помощью метафорической образности гротеск оспаривает всю о-Формленную мартирологию польской Голгофы и телепортирует „инициацию” патриотов в сферу трансцендентного.

7. Антиномические биномы выдают Формальную обремененность обоих коррелятов, несмотря на кажущуюся свежесть и новаторство второго, вещающего проспективную формализацию. Гротеск реллятивизирует оппозицию, чтобы предложить неожиданное решение. Трансформогенный баланс между элементами дихотомии, обусловленный эстетико-экспрессивной энергией гротеска, и его способность сочетать несочетаемое обеспечивает трансфигурацию бытийностей и их возможность „дышать” в другом измерении и функционировать при другом „давлении”.

8. Смех посредством гротеска взрывает Формы и обещает перманентную открытость для изменений собитийности, мышления и жизни индивидуума.

Антиформальные экспедиции в их всевозможных разновидностях на территории гротеска в творчестве разных писателей очеркивают перспективу будущих плодотворных исследований.

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Suggestive specificity of tactile communication

Abstract. Using the suggestive mechanism of communication quite active and widely practiced process in everyday communication, in which the speaker's competence as a cognitive subject's cognitive agent acts as one of the key parameters relating to his pragmatism of communicative behavior under conditions of discomfortable use emotive verbal and tactile stimuli.

Key words: communication, dialogue, suggestion, verbal behavior, nonverbal communication.

For a better understanding of each other, for example, participants in communicative interaction psihotypes it was important not to dwell on any one of the designated areas or single out specific models of communicative interaction, and to draw on the integrated nature of the entire lineup. In particular, it is possible to use the model of energy-informational approach, one provision of which is the idea that the process of understanding of communicative interaction partners is an implicit setting of energy units or the degree of consistency with the openness of energy centers of communicating people (Meneghetti, 2002: 108-118). It's important to keep in mind that if a communicative interaction partners found a match, then they understand not only what was reported, i.e. propositional content expressed (expression, expressions, complex communicative act of discursive practices), but they are also aware of their illocutive and intensional i.e. the "what" and "why" ("why" and "how") uses data from the expression language constructs formal indicators speech acts with different illocutive function, tagging them with appropriate indicators of different order (Romanov, 1988).

Complex interaction model of communicative interaction (a-b-c) is based on a specific mechanism of communication, without having to articulate speech and based on communicating with gestures, facial expressions, sounds, etc. (Kosilova: 16, 2012), i.e., the mechanism of "transfer" ascending by definition, L. Shertok, "to relations, much

more archaic" strictly “dual”, dopredmetnym” rooted in the animal world, a condition in which the communication is done on a purely affective level, are not associated with figurative meaning (Ten, 2011: 210).

The definition of "dopredmetnye relations" here should be understood not in the sense`s thingism but in the sense of “unpragmatist”, bearing in mind, of course, the focus of human activity (Ten, 2011: 211), when, while under a certain influence, like a man retreats to a more primitive forms of communication, to purely “affektive case”, the corresponding functions of the most archaic structures of the nervous system, paleokorteks (Ten, 2011: 211). L. Shertok further observes: “it, therefore, is the innate original potential to establish a relationship of some kind of blank matrix in which the further development would fit all the subsequent system of relations” (Ten, 2011: 211). It would be fair according to E.V. Kosilova “expand the concept of self-control” (suggestive communication) and to include in the scope of the notion of “nonverbal communication of close people, such as couples (certainly not in all cases), long-serving spouses, and especially mother and her baby» (Kosilova, 2012: 17), i.e. communication of communication, “code of trust” (Romanov, 1988: 14, 55-68) where in relation to each other is already installed and cannot be modified because the effect of “understand each other perfectly” or even without words – “this is a typical effect of the suggestive mechanisms”. Therefore “it would be a big mistake considers the suggestion as something violent, like some sort of involuntary hypnosis (Kosilova, 2012: 17).

Suggestive nature of such understanding of tactile communication, based on absolute (i.e. conventional, established by the collective) trust, reveals a verbal communicators or nonverbal effects and interaction that is perceived by them – for the most part latent without critical evaluation (Romanov, Cherepanova, 1998: 22) within the “matrix” action-filled relationships between participants of the tactile communication. This form of suggestive stimulus (verbal or tactile) diplastic: it defines that need not be the person the action or representation, which is able to create his own feelings and impulses. Moreover, to temporarily paralyze these sensations and impulses inspiring factor should lie outside the norms and mechanisms specific to the signal system and does not fall within the scope of action of the second signal system, “born as a system of coercion between individuals: what not to do, and what to do” (Porshnev, 1974: 450-451). Displastic form suggestive stimulus is B.F. Porshnev, the source for the human expression of social relations “we-they”. Moreover, it is noted that at the beginning of the second signal system is not sharing, don't post anything from one person to

another, a special kind of influence on the actions of one individual to another, known as a special form of communication that takes place before the communication function increments (Romanov, Cherepanova, 1998: 22-26), which is still on the level of dialogics by F. Pelicci (1996).

Talking about the suggestivy nature of the communication and its role as a base arche (primary stages) in building relationships among its members, it is necessary to note a number of its features, namely a) suggestive communication combined with the type of thinking, which can also be called suggestive (Kosilova, 2012: 16), b) suggestive communication in addition to hierarchical relationships (suggestor-suggestant) allows also communication on equal partnership (Romanov, Cherepanova, 1998), c) together with the suggestion and prohibition (Porshnev, 1968), d) suggestive communication has an essential property "interiorization", understood as "learning some material", which includes the activities, programs and algorithms, as well as values, beliefs about morality without knowledge of what the source of this material was external (Kosilova, 2012: 16), e) holding of suggestion "in itself" arrogating to common goals and treating them as their (Kosilova, 2012: 17) and thus the synergy-to be "co-workers", "co-creation", which enables the addition of offline leak activity without direct coercion.

To the characteristics of the suggestive communication should also be included and that the "suggestive mechanisms are usually quickly, they are handy and use them quite voluntarily" (Kosilova, 2012, 17). To this must be added the feature of suggestive thinking in suggestive communication is a property of the individual "keep yourselves from the team" when the specific objectives of the individual, the individual's personal goals are, while other individuals are as means to achieve their affects (Kosilova, 2012: 17). In addition, at this stage there is a predominance of collective thinking, the intensity of which above all "the leader in communication" (Romanov, 1988).

As the researchers note in the field of communicative interaction, for modern people suggestive type interaction is fairly commonplace (Kosilova, 2012: 17; about suggestive model of communication see more: Romanov, Cherepanova, 1998), since everyone has experience interiorization collective activity. Use the suggestive mechanism of communication-and this applies to both active self-control and its reception is quite active and widely practiced in daily communication process: "we are equally comfortable and quick to convey his desire, and when we can do that gesture, we prefer the word, gesture and understand the desire for the other, and we therefore prefer understanding gestures of understanding words. On the contrary,

communication, which have absolutely no self-control, elements usually seems to us difficult, sometimes to such an extent that we understand these missing mechanisms” (Kosilova, 2012:. 17).

The integrated display of suggestive mechanism of communication should draw attention to the special role of energy resonance mechanism that creates the conditions for more effective information transfer in communicative Exchange and, in turn, will determine the conformity of the openness of energy centers of each of communicators, but also reflect the formal and sincere relationship between the interlocutors, to form their level or “code of trust” (Romanov, 1988), thereby adjusting the further improvement/deterioration of their State of health as a consequence of the formation of emotional perception of reality.

Thus, in this variety of communicative interactions can be divided into three states open centres in relation to each other – is open (harmonious), excessively open and closed (Meneghetti, 2002). According to A. Meneghetti (Meneghetti, 2002), a generalized form of interaction in a person can serve as a basis for constructing a typology of personality. Same direction of opening these energy centers is a condition of good understanding. Therefore, the communicative interaction is not limited only to external exchanges signals and understanding the other is only to understand his discourse, because, according to the T. van Deyk (Deyk, 1989), the man always does more than he thinks he does, which gives rise to discourses and all verbal-nonverbal complexes in the “regulatory process” (Romanov, 1988; Malysheva, 2013). This means that the implicit structure of communication can be unison (mutual engagement) or over the dissonance (lack thereof). There is the following pattern: the higher the level of evolution of partner’s consciousness, the more he is able to tune to another. In other words, he is capable of understanding the other. Another area implicit communication concerns the mechanisms of interaction of the conscious and the unconscious, and this is especially characteristic of interactive processes in mass communication and social interactions.

Perhaps for this reason dialogic interaction is not always adhered to in the course of their communicative effects and intentions of the principles politeness and discretion ("friction (Voloshinov, 2010), but merely implement expressive function of language, which is related to adresant and aims at “direct expression of the speaker's relationship to what he says”. It is connected with the desire to impress a certain emotion, genuine

or cheesy; therefore, the term "cognitive" (feature), who introduced and championed A. Marti, seemed more apt than "emotional" (Ulybina, 2001).

It is clear that within such person interaction and formulated the "normative base of communicative behavior" speaking subject, covering occupational standards, group norms, situational rules and individual standards. It is also obvious that occupational standards of conduct common to all communication linguacultural community of the society and to a large extent reflect the accepted rules of etiquette and standards of polite conversation. Situational rules found in cases where the communication is ekstralinguistic situation. Individual norms of communicative behaviors reflect the individual culture and communicative experience individual and represent personal and situational communication, cross-cultural refractions of linguistic identity.

The paradigm of communicative behaviour also includes socially and communicatively meaningful domestic behavior, defined as a set of subject-everyday actions people receiving in this society, in the linguacultural community of semantic interpretation and thus absorbed into the overall communicative process and can affect behavior and communication. In short, the consumer behavior is regarded as a kind of "everyday language" (Voloshinov, 2010).

Curiously, in linguistics, a large number of options allocated for language identification, determining its communicative behavior. Often, these parameters are combined under the common concept, named as "language passport". In this volume include sexuated ("passport data") speaking person, such as gender, age, nationality, social role, status, education, occupation, etc. And though their relationship to language identity is ekstralinguistic nature, however, they play a significant role in communication because, first and foremost, they through voice characteristics (intonation, style, vocabulary, etc.) present the subject speaking interlocutors in communicative process and thus, place a mark on the level of relations between the communicants and the manner of their speech and behavior that are important, they have a major impact on the linguistic, communicative competence of each of the interlocutors in general and, therefore, they affect the very structure of the identity of the speaker, which, according to U.N. Karaulov (Karaulov, 1987: 71) "is built on the transversal axes: types of speech activity, language and level of proficiency levels corresponding to this level".

In other words, emotive / emotional competence of speaking subject as cognitive agent acts as one of the key parameters relating to pragmatism of its communicative

behavior under conditions of discomfortable use emotive verbal and tactile incentives, where simultaneous operation in communication ekstralinguistic funds" in the form of tactile action reveals the elements of the integrated emotive semiosis ratio in the process of communicative Exchange and best reflects the specific nature of interactive communication, this means that the cultural nature of emotional reactions deserves special attention because it is based on the idea of emotionology as a normative system of emotional attitudes, existing in a particular culture with which individual emotional behavior related in one way or another. As long as the person lives in an emotional system, which includes norms, principles, rules, standards, etc., his behavior in the process of implementing scripting is emotional code of life, reflecting the requirements of broadcastings mechanisms of sensations and feelings in forms of behavior, including linguistic behaviour. Thus, a man is very strong and communicative rooted feeling with which a person lives, but at the same time, he is at odds with the obvious facts. These obvious facts should be primarily attributed to (install) that emotion is the phenomenon of a highly predictable, because it affects not only the behavior of the language identity in its verbal and non-verbal aspects, but also on its formation under the influence of the environment.

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The contents and features of formation of emotional concepts and their verbalization in children of senior preschool age

In the present conditions, the deterministic rapid growth of social, economic, and informational changes, especially important becomes the problem of development of emotional sphere of the child and, especially, those emotional conceptions, which underlie the process of reflection in speech. The process of informatization, the growing importance of media as an institution of socialization, a wide range of information and educational resources provide new opportunities for the development of child's personality.

The mission of preschool education to promote the positive socialization of the child in a multicultural, multinational society. The task of introducing children to life in the modern social space requires updating not only the content of preschool education, but also ways of interaction and communication between children and adults based on emotional interaction, forming value orientations. Thus, experiences that are associated with the assessment of events and others, are not only individual but also social in nature, helping the child to identify with a specific social and ethnic group (A. N. Leontiev) [1].

In this regard, it is necessary to study conditions, to disclosure of various forms of speech activity in the child, contributing to the development of a socially active individual into the social situation of development of preschool children, opportunities for positive socialization of the child. One of the most important elements of these processes are emotional representations, which are more successfully developing in children in their verbalization.

The basics of understanding the emotional ideas inherent in the works of L. S. Vygotsky, A. A. Zaporozhets (regulations on the unity of intellect and affect as an essential condition of development of the psyche), which pointed out that the idea of emotion is the result and the basis of the cog Problems, principles and mechanisms of formation of representations and concepts in conjunction with verbal development of the child is reflected in the works of B. G. Ananiev, V. A. Artemov, L. S. Vygotsky, P. Ya. Galperin, V. V. Davydov, V. G. Kazakov, L. L. Kondratiev, A. G. Krysko, J. Piaget, L. S. Rubinstein [4].

The problem of studying emotions as the basis of semantic entities, resulting from the verbal activities became the subject of research by V. K. Vilyunas, B. S. Bratus, V. V. Stolin, M. Calvino, E. B. Spring, B. M. Masters. In this regard, it is important to emphasize the influence of emotional processes on the formation of conscious attitude to the word [5].

The emotional presentation as the body of knowledge about emotions for preschoolers explored in his works, B. I. Kusemisov, M. A. Shchetinina. Of special interest are scholarly works, which presents the basic ideas associated with the dynamics of development of intellectual functions closely associated with the development of emotional processes (L. S. Vygotsky, A. N. Leontiev, S. L. Rubinstein).

Still relevant remain research that studies the design and modeling of the educational process the development of emotional vocabulary of preschool children, methods and techniques of its development based on the formation of specific knowledge about the object or phenomenon (G. N. Bavykina, V. V. Gerbova, A. P. Ivanenko, N. P. Ivanova, L. A. Kolunova, A. I. Lavrentieva, V. I. Loginova, Y. S. Lyakhovskaya, L. A. Penyevskaya, O. I. Solovyeva, E. M., Strunina, E. I. Tiheeva, V. I. Yashina. The work of these authors has made a significant contribution to the study of the problems of studying the vocabulary of preschoolers.

The problem of categorization of emotions in the vocabulary of the language with the psycholinguistic position is disclosed in the works of V. I. Maltseva, V. I. Shakhovsky, L. A. Dubrovskaya, V. I. Zhelvis etc. [6].

The purpose of this article is to determine theoretical (psycho-pedagogical) background of the formation of emotional concepts and their verbalization in children of senior preschool age the main scientific approaches to the concretization of the pedagogical bases of their verbalization.

Emotional representations are the basis for the formation in children of awareness and perception, assessment of the validity, the ability to understand and Express their attitude to the environment, which is a necessary condition of intellectual development of personality (L. S. Vygotsky, S. L. Rubinstein).

A. V. Zaporozhets defines emotional performance as the emotionally-Gnostic systems, as a form of "partial reflection" of reality, including perceptions, representations and emotions. In emotional representations of reality is "in its relation to the individual, his needs, interests, motives, installations" [7 p. 146].

L. S. Vygotsky, A. N. Leontiev, B. M. Lomov, S. L. Rubinstein, considering the ratio of cognitive and emotional-motivational processes in the development of the psyche, highlight the unity of affect and intellect as a condition of development of the personality, the affective regulation of thinking, the process of thinking as the intellectual and emotional unity, the existence of the indissoluble connection of emotions and cognitive processes.

A. Vallon, A. N. Leontiev argued that perceptions mediate and even shape the child's behavior. A. V. Zaporozhets, D. B. Elkonin also produce emotional representations as special kind of representations of the child performing the function of behavior regulation, anticipate the results of their own activities and experiences its meaning [7].

D. B. Elkonin was determined that developing the emotional presentation of the senior preschool children of a "living - nonliving, natural and social phenomena, good and evil", "give the first outline of what can be called ideology" of the child. The trend towards generalization of these representations is clearly manifested in the preschool years, is "the first attempt to create a picture of the World - Nature and Society" (D. B. Elkonin) [7].

The beginning of the development of emotional representations of older preschoolers can be detected in a body of knowledge and relationship to nature. They have value to the personality development of children in General and teaching them in school (the ability to observe the world around us, to notice features and properties of objects, their changes, to reflect them in speech; ability to establish causal relationships, to notice the dependency, reflected in narrative and explanatory speech; cognitive interest in the world around them, willingness to learn, desire to use knowledge in practice) is developed in the process of formation of emotional representations (O. V. Gordeeva) [9].

V. A. Labunskaya notes that the formation of a system of emotional representations should be conducted in close connection with the education of the emotionally-positive relation to nature that must manifest itself in active work, in children's actions.

L.S. Vygotsky argued that in the preschool age ideas of nature are associated with a higher level of abstraction, well developed operations analysis and synthesis of reality, a large vocabulary. Children are able to see and enjoy the beauty of nature. They have produced an emotionally-evaluative attitude to nature, to the results of labour, to art, to the behavior of peers and adults: estimates are given deeper and broader motivation.

According to the views of scholars such as B. S. Bratus, V. K. Vilyunas, V. V. Stolin, M. Calvino, B. M. Masters, revealing fundamental assumptions about the role of emotions in the reference-based semantic entities - awareness of emotional phenol-mena is possible in the form of symbols, which is the result of the verbal activity [9].

Researchers V. V. Gerbova, G. N. Bavykina, A. M. Borodich, V. I. Loginova, E. I. Tiheeva paid attention to the fact that the learning of words must occur on the basis of sensory perception in unity with the formation of a tion of elements of conceptual thinking [10].

According to the teachings of L. S. Vygotsky, thinking is in the form of concepts, and concepts require support in the word. V. I. Shahovsky noted that the motivic meaning of a word always relates to a certain understanding that cannot be independent of the concepts expressed verbally.

Theoretical analysis of the literature allowed us to identify components of emotional representations (cognitive, emotional value, behavioural). Systematizing the views of B. G. Ananiev, V. A. Artemov, A. Vallon, L. Vygotsky, P. Y. Galperin, V. V. Davydov, A.V. Zaporozhets, J. Piaget, S. L. Rubinstein, A. N. Leontiev, D. B. Elkonin, etc., we have issued criteria evaluation scheme of emotional concepts and their verbalization which reflects the perspectives of our study.

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Some features of expressing verbal aggression in mass media

Introduction

The relevance of the study

The article deals with expressing verbal aggression used in the media which primarily intends to affect the population. Nowadays, the media are not only the tool of spreading aggression in different areas of society, examining and promoting an aggressive demeanor, but also a channel of influence on the consciousness and behavior of mankind. In other words, in today's world, the media popularize and spread the model of aggression in various situations as a pattern of behaviour.

The aim of our work is to study the basic aspects of verbal aggression and to analyze the use of linguistic means for its expression.

Materials and methods

Analyzing this phenomenon the following research methods were used: analysis of scientific literature and articles on the use of expressing verbal aggression; descriptive method; comparative method; structural method; method of stylistic analysis.

The media are the main means of spreading any kind of information in all countries. People use the media for various reasons, but first of all they want to be aware of what happens around. People easily perceive information they are provided by the media without thinking about the accuracy of the facts [1]. People allow themselves to be manipulated, take the view imposed by the media, which tries to influence the spiritual state of the population, to manage and inclcate the necessary patterns of thinking and behavior [2].

The level of freedom of different types of media has been estimated on the basis of the analysis of speech freedom in a particular country, state interference in the media, the work of journalists and the government's attitude towards them, and then all the countries conventionally have been divided into three groups: countries with "free", "partly free "and" not free "media. Such countries as the US and the UK are the countries with the status of a "free" press.

Newspaper in modern life is the most important means of transmitting information. In everyone's life, it plays a huge role [3]. When studying the use of expressing verbal aggression in Western mass media the following newspapers were analyzed: The Washington Post, the New York Times (USA); The Guardian, BBC News, Independent (the UK); and others. It is the French newspaper Charlie Hebdo which has a high level of aggression and is famous all over the world for offending caricatures. Every day we are confronted with verbal aggression while reading newspapers or watching the news on TV because usually journalists cover in their reporting adverse events and incidents that cause the audience's negative emotions. For example, the crash of Tu-154 plane in Sochi caused a lot of attention from journalists around the world who sought to reflect the different sides of what had happened in their publications.

It is worth noting that the majority of US and UK newspaper editions limited themselves only to the official data, they stressed the importance of the Alexandrov Ensemble and Dr. Elizabeth Glinka for the whole country and brought their condolences. Thus, the media of these countries, unlike the other ones, almost did not show aggression in connection with the disaster.

As an example, article written by Paul Kazarin "Battle of empathy", published in the Ukrainian newspaper "Ukrainian Truth", can be given. "The response to the crash of the Tu-154 is an illustration of how Ukraine and Russia have managed to divorce, but Moscow did not notice" [4]. The title and the beginning of the article written in an ironic style demonstrate a negative attitude of the author to the event. The author seeks to create a certain attitude to these two countries attempting to elicit sympathy for the Ukraine and to build a negative image of Russia: "The only problem is that hybrid warfare is differently refracted in the minds of the Russians and the Ukrainians. For the latter it is given in perception. In six waves of mobilization. The funerals from the front. And the Russians continue to live in a world where there is no war, and are sincerely puzzled why the neighboring country refuses to sympathize with them" [4].

Also in the article the author accuses Russia in the appropriation of the Crimea and invasion of Donbass, arguing that the Ukraine is fully affected by the war while in Russia the war is only "virtual". The author accuses Russia directly in the events that occur on the territory of the Ukraine, "when the Russian artillery fired from the Rostov region on the Ukrainian Army", "when the Buryat tankers shot the Ukrainian soldiers," "when the Federation Council allowed Putin to use the army abroad " [4]. People reading the article filled with utterances with verbal aggression are forced to create a negative attitude towards Russia unintentionally; one can understand it while reading the comments to this article. After analyzing this article, we can emphasize the examples of verbal aggression used by the author and divide them by parts of speech. Nouns: "the place in hell, the funeral from the front, Bandera, ukrys, mugs; verbs: to arrange the invasion, annex, shoot, boil over, conquer (with tanks); adjectives: crucified (boys), alien, hostile." Thus, it can be concluded that in this article the author mostly prefers the nouns and verbs to express aggression and to create a tense atmosphere. It should be noted that this article is not the only one describing not only the unwillingness of the Ukrainian citizens to express sympathy for the disaster but they also openly express malicious joy. Some of them claim that in recent years a large number of the Ukrainians have died or been seriously injured but none of the representatives of the Russian Federation has expressed sympathy or support, therefore, Ukraine for its part is not going to express this support. This is one of many examples of the media using verbal aggression to have an impact on the population.

Also, the French newspaper «Charlie Hebdo» was once again distinguished by a certain part of brutality, which strikes people around the world publishing extremely cynical caricatures. After the crash of Tu-154 in Sochi the newspaper published a shocking picture of the plane accident and the caricature of the Russian choir soloist singing "A-ah". Such words were written under the pasquinade: «Le répertoire des choeurs de l'armée rouge s'élargit» (the repertoire of the choir of the Red Army is expanding).

Moreover, the aggression on the part of the French newspaper provoked an aggressive response from the Ministry of Defense of the Russian Federation. "Rossiyskaya Gazeta" in the issue of December 29 published a sharply negative statement of Major General Igor Konashenkov: "Regular pouring out on the paper of these Paris two-legged creatures do not insult. Even paying attention to that filth is humiliating for a normal person" [5]. Besides the examples of verbal aggression

mentioned above it is also possible to distinguish the following ones: “aberration of consciousness”, “loss of dignity”, ‘(intellectual) pornography”, “outrageous”, “mocking”, “anti-Russian”, “repulsive”, “vile”, “harshly stigmatized”, “boycott” [4]. It should be noted that the author tries to express his attitude through multiple adjectives expressing aggression.

Thus, we can observe the existence of coterie of verbal aggression manifestation in weekly newspapers editions around the world, as well as in the speech of politicians who should be exemplary for the entire population but they allow themselves to be expressed not only by means of cultural expressions and phrases.

Another event that shocked the world was an attack and murder of Russian Ambassador to Turkey, Andrei Karlov. Most of the media in Russia, USA, UK and other countries have recognized the incident as a terrorist act unacceptable in a civilized world. However, not all media highlighted it only in this perspective, some publications and journalists have chosen not to condemn the incident and not to express their sympathy and support of the Russian Federation, and to take the side of the terrorist.

As an example, there could be taken an article entitled «Assassination of Russian Ambassador Andrei Karlov was not terrorism, but retribution for Vladimir Putin's war crimes» [6], which was published in an American newspaper «New York Daily News». Even the title of this article shows that the author does not consider the incident to be terrorism; he finds it to be a kind of retaliation, which finally caught up with Vladimir Putin.

“So I, for one, am shedding no tears for Andrei Karlov. Frankly, I’m surprised his murder didn’t come months ago” [6]. The author claims that he did not shed even a tear and wonders that the murder has not happened months earlier.

He proceeds to tell the readers that “Andrei Karlov is the human embodiment of policies that deployed bunker busters to kill babies, sent fighter planes on scorched earth bombing runs that destroyed a whole city” [6].

The author calls the Russian diplomat the real murderer and a soldier, and that is why does not consider the case to be an act of terrorism, since, according to the author, only one soldier killed the other: “Given that role, he wasn’t a diplomat, but a soldier, and his death is the same whether it came on a battlefield outside Aleppo or in an art gallery in Ankara. His killer was also a soldier — not a terrorist, mind you, but a soldier. Terrorists kill innocent people with trucks in Christmas markets or with planes in skyscrapers. Soldiers kill their fellow soldiers” [6].

The article is full of words expressing aggression which can be divided into several groups:

1. Nouns: assassination, retribution, war crimes, assassin, dying body, dictator, bombing run, atrocity, Adolf Hitler's genocide, battlefield;

2. Verbs: deploy bunker buster, kill babies, destroy, gun down, burn down;

3. Adjectives: murderous, brazenly flouting.

The day after the article was published, for which the author was convicted by many readers and policy makers, there appeared the following article entitled "Vladimir Putin demanded an apology from me!" [6]. The author resents the fact that he is required to apologize and claims that Russia has got involved in many catastrophes: "Putin has intervened in our election, killed civilians in Syria, stolen Crimea, shelled Ukraine, threatened other neighbors, has been arming Hezbollah, supplied the missile system that shot down Malaysia Airlines' flight 17 in 2014 and then hacked into the computers of the Dutch agency investigating the crime" [7].

The author does not try to conceal his negative attitude and openly expresses aggression: "So now Vladimir Putin is demanding an apology from me. Who knew that a strongman supporting mass atrocities in Syria could be so sensitive?" [7]; "Apologize, Russia? Only if you go first and apologize for Putin's thuggery"; "Justice has been served" [7].

In addition to the examples of verbal aggression mentioned above the following ones can be added: military, rebels, blood, gunman, assault; torture, jail, bomb, and crush.

After analyzing the articles of the author, it can be concluded that in most cases he uses nouns and verbs to express his aggressive attitude and have influence on the population.

Results

Verbal aggression as an integral part of modern media is observed in any publication, regardless of the country in which this edition is published. However, this form of expressing aggression is different: sometimes the author directly affects the audience, urging to act aggressively; sometimes the author intentionally uses ironic writing style and flow of speech to create an aggressive state of the reader. Modern media, regardless of the topic, of the problems discussed, the country in which the publication is made, prefer to use nouns in verbal aggression, which include insults, threats, ridicule, and verbs expressing threats or insults, as well as verbs describing the

action of the aggressor. Adjectives describing the acts of aggression are used less frequently, but definitely create a negative atmosphere and affect readers' minds an attitude.

Conclusion

Thus, we see that a large number of media in all countries does not try to conceal their aggression and to provide readers with the facts in the original form; they give personal assessment of the situations sometimes imposing their own opinions on readers for different reasons. In today's world people cannot assess the situation in the world by themselves because they do not receive accurate information, they receive only what some newspapers, TV channels or even the state think is necessary to provide them with.

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Updating discourse on the problem of co-optation integrative potential in the security dimension of a united Europe

Mainly theoretical studies of the development of a united Europe security were developed in two main areas. The first was focused on dimension regulatory and rule-based approach to European integration, which directly correlates with the concept of «creating security community among former enemies». Karl Deutsch rightly argued that the security community can exist at the international level and security policy deeply shaped by it. The research concept of the relationship between the international community and opportunities for peaceful change is urgent and essential for regional contexts. The idea that actors can share values, norms that provide social identity, and to participate in various areas of interactions that reflect the long-term interest to have diffuse reciprocity of interest despite its ambiguity (political community is limited territorial state, and is not very big the possibility of effective action abroad). But constructivists insist that security policy is profoundly shaped by communities and states that live within the international security community get in his character traits appeasement, they have a sense of community, which, in turn, creates an assurance that they will resolve their differences without war. Thus, it is argued that those states, which live in communities, provide security not just stable order, but indeed stable peace [1].

The second logic way was focused on technology security and gradually establishing EU through the development of its military instruments [2]. Both approaches raise important questions concerning the nature and possibilities of EU action space forming a common security and a common constituent nature of the social order as such support arrangements.

Combining safety and community, the state is the revisionist in the views on common values and security authorities. In some of them the concept of power includes the ability to protect their community values and expectations of proper behavior against

external threats and to attract new countries to the ideas that give meaning to national security and material progress. Thus, the value of power begins to shift and «now states identify» new «security issues that revolve around issues of economy, environment and social security» [3]. So the vision is a challenge to the hegemony of the realists, because inspires politicians to alternative understanding that perhaps in contemporary global politics.

The theory of security community pays significant attention to issues of identity and social foundations of interaction with other actors. All political identity is conditional, dependent on interaction with other actors and is found within the specified context. This perspective represents the view that the national and state identity emerging in relations with other nations and states - under the identity of political figures associated with their relations with others beyond the border communities and territories. The closer to the closely related community safety, however, the shorter collective cognitive distance between its members and the greater community acquires corporate identity. These communities are treated as people's identity environments that are no longer derived from the international environment [3].

Modern theorists believe an important aspect of their research paying attention to the symbolic power struggle as an explanation of the nature of European security that is logical based on the concept of social and symbolic power in the tradition of P. Bourdieu. Researchers claimed that area of European security since the Cold War continues the process of transformation constant struggle between the various actors in their efforts to be perceived as legitimate agents in the formation of a new social order. [4] The dominant narratives in society can be identified on specific aspects of security, but in the end, reality, partly under the influence of accelerating the political nature of time has made the space even more transformational.

Thus, trying to uncover the possibilities inherent in providing «political» in the conceptual development, European security experts seek to understand the possibility of reorganizing the existing order security agents, which actively seek its shape and form of power that they exercise in the process.

In this context, the European Union is treated as a central actor in the region and the security offering perceived as a manner of investing in the preservation of the existing hierarchy of power in the social space. The approach combines safety regulations, soft approaches based on the discipline of social, political and economic spheres of life on the continent, as well as the increasing use of military force for

humanitarian purposes, giving some forms of «capital-invest» for self-expression EU as actor in world politics. This process is also fundamental to social identity of the EU as an appropriate agent in the process of rethinking European security and enables justify their existence.

The most difficult point is the sine wave's oscillations that occur in relations with Russia, which can be regarded as the result of fighting between agents who apply for status in the dominant discourse and resources. Different points of view that European security must to be conceptualized in the context of defining the role of Russia reflect differences between EU member states and its institutions, raising questions about the consistency of the inner nature of the EU.

It should be noted that changes in the EU policy towards its neighbors is usually reactive, the practical empiricism is under pressure such as real military conflict. In turn, the problem is significant politicization of issues of building partnerships with the EU in terms of security confirms the argument that the European community «no-war» was created because of desecuritization [4].

In this context, argue that Western Europe is a special community safety. In contrast to the expectations of most modern theorists, it was achieved through the construction of public facilities or building security institutions, but primarily through a process of progressive marginalization desecuritization as mutual security problems for other issues. In particular O. Weaver argues that Europe has gone through a period of danger to the safety desecuritization, and then, in 90 years, the situation resecuritization security community [4]. The researcher also claims that because other issues were considered as security (economic, environmental, etc.), it may raise the tension, but it will not lead to war. And it can be determined on the peaceful settlement of tensions, which would previously only resolved by military means. [5]

Appointed in terms of theoretical thought enjoys significant influence direction poststructuralist's constructs where the greatest way shared meaning of "politics" and "political." The policy also responsible for the legitimacy of the existing order, but not doubts its origin. But in order to understand the construction of different subjectivities need to look at the political moment [6].

It should also focus on the complex correlation factor between «political» and security. In this context, experts on issues argue that the political must be what allows the human potential for development. «Political» can be seen as contrary to security is that rising uncertainty inherent in society in moments no fixed structure of social value

and the manner fundamentally at odds with the desire values predictability, stability and knowledge [7]. Instead, safety is organizing principle of the modern world and the answer to human desire order, stability and sustainability, says it is. Security is fundamentally linked to the desire of mankind comprehensive knowledge and control of the uncertainty over the change and transformation, and the pursuit of safety is one of the most motivated elements forming its policy actor in the international environment.

In the 2000s, the national sovereignty and the balance between the great powers heavily again was highlighted as relevant sources of safety and theorists saw the emergence of contradictory dynamics security. New challenges and threats, rapid remilitarization of international relations contributed to Promote interaction center field players began their process of political and economic consolidation, reflected at the regional and international levels. Factor global terrorist threat has opened an opportunity for a new process of rapid hipersecuritization many aspects of social and political life in Europe, so the new configuration narratives, approaches and tools, finding a balance between the military, economic, financial and regulatory capital. Conceptual ambiguity ENP and EaP is mainly the lack of vision of the pan-structuring. This ambiguity is also present in the process of EU enlargement, as it is not clear what drives the EU: the desire to unite the European peoples; building economic bloc; promoting security through political restructuring periphery or because of the economic development of these regions? De facto regional approaches are reconciled with the differentiation and have the form of partnership that continues to be poorly defined from the standpoint of security dilemmas in cases of competing influences. According K. Firke «promoting security model that values the ideal type of democracy and economic progress, the EU does not recognize that there is no ideal type of democracy and economic development, many experience a peaceful political governance and political and social progress can be achieved and that any people (social and political) project should be interpolated historically» [8].

The new program is based on current research pragmatic vision. Pragmatism - philosophical approach, based on the work of authors such as John Dewey and William James, has grown in popularity in today's international political theorizing as an alternative to the traditional approach where security continues to be viewed in the context of the dichotomy of «good – bad» and identify that you should avoid are extracted from human experience [9].

The analysis focused on the practice is substantially contextual because considers that security means different things in different contexts, not always constant sense because critical given negotiation process. His supporters rightly emphasize that you can understand the value of security just by learning how it works and appears in different empirical contexts. Modern theorists propose to abandon attempts to establish «ethics Security», alleging that it is pragmatic helps move forward with practical research program that avoids the definition of «good» in theoretical terms, allowing you to assess regulatory impacts of the various methods of security in terms of a particular context [10]. The new pragmatism opens space for empirically grounded research issues of international security.

Thus, we can say that the basis of modern theoretical approaches is the desire to understand the essence and nature of formative processes that shape the international order and contribute to restructuring the security system in Europe with a comprehensive consideration offs of different forms of security policy.

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Communicative competence as an important factor of professional development of a future doctor

Abstract: The article interprets the concept of communicative competence as a component of a future doctor's professional development at a higher medical educational establishment. The analysis of the scientific methodical literature has been carried out. The criteria of the linguistic material selection have been indicated: completeness of the story and logical maturity of the material; exemplariness of speech; presence of challenge and relevance; general educational value; textual diversity with respect to a theme, composition, stylistic features; stylistic neutrality; presence of the known speech material; presence of simple syntactic structures; small volume; accessibility and simplicity of the contents; use of comprehensive description; professionally informative fullness and novelty; insightfulness, authenticity, accessibility; text volume, type, subject; text complexity (determined by correlation of known and unknown words, possibility to guess their meaning, importance of such words for understanding of the contents; failure to meet requirements of the normative standard etc.). The stages of familiarization of students with new terminological lexical units have been indicated: the stage of familiarization of students with new medical terms in a context; post-textual stage that implies automation of the usage of new terminological lexical units by students.

Key words: communicative competence; future doctor's profes-sional development; English-language lexical competence; profession-oriented text.

A problem statement. The process of integration of the system of higher education of Ukraine into the European educational environment predetermines providing of students with the necessary level of foreign language communicative competence.

An important aspect in the professional development of a future doctor is the formation of communicative competence. To select the educational material related to formation of the English-language lexical competence of future doctors in the environment of profession-oriented reading, we follow the criteria which, after N. F. Borysko, we understand as basic features assisting in qualitative and quantitative assessment of the textual material to be applied as the teaching tool. (Borysko, 2000, p. 116).

Analysis of the recent sources and publications. The researchers who pay special attention to necessity of teaching English with taking into consideration professional needs include Michael Halliday, Angus McIntosh and Peter Strevens.

A problem of formation of communicative competence has been a topical one in works by many researchers, suffice it to mention O.B. Bigych, N.F. Borysko, G. E. Boretska, M.K. Borodulina, N.D. Gal'skova, Y.V. Gnatkevich, R.P. Mil'rud, Y.O. Semenchuk, O.M. Solovova, O.B. Tarnopolsky, O.M. Shamov, S.F. Shatilov, V.V. Schmidt, R. Oxford, R. C. Scarcella, P. Nation, D. Nunan and others.

The methods of teaching the terminology to the students studying foreign languages at non-offering linguistic education establishments are dwelt upon in studies by V.D. Borschovetska, M.O. Burlakova. Separate mention should be made of scientific research works that exposed the problem of formation of lexical skills for fluent command, which field had been studied by N.I. Govorova, O.N. Krasnyanska.

They explored the issues of semantization of English, German, French and other languages' terminological units; the ways of lexical skills development and strategies of the use of foreign lexis on the beginner's and intermediate levels have also been scrutinized. Despite obvious achievements in addressing the problem of teaching the specialized lexis, the practical experience prompts the necessity to enhance the quality of mastering the English lexis by students. It concerns, in particular, studying the terminology by medical undergraduates.

Results and Discussion. Relevance of English as the worldwide communication means in the fields of science, education, business cooperation has brought about the demand for a special teaching approach – «English for Specific Purposes (ESP)», which encompasses «English for Science and Technology (EST)», «English for Academic Purposes (EAP)», «English for Occupational Purposes» (EOP).

Researchers regard the concept of foreign language communicative competence as an integral feature of one's occupational activity. The means of development of the

English-language lexical competence in our research is the profession-oriented text. Therefore we deem it pertinent to establish the following order of the educational material selection: first to determine the criteria of such selection and carry out the selection of profession-oriented texts for reading; then to determine the criteria of lexical material selection and carry it out on the basis of the selected texts.

The analysis of scientific methodical literature allows concluding that there are different views as to the textual material selection. In particular, it is suggested that the following criteria are applied: 1) completeness of the story and logical maturity of the material; exemplariness of speech; presence of challenge and relevance; general educational value; textual diversity with respect to a theme, composition, stylistic features (Borodulina, 1982); 2) stylistic neutrality; presence of the known speech material (save for the potential vocabulary's lexical units); presence of simple syntactic structures; small volume; accessibility and simplicity of the contents; use of comprehensive description (Yelukhina, 1978, p. 31); 3) professionally informative fullness and novelty which implies the relevance of information for a reader and information novelty of each subsequent text (Kytayeva, 1989); 4) insightfulness, obligatoriness (term by Y.M. Vereschagin and G.M. Kostomarov), authenticity, accessibility (Strekalova, pp. 7–10); 5) text volume (computed by means of word count); text type (the training goal and students' previous experience taken in consideration); thematic relevance; text complexity (determined by correlation of known and unknown words, possibility to guess their meaning, importance of such words for understanding of the contents; failure to meet requirements of the normative standard etc.) (Solmecke G., 1997, pp. 44–45).

When mastering the professional terminological vocabulary, future doctors have to use complex cognitive strategies, such as: comparison of speech phenomena in Latin, English and native language; associations, word form analysis based, in particular, on knowledge of word-formation elements of Latin utilized to create special medical terms; reliance on the professional context; reliance on comprehensive description and independent making of Mind-maps; use of personal experience of studying profession-oriented subjects taught in mother tongue (terminology mastering experience, in particular) and Latin aimed at highlighting and comprehension of new terminology in the professional context; memorizing medical terms in set expressions etc.

There is no need, in our opinion, for any additional validation of the fact that in the course of their occupational activity the doctors do read authentic profession-oriented texts. That is why, in the process of studying at a higher educational establishment, mastering English should to be built on the material of authentic texts, i.e. the texts „produced with communicative purposes regardless of language teaching" (Zhluktenko, 1971, p. 70).

It is known that mastering a foreign vocabulary takes stages. It is a common tradition to highlight the following stages in lexis teaching: 1) the stage of familiarization with new lexical units – semantization of lexical units; 2) the stage of automation of operations with new lexical units on the level of word form, free word combination and sentence, on the level of supra-phrasal units (Methods, 2013). The same stages are taken in the process of formation of English-language lexical competence of future doctors as well, which implies, as mentioned above, learning medical terminology. Along with that, we suggest that the stage of familiarization with new terminology be subdivided into two stages:

1) *The stage of primary familiarization with new medical terminology out of context*. Most methodologists believe that familiarization with a lexical unit should be set in context. We assume that the primary familiarization with new medical terminology out of context facilitates a wider understanding of a term's meaning, aids in development of skills related to predicting such term's meaning adjustment in new contexts.

2) *The stage of familiarization with new medical terminology in context*.

In the stage of the primary familiarization with new medical terminology out of context the students are supposed to prepare to read a profession-oriented text rich in medical terminology. The reading stage correlates with the stage of the primary familiarization with new medical terminology aiming at: introduction of new medical terms, their preliminary semantization (independent or with the educator's help) out of context by formal attributes – associations, word form analysis based, in particular, on knowledge of word-formation elements of Latin utilized to create special medical terms; building of declarative knowledge about English medical terms formation on the basis of word-formation elements of Latin; development of skills related to predicting medical terms' meanings.

The purpose of the stage of familiarization with new medical terminology (in context) in the process of the reading proper is: independent semantization of new medical terminology in context; denial or confirmation of new terminological lexical units'

meanings based on conclusions drawn in the previous stage; control of understanding the meanings of new medical terms in the process of reading.

The post-textual stage of reading envisages automation of students' operations with new terminology on the level of word form, free word combination, sentence, supra-phrasal units when the following goals are achieved: activation of new medical terminology, ensuring of memorizing thereof, development of declarative knowledge about English medical terms formation means.

The need to use authentic textual material is recognized by most methodologists, for the authenticity of texts guarantees the reader a contact with a foreign language in real situations and in natural communication environment, the texts' linguistic base demonstrating the authentic context of lexical units' usage, which is important indeed for the problem studied. According to G.V. Barabanova, at non-offering linguistic education establishments the authentic text selection should be governed by prioritizing the choice of true authentic texts (Barabanova, 2005, p. 101); Y. V. Nosonovich believes that „prepared" training texts lose the typical textual features, the author's individuality and ethnical specificity; authentic texts are stylistically and thematically diverse and arouse the learners' interest; they illustrate the functioning of the language in the forms naturally accepted by native speakers; whereas use of processed, simplified texts may further on cause difficulties in comprehension of texts from "real life" (Nosonovich, 1999); O.B. Tarnopolsky notes that only dealing with authentic texts can teach the students to read real, not artificial, foreign language texts in real conditions (Tarnopolsky, 2006, p. 79).

The relevance and professional-informative value criterion is of a considerable importance, since the text is a source of information supposed to be relevant and aligned with contemporary issues of medicine on the global scale, the text, as such, being rich in modern medical lexis; the informative capacity of the textual material is, therefore, verified by its value with respect to the needs of future professionals (T. S. Serova, 1989). Thus, the texts meant to be used for educational purposes should contain occupationally valuable information that facilitates development of the students' English-language lexical competence and professional competence at large.

The next significant profession-oriented text selection criterion we emphasize is the cross-disciplinary coordination, which envisages the selection of English texts containing the medical vocabulary already mastered by the learners through their mother tongue when studying occupation-related theoretical and practical subjects.

Such selection approach results in creation of optimum conditions for learning English medical lexis in particular and acquiring professional competence in general, for knowledge of terminology mastered in the process of occupational training is consolidated, deepened and systemized through foreign language classes.

Mastering the occupational vocabulary, future doctors have to adhere to complex cognitive strategies, including: comparison of speech phenomena in Latin, English and native language; associations, word form analysis based, in particular, on knowledge of word-formation elements of Latin utilized to create special medical terms; reliance on the professional context; reliance on comprehensive description and independent making of Mind-maps; use of personal experience of studying profession-oriented subjects taught in mother tongue (terminology mastering experience, in particular) and Latin aimed at highlighting and comprehension of new terminology in the professional context; memorizing medical terms in set expressions.

Conclusions. The English-language communicative competence is, thus, a necessary condition in formation of a future doctor as an accomplished professional. Studying thereof presents the means to be applied in occupational training at a higher medical educational establishment. Nowadays future doctors need to be foreign-language communicatively competent to acquire professional knowledge and develop occupational skills. We see perspectives for issue-related research in pursuing new approaches aimed at setting problem-situations facilitating occupational formation of future health professionals and development of their English-language communicative competence.

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Influence of anthropogenous load on the structural state of the soil in the conditions in the dry steppe zone

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Влияние антропогенной нагрузки на структурное состояние почвы в условиях в сухостепной зоны

Аннотация: По результатам анализа образцов почвы проведена оценка структурного состояния почв в сухостепной зоне Акмолинской области. В большинстве своем состояние верхнего 0-5 см слоя почвы оцениватся как отличное и хорошее, что объясняется тем, что ненарушенные или не вспаханные почвы, как правило, имеют довольно хорошую структуру. В тоже время, на отдельных пробных площадках на территории всех этих сел имеются тенденции к распылению верхнего слоя почвы в результате различных внешних факторов, в том числе и антропогенного.

Ключевые слова: опустынивание, деградация растительного покрова, фитоценозы, деградация почв, степные экосистемы.

Один из негативных глобальных процессов сегодняшнего дня является проблема опустынивания засушливых территорий. Оно определяется одновременно как экологический процесс и как состояние окружающей среды и используется для обозначения деградации земель в аридных, семиаридных и субгумидных районах в результате действия различных факторов, включая изменение климата и деятельность человека. Организация Объединенных Наций в 1994 году приняла специальную Конвенцию по борьбе с опустыниванием. Конвенция определяет его как «деградацию земель» в засушливых, полузасушливых и сухих субгумидных районах в результате действия различных факторов, включая изменение климата и деятельность человека. В контексте

Конвенции под «землями» подразумевается биопродуктивная система, включающая в себя почву, воду, растительность, прочую биомассу, а также экологические и гидрологические процессы, происходящие внутри системы. Сухие и засушливые климатические зоны, где в наибольшей степени вероятно проявление опустынивания, занимают около 48 % суши Земли. Площадь земель, подверженных или потенциально опасных в отношении опустынивания, составляет около 52 млн. кв. км. Ежегодно до 20 млн. га земель подвергаются деградации [1].

Правительством Республики Казахстан 24 января 2005 года утверждена «Программа по борьбе с опустыниванием в Республике Казахстан на 2005-2015 годы» Процессам опустынивания и деградации подвержены в разной степени земли 70% территории республики, что во многом обусловлено природными особенностями страны. Из 188,9 млн. пастбищ страны крайняя степень деградации наблюдается на 26,6 млн. га. В целом по республике отмечается устойчивая тенденция к ухудшению качества земель: снижение содержания гумуса, биогенных элементов, видового состава растительности, биологической продуктивности [2].

Целью работы является определение влияния антропогенной нагрузки на состояния почвенного покрова на территориях, прилегающих к сельским населенным пунктам в условиях сухой степи.

Для проведения исследований были организованы экспедиции. Проведен маршрутный геоботанический мониторинг степной растительности и почвенного покрова на территориях прилегающих к селам Ерейментауского района, в 2012 году села Еркеншиликский, в 2013 году села Новомарковка и в 2014 году села Тургай. На территориях прилегающих к селам Астраханского района, в 2012 году села Петровка, в 2013 году села Новочеркасский и в 2014 году села Каменка. На территориях прилегающих к селам Целиноградского района, в 2012 году села Кабанбай батыр, в 2013 году села Максимовка и в 2014 году села Воздвиженка. Все населенные пункты находятся в природно-климатической зоне сухой степи. Исследования велись в направлении от населенных пунктов по 4 основным трансектам (север, юг, запад, восток).

Гранулометрический состав или структура почвы является одним из главных факторов ее плодородия. Различают два понятия структуры почвы: морфологическое и агрономическое. В морфологическом понимании каждому

типу почвы или ее отдельным генетическим горизонтам присуща своя, характеризующаяся определенной формой, структура. Ее формирование связано с почвообразовательным процессом. С агрономической точки зрения наибольшее значение имеет не форма, а размеры и прочность структурных отдельностей. При этом они подразделяются на микро- и макроагрегаты. Эти термины были введены К.К. Гедройцем [3]. К микроагрегатам он относил частицы мельче 0,25 мм в диаметре, к макроагрегатам – крупнее 0,25 мм.

Изучаемая нами территория относится к невозделываемым сельскохозяйственным землям, используемая местным население и фермерами в качестве пастбищ, причем отдельные трансекты по направлению от сел имеют более интенсивную нагрузку в сравнении с другими. Зачастую почвы на таких участках распыляются, подвергаются ветровой и водной эрозии.

По результатам сухого просеивания образцов почвы проведена оценка структурного состояния почв исследуемых территорий сёл трёх районов. В сёлах Ерейментауского района В большинстве своем состояние верхнего 0-5 см слоя почвы оценивается как отличное и хорошее, что объясняется тем, что ненарушенные или не вспаханные почвы как правило имеют довольно хорошую структуру. Возле территории села Новомарковка на отдельных пробных площадках имеются тенденции к распылению верхнего слоя почвы в результате различных внешних факторов, в том числе и антропогенного. Почва южного трансекта на расстоянии 500 м и восточного транссекта на расстоянии 1500 и 2000м оценена только как неудовлетворительное., во многом это объясняется довольно большим процентом крупной фракции, т.е крупнее 10 мм. Почва на расстоянии 2500 м от села в восточном направлении, почва распылена и состояние структуры почвы оценена как удовлетворительное.

В сёлах Астраханского района в большинстве своем состояние верхнего 0-5 см слоя почвы возле территории села Новомарковка оценивается как отличное и хорошее. На территории села Петровка почва восточного трансект на расстоянии 1000 м и 2000 м оценена только как удовлетворительное. Неудовлетворительная структура была в западном и в южном направлениях села Каменка. Такую картину можно объяснить повышенным антропогенным воздействием, также это объясняется солонцовыми пятнами вокруг сёл, которые имеют плохую структуру верхнего слоя почвы.

В сёлах Целиноградского района в большинстве своем состояние верхнего 0-5 см слоя почвы возле территории села Новомарковка оцениватся как отличное и хорошее. На территории села Кабанбай батыра почва на расстоянии 1000 м от села в северном направлении сильно распылена имеет неудовлетворительное состояние, в южном направлении на расстоянии 1000 и 2500 м состояние структуры почвы оценена как удовлеворительное. На территории села Максимовка на расстоянии 500 и 1000м в южном направлении на западном направлении на расстоянии 1500, 2000, 2500, 3000м, в восточном направлении на расстоянии 1000м в южном направлении на расстоянии 1000 и 2500 м почва распылена и состояние структуры почвы оценена как удовлетворительное.

Самые худшие по структуре почвы были возле села Воздвиженка, где в северном направлении на расстоянии от села 500м почва характеризовалась как безструктурная. На расстоянии 1500 м почва имела неудовлетворительную структуру. Неудовлетворительная структура почвы была на расстоянии 500 м в восточном направлении от села Воздвиженка. Такую картину можно объяснить тем, что вокруг села Воздвиженка протекает река и это образует вынужденную ситуация, где людям приходиться выпасать скот на ограниченной территории возле села и некоторые участки почвы вытоптаны скотом и имеют неудовлетворительную структуру, также это объясняется солонцовыми пятнами вокруг сёл, которые имеют плохую структуру верхнего слоя почвы.

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Ways to improve the quality of professional training in physical therapy and occupational therapy in terms of technical higher educational institutions

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Шляхи підвищення якості професійної підготовки фахівців з фізичної терапії та ерготерапії в умовах технічних вищих навчальних закладів

Постановка наукової проблеми та її значення. Незважаючи на постійне збільшення фінансування галузі охорони здоров'я, значні досягнення в діагностиці та лікуванні, зростання числа медичного персоналу, кінцевий результат комплексу зусиль, що спрямовані на збереження та зміцнення здоров'я людини, ще нажаль, залишається малоефективним. Поширення різноманітних захворювань,

ушкоджень і порушень роботи органів і систем людини багато в чому обумовлено патогенним стилем сучасного життя. У зв'язку з цим все гостріше стає проблема підготовки кваліфікованих фахівців з фізичної реабілітації (ФР), а з 01.02.2017р. - фізичної терапії, ерготерапії (ФЕТ), які могли реалізувати комплекс оздоровчо-відновних заходів, спрямованих на оздоровлення, попередження захворювань і травматизму, ФР та адаптацію людини до сучасних умов.

У технічних вищих навчальних закладах (ВНЗ) України таких як: Національний технічний університет України «Київський політехнічний інститут імені Ігоря Сікорського», Запорізький національний технічний університет, Міжнародний технічний університет імені академіка Юрія Бугая здійснюється підготовка фахівців з ФР і ФЕТ [3 – 5].

Аналіз досліджень з проблеми. В Законі України «Про реабілітацію інвалідів в Україні» (2006р.) визначено призначення ФР - це система заходів, спрямованих на вироблення і застосування комплексів фізичних вправ на різних етапах лікування та реабілітації, що забезпечують функціональне відновлення особи, виявляють і розвивають резервні і компенсаторні можливості організму шляхом вироблення нових рухів, компенсаторних навичок, користування технічними, іншими засобами реабілітації, виробами медичного призначення [4, 5]. Лише втручання кваліфікованого фахівця з ФР і ФЕТ може повернути людині здатність самостійно рухатись. У цьому відношенні існує достатньо аргументована точка зору, що цим повинен займатися не лікар, а саме фахівець з ФР і ФЕТ. Проте ФР є невід'ємною частиною медичної реабілітації і повинна призначатися лікарем. Такої точки зору дотримуються відомі дослідники проблем ФР, вважаючи, що фахівці з ФР повинні готуватися як педагоги у сфері відновлення чи переробки рухової діяльності неповносправних осіб, оскільки ФР є *педагогічним процесом* [1, 4].

На сьогодні в Україні встановлено відповідність між національним тлумаченням терміну «фізична реабілітація» та міжнародним тлумаченням терміну «фізична терапія». Стандарти освіти і практичної діяльності, що мають визначальний вплив на розвиток ФР у світі, затвердила Світова конфедерація фізичної терапії (Копенгаген,1951).

У науковій літературі ФР трактується як «застосування з лікувальною і профілактичною метою фізичних вправ і природних факторів у комплексному процесі відновлення здоров'я, фізичного стану та працездатності хворих» [4]. Таке

визначення збігається з тлумаченням терміну «реабілітація», представленим в резолюції Генеральної Асамблеї ООН №48/96 від 20 грудня 1993 року: «Стандартні правила щодо зрівняння можливостей інвалідів» [1].

Перші кроки до формування ФР як самостійної освітньо-професійної галузі в Україні почав здійснювати Львівський державний інститут фізичної культури, де з 1994 року розпочалась співпраця із Канадським агентством міжнародного розвитку та 3-ма університетами Канади [1]. У 1994 році в Українському державному університеті фізичного виховання і спорту, потім в інших фізкультурних інститутах України кафедри лікувальної фізичної культури (ЛФК) і лікарського контролю реорганізуються у кафедри ФР і спортивної медицини. Потім це відбувається у медичних [4] і технічних вищих навчальних закладах (ВНЗ) України, серед яких Національний технічний університет України «КПІ імені Ігоря Сікорського» (1998р.) [5] і Міжнародний технічний університет імені академіка Юрія Бугая (2002р.), Запорізький національний технічний університет [4].

Особливості підготовки фахівців з ФР і ФЕТ різних освітньо-кваліфікаційних рівнів (ОКР) бакалавра і магістра у технічному ВНЗ визначаються державними стандартами підготовки з урахуванням традиційних для технічного ВНЗ напрямками. Шляхи підвищення якості професійної підготовки фахівців з ФР і ФЕТ в умовах вищих технічних закладів є важливою задачею.

Мета і завдання роботи. Мета роботи – визначення шляхів підвищення якості професійної підготовки фахівців з ФЕТ в умовах вищих технічних закладів. Реалізація мети вимагає вирішення таких завдань: аналіз наявних програм підготовки у технічних ВНЗ згідно Болонського процесу; аналіз наявності методичного і технічного забезпечення підготовки; наявності відповідних баз для проходження студентами практик.

Виклад основного матеріалу й обґрунтування отриманих результатів дослідження.

В НТУУ «КПІ» з 1998р. розпочато підготовку фахівців зі спеціальності ФР, а у 2000р. створено відповідну випускову кафедру, за якою закріплено підготовку фахівців зі спеціальності за ОКР «бакалавр» і «спеціаліст» з фізико-технічним спрямуванням, створено спеціалізацію «Фізичні та біотехнічні засоби реабілітації» [5].

Висока професійна кваліфікація викладачів кафедри і університету, їх педагогічний досвід, методичний і науковий рівень, постійний пошук і використання

новітніх технологій в освіті і науці, залучення до творчого процесу студентів є визначальним чинником забезпечення високої якості освіти випускників кафедри ФР, їх затребуваності і конкурентоспроможності на ринку праці. Випускники кафедри кожний рік 100% працевлаштовані. У 2007р. в НТУУ «КПІ» відкрито аспірантуру зі спеціальності ФР. До навчання в ній рекомендуються кращі випускники кафедри, здійснюються захисти кандидатських дисертацій, розпочато підготовку PhD докторів філософії. З метою наближення теоретичної підготовки фахівців до їх практичної діяльності та сучасних технологій оздоровлення й ФР людини, в тому числі з використанням новітніх технічних (комп'ютеризованих, роботизованих і мікропроцесорних) систем і засобів, кафедра співпрацює з провідними організаціями України, де студенти знайомляться і особисто працюють з сучасними закордонними реабілітаційними системами і засобами Франції, Німеччини, Канади, Фінляндії, Китаю, Росії та вітчизняних виробників.

Діють договори про науково-технічне співробітництво та проведення практик з: Інститутом травматології та ортопедії НАМН України, Комунальним закладом Київської обласної Ради «Київська обласна клінічна лікарня», центром доктора Бубновського, фірмою «Клініка Літус», реабілітаційним центром «Амбулаторія спини», медичним центром «Вомед» та інш. Основні наукові напрямки кафедри лежать у сферах: визначення теоретичних і практичних проблем ФР при різних травмах і захворюваннях; особливості використання технічних засобів для ФР; методів кінезотерапії у ФР людей з захворюваннями ССС, проблемами з ОРА; моніторингу стану людини у екстремальних умовах і методів ФР після перебування у них; принципів дозування фізичного навантаження у ФР; дослідження новітніх методів, технічних систем і засобів для ФР і оздоровлення; розробка методик їх застосування для підвищення загальної та спортивної працездатності студентів.

Шляхи підвищення якості професійної підготовки фахівців з ФТ і ЕТ в умовах вищих технічних закладів вміщують:

- підвищення ефективності навчання, атестацій та семестрового контролю студентів, вільний вибір студентами «траєкторії навчання», формування потреби та здатності особистості до самонавчання; збільшення кількості та якості навчально-методичного та наукового забезпечення навчального процесу і науково-дослідної роботи (НДР), запровадження дистанційних методів навчання,

електронних форм навчально-методичних матеріалів для покращення умов і ефективності самостійної та НДР студентів;

- підвищення рівня підготовки аспірантів, захист кандидатських і докторських дисертаційних робіт викладачами кафедри; проведення кафедральних наукових конференцій різних рівнів, участь викладачів, аспірантів і студентів у конференціях ВНЗ, наукових закладів, національних і міжнародних науково-практичних конференцій спільно з організаціями-партнерами, підвищення наукової, педагогічної та організаційної кваліфікації викладачів кафедри;

- встановлення нових і виконання діючих угод про співпрацю з національними і закордонними установами; придбання наукового обладнання, діагностичної, реабілітаційної техніки, наочних матеріалів для забезпечення навчальної та наукової діяльності кафедри;

- підвищення ефективності студентської НДР, участь в наукових конференціях різних рівнів, підготовка грантів і запровадження нових НДР за напрямами кафедри, участь викладачів, аспірантів і студентів у міжнародній діяльності, запровадження перспективних навчальних курсів за результатами наукових досліджень.

Висновки та перспективи подальших досліджень. Головними шляхами підвищення якості професійної підготовки фахівців з ФЕТ в умовах вищих технічних закладів є: підвищення якості навчання та контролю студентів, викладання дисциплін, зв’язок навчальних курсів з результатами наукової роботи, підвищення ефективності практичних занять і практик на професійних базах з сучасними реабілітаційними системами й засобами, участь викладачів і студентів у наукових дослідженнях, підвищення мотивації студентів з опанування фахових дисциплін, забезпечення навчального процесу науковим обладнанням, діагностичною та реабілітаційною технікою, наочними матеріалами, тісний зв’язок навчальної роботи з результатами наукових досліджень. Перспективи подальших досліджень: прилучення студентської молоді до цінностей фізичної культури [7], впровадження професійно-прикладної фізичної підготовки майбутніх фахівців з ФЕТ [2, 6].

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The Activity of the Ukrainian Diaspora, Authorities and the Public of Ukraine Concerning Lighting Truth and Perpetuate the Memory of Victims of Holodomor of 1932–1933 years

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Діяльність української діаспори, органів влади і громадськості України щодо висвітлення правди та увічнення пам'яті жертв Голодомору 1932–1933 років

Вступ. Актуальність даного дослідження визначається необхідністю всебічного і глибокого вивчення історії, особливо тих її аспектів, які тривалий час перебували поза увагою дослідників. До таких, серед інших, відноситься діяльність організацій української діаспори та органів влади і громадськості України щодо дослідження, висвітлення правди і увічнення пам'яті жертв Голодомору 1932–1933 років в Україні.

В основу наукової роботи покладені власні ідеї автора, які грунтуються на його попередніх наукових дослідженнях, а також працях вітчизняних і зарубіжних науковців. З 1996 року автор успішно працює над науковими дослідженнями, присвяченими: діяльності української діаспори щодо становлення та розбудови незалежної демократичної України, зокрема, висвітленню закордонними українцями правди про трагічні сторінки Голодомору 1932–1933 років в Україні, вшануванню ними славного минулого нашої Батьківщини в ході великомасштабного відзначення Тисячоліття хрещення Русі-України, зусиллям зарубіжних українців спрямованим на дотримання релігійної свободи та прав

людини в Україні, підтримку європейських прагнень нашої держави і становлення демократії в Україні.

Наукова робота виступає продовженням його попередніх досліджень історії та державотворчих зусиль української діаспори. Вона присвячена пам'яті жертв жахливої трагедії українського народу – Голодомору 1932–1933 років в Україні.

В історичній літературі дана проблема практично не досліджена. Ряд наукових публікацій присвятили висвітленню діяльності української еміграції щодо вшанування пам'яті жертв Голодомору 1932–1933 років в Україні відомі вітчизняні та зарубіжні вчені Станіслав Кульчицький, Володимир Марочко, Джеймс Мейс, Френк Сисин, Василь Дідюк, Любомир Лаврівський, а також український журналіст очевидець тих подій Аркадій Сидорук [1]. Вплив відзначення скорботного ювілею Голодомору 1932–1933 років в Україні на боротьбу закордонних українців за демократію та державну незалежність України дослідив у своїх наукових працях і автор цих строк [2]. Проте багато аспектів цієї непересічної події ще вимагають свого висвітлення.

Тому дослідження діяльності організацій української діаспори та органів влади, наукових установ і громадськості України щодо висвітлення правди і увічнення пам'яті жертв Голодомору 1932–1933 років в Україні викличе значну зацікавленість як професійних науковців, так і представників політичних партій, громадського загалу і може становити суспільну користь за нинішніх складних умов перехідного періоду українського державотворення, стане однією з форм співпраці із зарубіжними українцями.

Практичне значення дослідження полягає у можливості його використання для написання узагальнюючих праць із всесвітньої історії, новітньої історії України, історії української еміграції, політології, під час навчального процесу у вищих і середніх навчально-освітніх закладах.

Результати наукового дослідження можуть бути використані органами влади та політичними силами країни з метою формування державної політики по відношенню до зарубіжних українців, створення позитивного іміджу України у світі та вирішення того чи іншого українського питання на міжнародному рівні.

Постановка завдання. Мета роботи – на основі осмислення нових документів, матеріалів і спогадів учасників подій, узагальнення здобутків історіографії всебічно охарактеризувати і висвітлити діяльність організацій

української діаспори та органів влади і громадськості України щодо висвітлення правди і увічнення пам'яті жертв Голодомору 1932–1933 років в Україні.

Серед завдань дослідження: вивчити роль української діаспори, органів влади та громадськості у висвітленні правди про Голодомор 1932–1933 років в Україні; дослідити міжнародну діяльність України та організацій закордонного українства, спрямовану на визнання Голодомору 1932–1933 років в Україні та вшанування пам'яті його жертв; висвітлити проведення заходів щодо увічнення пам'яті жертв Голодомору 1932–1933 років в Україні з нагоди 75-річниці цієї жахливої національної трагедії.

Результати дослідження. У 1981 році українська діаспора країн Заходу розпочала великомасштабну міжнародно-інформаційну кампанію щодо дослідження, висвітлення правди та вшанування пам'яті жертв Голодомору 1932–1933 років в Україні, приурочену до 50-річчя цієї жахливої трагедії українського народу. Активну участь у ній взяли понад 120 громадсько-політичних, релігійних, наукових, жіночих, молодіжних та професійних об'єднань закордонних українців.

Діяльність української діаспори в ході міжнародно-інформаційної кампанії щодо висвітлення правди про Голодомор 1932–1933 років в Україні була сконцентрована в декількох напрямках:

- підготовці наукових праць та проведенні міжнародних конференцій, присвячених Голодомору 1932–1933 років;
- організації маніфестацій, мітингів та інших багатолюдних акцій на відзначення цієї трагічної події;
- організації масштабної інформаційної кампанії в мас-медіа із залученням іноземних PR-агенств, а також підготовці документального фільму про трагедію Голодомору і трансляцію його в країнах Заходу;
- залученні офіційних осіб та органів влади країн Заходу до участі в діяльності української громади з метою державного визнання трагедії українського народу шляхом створення Комісії Конгресу США з вивчення голоду в Україні та Міжнародної комісії з розслідування голоду в Україні у 1932–1933 роках. Робота комісій такого рівня передбачала автоматичне визнання їх висновків міжнародним співтовариством, що надавало величезні можливості українській громаді для їх інформаційного використання та відкривало шлях для висунення звинувачень органам влади СРСР у геноциді українського народу, адже "злочини проти людяності" не мали строку давності [3, С. 398-399].

Необхідно зазначити, що активну участь в міжнародно-інформаційній кампанії української діаспори щодо дослідження, висвітлення правди та вшанування пам'яті жертв Голодомору 1932–1933 років в Україні брала Катерина Михайлівна Ющенко. Вона очолювала в 1983–1984 роках Українську національну інформаційну службу у Вашингтоні, в 1986–1988 роках працювала асистентом з особливих доручень у заступника Держсекретаря США з питань прав людини і гуманітарних справ, а починаючи з квітня 1988 по січень 1989 була заступником голови Офісу громадських зв'язків Білого дому. Катерина Михайлівна багато зробила для висвітлення правди про Голодомор 1932–1933 років в Україні, безкомпромісно відстоюючи право власного народу на незалежну демократичну Україну [3, С. 405-406].

Кампанія української діаспори щодо висвітлення правди про Голодомор 1932–1933 років в Україні мала ряд наслідків:

По-перше, весь світ дізнався про жахливу трагедію українського народу в контексті прагнень його до державної незалежності.

По-друге, органи влади СРСР були визнані на міжнародному та державному рівні винуватими в організації геноциду українського народу, під час якого загинуло за різними оцінками від 4,6 до 10 млн осіб.

По-третє, органи влади СРСР і УРСР вимушені були визнати сам факт голоду 1932–1933 років, чого до цього не було. А вчені в Україні розпочали його вивчення.

По-четверте, інформація про цей жахливий злочин сталінського режиму серйозно підірвала позиції КПРС та КП(б)У в Україні.

По-п'яте, факти Голодомору, підтверджені Міжнародною комісією з розслідування Голоду в Україні у 1932–1933 роках і Комісією Конгресу США з вивчення Голоду в Україні та тиражовані в мас-медіа, безсумнівно, сприяли зміні позиції багатьох державних діячів, політиків, науковців і журналістів у бік підтримки права українського народу на відновлення власної незалежної держави.

По-шосте, були значно зміцнені позиції української громади серед суспільств країн свого проживання.

По-сьоме, виявлені факти про Голодомор 1932–1933 років, а саме масштаб цієї трагедії, надавав національно-демократичним силам в УРСР додаткових аргументів та моральної наснаги в боротьбі за відродження державної незалежності України [3, С. 426-427].

Історичний факт Голодомору 1932–1933 років в Україні визнали близько 70 країн світу, у тому числі парламенти 19 країн визнали його актом геноциду. Своє ставлення до цієї трагедії висловили також Іоанн Павло II та Генеральний директор ЮНЕСКО К. Мацуура, які у 2003 році надіслали на адресу Українського народу відповідні послання у зв'язку з 70-ми роковинами Голодомору. Пам'ятники або пам'ятні знаки жертвам голодоморів в Україні встановлено у низці країн світу - Австралії, Австрії, Аргентині, Бельгії, Естонії, Казахстані, Канаді, Росії (Тюмень), США (Вашингтон Чикаго, Клівленд), Угорщині.

Важливим у політичному плані стало ухвалення 58-ю сесією ГА ООН "Спільної заяви з нагоди 70-х роковин Голодомору - Великого голоду 1932–1933 років в Україні", яку було розповсюджено як офіційний документ 58-ї сесії ГА ООН. Співавторами Спільної заяви (а по суті – Декларації) стали 36 держав-членів ООН, у тому числі Аргентина, Азербайджан, Бангладеш, Білорусь, Бенін, Боснія і Герцеговина, Гватемала, Грузія, Єгипет, Іран, Казахстан, Канада, Катар, Киргизстан, Кувейт, Македонія, Монголія, Науру, Непал, Об'єднані Арабські Емірати, Пакистан, Перу, Південно-Африканська Республіка, Республіка Корея, Республіка Молдова, Російська Федерація, Саудівська Аравія, Сирійська Арабська Республіка, Сполучені Штати Америки, Судан, Таджикистан, Туркменистан, Тимор-Леште, Узбекистан, Україна та Ямайка, її підтримали також Австралія, Ізраїль, Сербія і Чорногорія, 25 країн - членів ЄС. При цьому жодна з решти країн-членів ООН не висловилася проти. Вперше в історії ООН визначила Голодомор 1932-1933 років як національну трагедію українського народу, висловила співчуття його жертвам та закликала всі держави-члени Організації, її спеціалізовані установи, міжнародні та регіональні організації, неурядові організації, фонди і асоціації віддати данину пам'яті тим, хто загинув у цей трагічний період історії.

За результатами Спеціального засідання Верховної Ради України 14 травня 2003 року щодо вшанування пам'яті жертв Голодомору 1932–1933 років було прийнято Постанову від 15 травня 2003 року за № 789-IV, яка схвалила Звернення до Українського народу із зазначенням характеру Голодомору 1932–1933 років як геноциду.

В 2005–2009 роках органи влади України розгорнули масштабну кампанію щодо висвітлення правди та увічнення пам’яті жертв Голодомору 1932–1933 років з нагоди 75 річниці величезної трагедії українського народу. Величезна роль в ній

відводилася закордонному українству. Міжнародно-інформаційна кампанія мала на меті ряд цілей.

По-перше, відзначення жахливої трагедії, від якої постраждали мільйони людей по всій Україні, повинно було консолідувати навколо себе весь український народ, як в Україні, так і поза її межами. Адже кількість її жертв можна порівняти лише з втратами України у Другій Світовій війні. Існування могутньої процвітаючої незалежної демократичної Української держави повинно було виступити гарантом не повторення у майбутньому нового геноциду українського народу. Тобто спільне вшанування пам'яті жертв Голодомору 1932–1933 років повинно було консолідувати український народ задля недопущення у майбутньому повторення подібної трагедії.

По-друге, згадана діяльність виступала продовженням кампанії української діаспори щодо висвітлення правди та вшанування пам'яті жертв Голодомору 1932–1933 років в Україні, яка проходила у 80-х роках минулого століття та відчутно сприяла переконанню зарубіжних державних діячів, політиків, вчених, мас-медіа та громадськості у потребі підтримки державних прагнень українського народу. На цей раз зусилля української громади були також спрямовані на переконання західних суспільств у тому, що український народ поніс величезні жертви у минулому з боку тоталітарного режиму СРСР, спадкоємцем якого виступав авторитарний режим Російської Федерації. Саме тому тільки збереження демократичного ладу в Україні та її інтеграція до Європейського Союзу, НАТО, а також прийняття до СОТ, поряд із наданням необхідної закордонної допомоги та інвестицій, може запобігти повторенню подібної трагедії у майбутньому. Країнам Заходу, особливо США, нагадувалася негідна поведінка їх урядів, які замість того, щоб відповідним чином відреагувати на Голодомор 1932–1933 років в Україні та спинити планове винищення українського народу, саме в той час налагодили дипломатичні відносини із СРСР та закуповували зерно, відібране в українських селян, що гинули з голоду. Це повинно було на моральному психологічному рівні вплинути на політику західних країн щодо сьогоднішньої України. Акцією щодо позбавлення Пулітцерівської премії корес-пондента «The New York Times» Волтера Дюранті, за порушення морального кодексу журналіста та брехливі твердження про відсутність Голоду в 1932–1933 роках в СРСР, закордонні українці повинні були вплинути на західні мас-медіа з метою сприятливого та об'єктивного становлення як до України, так і до закордонної української громади.

По-третє, органи влади України вважали, що великомасштабне міжнародне відзначення пам’яті жертв Голодомору 1932–1933 років в Україні, буде стримувати «імперські амбіції Кремля», тобто сприятиме виробленню зваженої політики російського керівництва стосовно України.

По-четверте, консолідація світового українства навколо вшанування пам’яті жертв Голодомору 1932–1933 років в Україні підвищувала міжнародний імідж України та українського народу, як нації, яка пережила важкі, страхітливі моменти своєї історії, проте не схилилася, не здалася, а виборола власну державність та продовжує свій шлях розвитку у напрямку до демократії та європейської і євроатлантичної інтеграції.

По-п’яте, активна участь українських можновладців в організації відзначення пам’яті жертв Голодомору 1932–1933 років в Україні дозволяла їм підвищити власний рейтинг популярності в українському суспільстві як національних лідерів країни напередодні президентських виборів 2010 року. Адже урочистості за задумом організаторів не завершувалися в 2008 році, а повинні були тривати, майже до самих виборів, весь 2009 рік.

Органами влади країни було прийнято ряд нормативно-правових актів щодо висвітлення правди та увічнення памяті жертв Голодомору 1932–1933 років в Україні. Зокрема, Указ Президента України В. Ющенка від 11.07.2005 за № 1087 "Про додаткові заходи щодо увічнення пам'яті жертв політичних репресій та голодоморів в Україні", окрім інших важливих положень, містив доручення Уряду створити Український інститут національної пам'яті, а також підготувати і внести в установленому порядку на розгляд Верховної Ради України законопроект щодо політико-правової оцінки голодоморів в історії Українського народу. Указ Президента України В. Ющенка від 4.11.2005 за № 1544 "Про вшанування жертв та постраждалих від голодоморів в Україні" передбачав створення Оргкомітету на чолі з Прем'єр-міністром України з відзначення 75-х роковин Голодомору 1932–1933 років в Україні та проведення низки інших заходів, зокрема прискорення підготовки та подання законопроекту щодо політико-правової оцінки голодоморів в історії Українського народу, здійснення додаткових заходів щодо визнання міжнародною спільнотою Голодомору 1932–1933 років в Україні як геноциду Українського народу та однієї з найбільших трагедій в історії людства, вирішення питання щодо спорудження в м. Києві Меморіалу пам'яті жертв голодоморів в Україні.Указ Президента України В. Ющенка від 12.10.2006 за № 868 "Про

відзначення у 2006 році Дня пам'яті жертв голодоморів та політичних репресій" затвердив Оргкомітет з відзначення у 2006 році Дня пам'яті жертв голодоморів та політичних репресій, передбачав 25 листопада 2006 року приспущення Державного Прапора на території країни, оголошення Загальнонаціональної Хвилини мовчання та низку інших заходів, зокрема прискорення проектування та спорудження Меморіального комплексу пам'яті жертв Голодомору 1932–1933 років, активізацію роботи з визнання міжнародною спільнотою Голодомору 1932–1933 років в Україні як геноциду Українського народу та однієї з найбільших трагедій в історії людства.

28 листопада 2006 року Верховна Рада України прийняла Закон № 376-V "Про Голодомор 1932–1933 років в Україні" згідно з яким зобов'язала органи державної влади та органи місцевого самоврядування: сприяти консолідації та розвитку української нації, її історичної свідомості та культури, поширенню інформації про Голодомор 1932–1933 років в Україні серед громадян України та світової громадськості, вживати заходів щодо увічнення пам'яті жертв та постраждалих від Голодомору 1932–1933 років в Україні.

Весь 2008 рік в Україні був оголошений Роком пам’яті жертв Голодомору. Про це заявив Президент України Віктор Ющенко в Харкові під час засідання Координаційної ради з підготовки заходів у зв’язку з 75-ми роковинами Голодомору 1932–1933 років. У всіх областях України пройшли заходи щодо увічнення пам’яті жертв Голодомору 1932–1933 років в Україні. 10 червня 2008 року у с. Високі Байраки Кіровоградської області Президент України Віктор Ющенко започаткував акцію «33 хвилини» на підтримку ініціативи Національної скаутської організації «ПЛАСТ». Мета акції - вшанування та увічнення пам'яті жертв Голодомору та посилення уваги суспільства до злочинів тоталітарної системи. Формат акції - щовихідних у центрі населеного пункту або у місцях, що асоціюються з тоталітарним режимом, членами місцевих молодіжних організацій, громадськості рівно 33 хвилини зачитувалися імена загиблих земляків, свідчення очевидців з регіональної Книги пам'яті. В областях, що не постраждали від Голодомору, зачитувалися свідчення очевидців. У червні 2008 року заходи пройшли у Києві та кількох обласних центрах, з початку вересня акція проходила вже у всіх обласних центрах, а з 1 листопада також і у районних центрах та містах обласного значення. Кожні вихідні в українських містах впродовж 33 хвилин зачитувались імена знищених Голодомором земляків та свідчення очевидців

трагедії. Загалом по Україні в акції взяло участь понад 150 тис. громадян. Завершальний етап акції відбувся 22 листопада 2008 року в Києві перед відкриттям Меморіалу пам'яті жертв голодоморів [4].

15 листопада 2008 року в районах та містах Київської області з метою вшанування пам'яті загиблих в роки Голодомору 1932–1933 років в Україні проведено акцію «33 хвилини», під час якої було поіменно зачитано списки жертв Голодомору. В заходах взяли участь голови райдержадміністрацій, голови районних рад та їх заступники, представники облдержадміністрації, керівники структурних підрозділів райдержадміністрацій, представники районних та міських осередків політичних партій, громадських організацій, учні, студенти, місцеві жителі. 17 листопада 2008 року в колонному залі ім. М. Лисенка Національної філармонії України відбулася презентація Київського обласного тому Національної книги пам'яті жертв Голодомору 1932–1933 років в Україні. У фойє філармонії оформлено виставку архівних, фото документів з матеріалів державного архіву Київської області «Київщина. Голодомор 1932–1933 років» та виставку книг про Голодомор 1932–1933 років в Україні, виданих на Київщині. Найбільш активним дослідникам Голодомору, які готували матеріал до обласного тому Національної книги пам'яті жертв Голодомору 1932–1933 років в Україні вручено Подяки голови облдержадміністрації.

15 листопада 2008 року ВОО «Наша Україна» на Замковій площі Луцька біля пам'ятного знаку Жертвам політичних репресій та голодоморів провела акцію «33 хвилини». Було оголошено більше двох сотень імен осіб, загиблих внаслідок Голодомору 1932–1933 років. Цього ж дня у школах сіл Колодеже та Бережанка Горохівського району Волинської області учнівська молодь та члени міських молодіжних громадських організацій провели акцію «33 хвилини». Її учасники ознайомилися з пересувною фотодокументальною виставкою «Ми звинувачуємо». У Луцькому районному Будинку культури відбулася презентація книги Григорія Гуртового «Голгофа голоду: Спогади про пережите». Перед численною аудиторією виступили свідки Голодомору 1932–1933 років Клавдія Романюк та Михайло Ротко. Книга присвячена 75-річчю пам'яті багатомільйонних жертв Голодомору 1933 року. У ній вміщено спогади не лише автора, а й багатьох тих, хто був свідком або сам пережив у ті роки неймовірні страждання українського народу.

15 листопада 2008 року у Херсоні відбулося урочисте підбиття підсумків обласної акції «Свіча пам'яті». Протягом року волонтери в районах області збирали свідчення від очевидців Голодомору на Херсонщині 1932-1933 років, знаходили місця масових поховань, складали та відновлювали реєстри загиблих від голоду тощо. Учні загальноосвітніх шкіл, студенти та громадськість районів зібралися у приміщенні кіноконцертного залу обмінятися думками, поділитися досвідом та визначити переможців акції. Перед присутніми виступив голова облдержадміністрації Борис Сіленков. У програмі підведення підсумків акції відбулися: нагородження дипломами найактивніших учасників акції, відзначення подяками волонтерських команд, виступи професійних та самодіяльних колективів, слайдова презентація підсумків обласної акції, вшанування пам'яті загиблих хвилиною мовчання. Усім учасникам акції вручено подарунки – книжкові бібліотечки. У фойє зали працювала обласна тематична виставка архівних та фотоматеріалів, матеріалів обласної акції «Свіча пам'яті» - «Пам'ятаємо душею і серцем», із слайдовою презентацією ходу акції в бібліотеках області.

18 листопада 2008 року у Донецьку відбулася презентація документального фільму «Діти 33-го: не казка про чорного ворона», присвячений 75-м роковинам Голодомору 1932–33 років. Фільм знятий Донецькою ОДТРК. Зйомки проходили на території п'яти районів Донецької області і весь фактичний матеріал будувався на підставі документальних зйомок безпосередніх свідків голодомору – жителів Красно-армійського, Мар'їнського, Старобешівського, Великоновоселківського та Слов'ян-ського районів, яким в 1932–33 роках було по 5-12 років. Також для підготовки фільму був використаний матеріал архівів Служби безпеки Донецької області і Державного архіву Донецької області.

У рамках заходів до 75-х роковин Голодомору 1932–1933 років в Запорізькій обласній державній адміністрації відбулася презентація регіонального тому Національної книги пам'яті. У заході взяли участь голова облдержадміністрації Олександр Старух, його заступник Микола Фролов, професор Запорізького національного університету, голова редакційної колегії Книги Пам'яті Федір Турченко, директор Державного архіву Запорізької області Олександр Тедєєв, директор видавництва «Дике поле» Олександр Лазутін. В області вже не перший рік велася системна робота щодо вшанування пам'яті жертв Голодомору 1932–1933 років. На Запоріжжі встановлено 7 пам'ятників та 76 пам'ятний знак жертвам Голодомору. Завдяки спільним зусиллям органів влади, науковців, громадських

організацій виявлено 40 місць масових поховань жертв голоду, зібрано понад три тисячі свідчень осіб, які пережили ті страшні роки. Державним архівом Запорізької області створено реєстр, що налічує 30 фондів, які містять 890 документів про трагічні події Голодомору 1932–1933 років. Визначено 111 колгоспів, які були занесені на «чорну дошку» та приречені на голодну смерть.

За даними управління з питань внутрішньої політики Луганської облдержадміністрації, станом на 18 листопада 2008 року в Луганській області відкрито 280 пам'ятних знаків жертвам Голодомору 1932–1933 років в Україні. Зокрема, пам'ятний знак відкрито 17 листопада у селі Сміле Слов'яносербського району. 18 листопада урочисте відкриття й освячення пам'ятних знаків та хрестів жертвам Голодомору 1932–1933 років в Україні відбулось у селах Красне Поле, Первомайське та Височинівка Марківського району.

19 листопада в усіх навчальних закладах Миколаївської області відбувся перегляд Всеукраїнського уроку-пам'яті за участі Президента України В. Ющенка, в якому взяли участь понад 106 тис. учнів. 19 листопада в Миколаївській області відбувся єдиний День інформування населення за темою «До 75-х роковин Голодомору 1932–1933 років в Україні». Члени інформаційно-роз'яснювальних груп виступили у 702 колективах, установах та організаціях області. Всього інформаційною роботою охоплено понад 41995 тис. чол.

Протягом 2007–2008 років в Хмельницькій області видано понад 30 книг, збірників, брошур, присвячених темі голодомору, у т.ч. об'ємна збірка архівних документів «Розп'яте Голодомором Поділля» про Голодомор 1932–1933 років на Хмельниччині. Відкрито поіменну фонд-колекцію, в котрій зібрано дані про 17962 особи, які загинули в 1932–1933 роках від голоду. Опрацьовано 104 метричні книги актів реєстрації смертей 1932–1933 років, складено статистичні відомості поіменно встановлених жертв Голодомору в розрізі районів і міст області в кількості 34089 осіб. Укладено список 835 населених пунктів, які постраждали від Голодомору, 3 населених пункти зникли, 5 затоплені у зв'язку з будівництвом Дністровського водосховища. Зібрано та систематизовано по районах і містах області списки 93333 громадян, які постраждали від Голодомору 1932–1933 років. Виявлено понад 120 місць масових поховань жертв Голодомору 1932–1933 років та вжито заходи щодо їх упорядкування.

19 листопада 2008 року у Підволочиському районі Тернопільської області, на кордоні Тернопільської та Хмельницької областей, відбулося відкриття

пам'ятника жертвам Голодомору. Пам'ятник має вигляд прикордонного межового стовпа, пронизаного колючим дротом. До стовпа прихилений сніп пшениці, який перевитий вишитим рушником. Монумент символізує надання галичанами допомоги братам-українцям з Наддніпрянщини. Вибір місце для встановлення пам'ятника пов'язаний з трагічними подіями 30-х років минулого століття, коли жителі Галичини переправляли на плотах через Збруч, на радянський бік, продукти та збіжжя, щоб допомогти жителям Великої України, де в той час панував Голодомор. 21 листопада 2008 року в Тернопільській області розпочалася міжнародна молодіжна акція Спілки Української Молоді в Україні «Сопричастя». Кожен, хто погодився брати участь в цій акції, взяв на себе добровільне зобов'язання суворого посту, без вживання страви, впродовж 33 годин з 7.00 21 листопада 2008 року до 16.00 22 листопада 2008 року. Це було своєрідною особистою жертвою на помин душі померлих від голоду 32-33 років. Також впродовж 33 годин участі в акції кожен її учасник повинен був зробити добре діло, метою якого є допомога ближньому.

22 листопада 2008 року в Києві за участі керівництва держави, міжнародної громадськості та представників всіх регіонів нашої країни пройшли урочисті заходи щодо відзначення 75 річниці Голодомору 1932–1933 років в Україні. Президент України В.А. Ющенко урочисто відкрив Національний музей "Меморіал пам'яті жертв голодоморів в Україні" , побудований в парку Вічної Слави, неподалік від Києво-Печерської Лаври. Разом з усією Україною учасники заходу підтримали національну хвилину мовчання та всеукраїнську акцію "Засвіти свічку".

Закордонні українці також розгорнули активну діяльність з метою належного відзначення 75 річниці Голодомору 1932–1933 років в Україні. В жовтні 2006 року був створений Міжнародний Координаційний Комітет Голодомору Світового Конгресу Українців (МКК СКУ). Очолив його Стефан Романів. Членами комітету стали лідери організацій української діаспори та відомі представники зарубіжної української громади. Серед них, зокрема, Аскольд Лозинський, Євген Чолій, Михайло Савків, Богдан Футей, Роман Сербин, Юрій Клюфас, Ірина Мицик, Надія Луців, Морган Вільямс. Загалом до складу комітету увійшло понад 60 осіб з різних країн світу [5, С.203].

Серед завдань МКК СКУ були наступні:

1) Сприяти визнанню Голодомору 1932–1933 років в Україні геноцидом українського народу в парламентах іноземних держав, а також міжнародних організаціях.

2) Сприяти впровадженню вивчення Голодомору 1932–1933 років в Україні в шкільні програми.

3) Вивчити можливості щодо проведення судових справ від імені жертв Голодомору 1932–1933 років проти Російської Федерації як спадкоємця СРСР, а також проти західних корпорацій, які наживалися внаслідок Голодомору 1932–1933 років в Україні.

4) Сприяти великомасштабному відзначенню величезної трагедії українського народу на світовому рівні [5, С. 203].

Влада України активно підтримала дії української діаспори. Посольства України у зарубіжних країнах отримали вказівку від МЗС усіляко сприяти діям українських громад цих країн. МЗС України та українські дипломатичні представництва в різних країнах світу спільно з громадськими організаціями зарубіжних українців розгорнули напружену діяльність щодо визнання міжнародними організаціями та органами влади іноземних держав Голодомору 1932-1933 років в Україні – актом геноциду українського народу.

Неодноразово відбувалися зустрічі та наради керівництва МКК СКУ з Президентом України Віктором Ющенко, Першою леді України Катериною Ющенко та працівниками її фонду «Україна - 3000», Прем'єр-міністром України Юлією Тимошенко, віце-прем'єр-міністром України з гуманітарних питань Іваном Васюником, головою СБУ Валентином Наливайченко, міністром культури і туризму України Василем Вовкуном, міністром закордонних справ України Володимиром Огризком, директором Українського інституту національної пам'яті Ігорем Юхновським та багатьма іншими високопосадовцями.

Президент України Віктор Андрійович Ющенко видав ряд указів, які сприяли перетворенню теми досліджень Голодомору 1932–1933 років в пріоритетну проблематику для досліджень українських вчених. Перша леді України Катерина Михайлівна Ющенко та Міжнародний фонд «Україна - 3000», який вона очолює, розгорнули масштабний проект із цього приводу, всіляко заохочуючи дослідницькі та журналістські праці в цьому напрямку. Кабінет Міністрів України вчасно і в повному обсязі профінансував всі заходи, пов'язані з роковинами 75-річниці Голодомору і пообіцяв українській діаспорі подальшу підтримку в цьому питанні.

Українською діаспорою тиражем 90 тисяч екземплярів були видані дві брошури про Голодомор 1932–1933 років для поширення в закордонній українській громаді та інформування іноземних державних осіб, політиків, громадськості і мас-медіа про жахливу трагедію українського народу. В багатьох державах бути організовані виставки з нагоди цієї події. В США, Австралії і Канаді була проведена напружена робота задля включення в навчальні програми з історії та суспільних наук вивчення питання про Голодомор 1932–1933 років в Україні.

Були започатковані акції садження дерев та встановлення пам'ятних таблиць в українських церквах, народних домах та вулицях міст іноземних держав в пам'ять про жертви українського Голодомору. В Новій Зеландії, Австралії і Канаді видані поштові марки з нагоди 75-річниці Голодомору в Україні. В листопаді 2007 року члени МКК СКУ на чолі з Стефаном Романівим взяли участь у форумі ООН, закликавши ООН визнати Голодомор 1932–1933 років в Україні актом геноциду – злочином проти людства [5, С. 205].

Завдяки зусиллям української діаспори США 13 жовтня 2006 року Президент США Джордж Буш підписав закон про виділення ділянки федеральної землі у Вашингтоні для побудови пам'ятника жертвам Голодомору 1932-1933 років в Україні. Українська діаспора вже зібрала гроші для побудови відповідного меморіалу [6, С. 295].

15 листопада 2008 року вулицями Нью-Йорка пройшла традиційна хода учасників акції на вшанування пам'яті жертв Голодомору в Україні 1932–33 років, яка завершилася урочистим молебнем у Соборі Святого Патрика. В акції взяли участь провідники української громади, духовенство, представники четвертої хвилі української еміграції в США, місцеві американські прихожани, які симпатизують Україні й побажали скласти шану мільйонам жертв комуністичного режиму. З урочистою промовою в соборі виступив давній друг України конгресмен Моріс Хінчі, який підкреслив навмисні дії Сталіна і його поплічників в організації цього терору голодом українського народу і висловив солідарність з українцями в річницю Голодомору-геноциду.

Голова Українського конгресового комітету Америки Тамара Гало-Олексій зачитала звернення президента США Джорджа Буша до українського народу з нагоди 75-х роковин Голодомору. Президент наймогутнішої країни світу, зокрема, підкреслив: «Я шлю свої вітання всім, хто вшановує 75-ті роковини Українського Голодомору. З цієї нагоди я приєднуюсь до моїх американських співвітчизників у

поминанні цього злочину проти людства. Понад сім десятків років тому мільйони невинних українців були знищені голодом, коли сталінський режим навмисно спричинив руйнівний голод. Ця урочиста подія є нагодою згадати ці страшні події, пам'ятати про загиблих людей і підкреслити нашу відданість боротися з тиранією. Сьогодні, вільний народ України робить свій внесок у просування свободи у світі. Сполучені Штати пишаються тим, що можуть звати Україну своїм другом, і ми продовжимо тримати солідарність з її народом. Я вдячний всім тим, хто шанує жертви Українського Голодомору. Завдяки вашим зусиллям ви нагадуєте всім нам про силу добра, яке торжествує над пітьмою зла. Нехай Бог буде з усіма Вами» [7].

Посол України Олег Шамшур у своєму зверненні відзначив колосальні просвітницькі зусилля української громади та її американських друзів, особливо протягом останніх двох років, які сприяли поширенню інформації про Голодомор серед громадськості та політикуму США, що мобілізували увагу мешканців 24 американських міст. Він особливо відзначив роль Конгресу США, який у вересні прийняв чергову резолюцію, засудивши сталінські злочини в Україні.

Українською діаспорою була започаткована Міжнародна акція «Незгасима Свічка», метою якої було донести до світового співтовариства правду про Голодомор 1932–1933 років в Україні та домагатися визнати його актом геноциду проти української нації. У кожній з країн перебування символічної свічки повинні були проводитися заходи щодо вшанування пам’яті жертв Голодомору 1932-1933 років в Україні. Наголос в цій акції був зроблений на те, щоб передавати естафету від очевидців Голодомору українській молоді, від українців – іноземцям, єднати різні покоління, сприяючи зміцненню національної свідомості в закордонних українських громадах. Це був спільний проект МКК СКУ та МЗС України. В кожній окремо взятій зарубіжній країні його спільно проводили організації української діаспори та посольство України [5, С. 205].

Акція «Незгасима Свічка» протягом 2008 року пройшла в квітні-травні в Австралії, Канаді, США; в червні-серпні – В Колумбії, Еквадорі, Перу, Бразилії, Парагваї, Аргентині, Чилі, Великобританії, Швеції, Естонії, Латвії, Литви, Білорусі, Польщі, Німеччині, Бельгії, Франції, Італії, Португалії; вересні-жовтні – в Італії, Сербії, Хорватії, Угорщині, Румунії, Молдові, Казахстані, Росії, Вірменії, Грузії. В серпні 2008 року світове українство урочисто вшанувало пам’ять жертв Голодомору 1932–1933 років під час проведення IX Конгресу СКУ в Києві за участі

Президента України В.А. Ющенко і Прем'єр-міністра України Ю.В. Тимошенко, а також членів Кабінету Міністрів України та депутатів Верховної Ради України.

У рамках вшанування 75-х роковин Голодомору в Україні 22 листопада в Києві відбувся Міжнародний форум «Народ мій завжди буде!» У заході взяли участь Президент України Віктор Ющенко, Президенти Грузії Михаїл Саакашвілі, Латвійської Республіки - Валдіс Затлерс, Литовської Республіки - Валдас Адамкус, Республіки Польща - Лех Качинський. Всього на форумі були представлені делегації 44 держав світу, а також міжнародні організації - Європейський парламент, ЮНЕСКО, Парла-ментська асамблея Ради Європи.

Президент України Віктор Ющенко навів аргументи на користь того, що голод в Україні мав штучний характер і був спланованою політикою проти українських селян - найбільш самодостатньої верстви суспільства 1930-х років. Таким методом було безжально згублено мільйони невинних людей, половина з яких - діти. Одночасно винищувалася інтелігенція, письменники, науковці, вчителі, священики - усі, хто міг чинити найменший інтелектуальний опір. Понад те, комуністичний режим десятиліттями намагався вбити й саму пам'ять про них, учасників цієї трагедії.

«Голод був вибраний як знаряддя упокорення Українського народу. Метою було знекровити Україну, підірвати її сили і таким чином усунути можливість відновлення державності», - сказав Президент України [8].

Він відзначив, що тепер зусилля із донесення правди про цю трагедію української нації почуті світом. Від імені Української держави він висловив вдячність усім державам і міжнародним організаціям, які визнали Голодомор 1932–1933 років актом геноциду, засудили його як злочин проти людськості і вшанували мільйони невинних жертв. Президент також подякував усім церквам та релігійним громадам, які сьогодні разом з Україною. Особливо Віктор Ющенко подякував Вселенському патріархові Варфоломію I та Папі Римському Бенедикту XVI, які, вшановуючи пам'ять жертв Голодомору, разом із своїми вірними молитовно приєднуються до поминання невинно убієнних [8].

За словами Президента, Україна завжди буде вдячна Роберту Конквесту і Джеймсу Мейсу - американським дослідникам, які першими відкрили світові правду про Голодомор. Оцінюючи наслідки голоду для України, Президент назвав найголовнішим те, що як нація українці змогли вистояти у цій трагедії [8].

До Президента України надійшли листи від Президента США Дж. Буша, Новообраного президента США Барака Обами та Вселенського патріарха Варфоломія І з нагоди 75-ї річниці Голодомору 1932–1933 років. У листах висловлено солідарність з українським народом, який згадує про жертв Великого Голоду. Також з нагоди вшанування в Україні 75-х роковин Голодомору 1932-33 рр. до українського народу з висловленням солідарності звернулися керівники багатьох країн світу. Зокрема надійшли звернення від Президента Ірландії Мері МакАліз, Президента Лівану Мішеля Сулеймана, Президента Парагваю Фернандо Луго Мен-деса, Президента Фінляндії Тар'ї Халонен, Президента Чеської Республіки Вацлава Клауса, Президента Швейцарії Паскаля Кушпена, Віце-президента Аргентинської Республіки Хуліо Сесара Клето Кобоса, Прем'єр-міністра Іспанії Хосе Луіса Родрігеса Сапатеро, Міністра закордонних справ Австрії Урсули Пласнік, Державного сек-ретаря у закордонних справах Співдружності Великої Британії Девіда Мілібенда [9].

Завдяки спільним зусиллям організацій української діаспори та МЗС України на парламентському рівні Голодомор в Україні актом геноциду українського народу був визнаний в Австралії, США, Канаді, Грузії, Естонії, Латвії, Литві. Польщі, Угорщині, Перу, Мексиці, Еквадорі, Колумбії, Парагваї, а також Ватикані. На регіональному та муніципальному рівні подібне рішення прийняли Бразилія, Іспанія, Аргентина та Італія [10, С. 217].

Висновки та рекомендації. Підсумовуючи все вищевказане необхідно підкреслити, що органи влади нашої країни, організації української діаспори, наукові установи і громадськість України на міжнародному і загальнодержавному рівні консолідовано розгорнули активну діяльність щодо висвітлення правди та увічнення пам’яті жертв Голодомору 1932–1933 років в Україні, приурочену до 75 річниці цієї жахливої трагедії українського народу. Згадана діяльність стала вагомим фактором вітчизняної державної гуманітарної політики. Вона призвела до підвищення позитивного міжнародного іміджу України та перетворення її на повноцінну учасницю європейського цивілізаційного простору XXI століття. Окремо потрібно підкреслити визначну роль тогочасних Президента України Віктора Ющенка та Першої леді України Катерини Ющенко в організації та повномасштабній державній підтримці заходів щодо висвітлення правди та увічнення пам’яті жертв Голодомору 1932–1933 років в Україні.

Рекомендації за результатами дослідження:

1. Рекомендувати Адміністрації Президента України, Кабінету Міністрів України, Верховній Раді України звернути увагу на дотримання громадянами України положень Закону України № 376-V "Про Голодомор 1932–1933 років в Україні".

2. Рекомендувати центральним органам влади України продовжувати заходи щодо висвітлення правди і увічнення пам'яті жертв Голодомору 1932–1933 років в Україні, зважаючи на те, що згадана проблематика є складовою вітчизняної історичної політики та важливим елементом гуманітарної політики України, здатним відчутно впливати як на українське суспільство, консолідуючи його, так і на іноземні держави.

3. Рекомендувати Міністерству закордонних справ України продовжувати активно співпрацювати з українською діаспорою в справі висвітлення правди і увічнення пам'яті жертв Голодомору 1932–1933 років в Україні, звернувши увагу на той факт, що висвітлення правди про Голодомор 1932–1933 років в Україні та представлення його актом геноциду українського народу було складовою національної ідеї української діаспори в країнах Заходу, яка дозволяла їй зберігати свою національну ідентичність, консолідуватися та продовжувати боротьбу за державну незалежність України, тобто будь-яке заперечення Голодомору 1932–1933 років закордонна українська громада буде оцінювати як факт здачі національних інтересів та зневагу до своїх зусиль щодо міжнародного визнання жахливої трагедії українського народу, що в свою чергу призведе до погіршення міжнародного іміджу України та ускладнень в сфері реалізації закордонної політики нашої країни.

4. Рекомендувати Національній Академії Наук України, Інституту історії України НАН України, Інституту національної памяті продовжувати приділяти підвищену увагу дослідженню та висвітленню теми Голодомору 1932–1933 років в Україні.

5. Рекомендувати Президії Національної Академії Наук України створити академічний Інститут дослідження світового українства, Інституту історії України НАН України створити в системі інституту відділ дослідження історії української діаспори, зважаючи на активний вплив закордонного українства на процеси становлення і розбудови Української держави, зокрема, щодо дослідження,

висвітлення правди і увічнення памяті жертв Голодомору 1932–1933 років в Україні.

6. Рекомендувати Міністерству освіти, науки, молоді та спорту України включити в програми з історії вищих і загальноосвітніх навчальних закладів докладне вивчення історії зарубіжних українців, зокрема їх зусиль, спрямованих на розбудову української державності, зокрема, щодо дослідження, висвітлення правди і увічнення памяті жертв Голодомору 1932–1933 років в Україні.

7. Рекомендувати Державному фонду фундаментальних досліджень забезпечити проведення конкурсів науково-дослідних проектів, тематично присв'ячених висвітленню теми Голодомору 1932–1933 років в Україні, в рамках гранту Президента України для молодих вчених підтримувати проекти, метою яких є вивчення процесів в середовищі закордонних українців, висвітлення боротьби української діаспори за демократію і незалежність України.

8. Рекомендувати Комітету з Державних премій при Президентові України під час розгляду наукових праць, висунутих на здобуття Державної премії України в галузі науки і техніки та Премії Президента України для молодих вчених, підтримувати наукові роботи, присв'ячені висвітленню теми Голодомору 1932–1933 років в Україні.

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