

Control Transformation in the Lean Management System

Khanif Sharifzyanovich MULLAKHMETOV

Kazan Federal University, Naberezhnye Chelny Institute of KFU, Naberezhnye Chelny, Russian Federation, mkhsh007@gmail.com

Ruslan Duferovich SADRIEV

Kazan Federal University, Naberezhnye Chelny Institute of KFU, Naberezhnye Chelny, Russian Federation, ruslansadr@yandex.ru

Ekaterina Vladislavovna KROTKOVA

Kazan Federal University, Naberezhnye Chelny Institute of KFU, Naberezhnye Chelny, Russian Federation, nek_m@rambler.ru

Liliia Aleksandrovna GABAI DULLINA

Kazan Federal University, Naberezhnye Chelny Institute of KFU, Naberezhnye Chelny, Russian Federation, liliya142@yandex.ru

Elvir Munirovich AKHMETSHIN

Kazan Federal University, Elabuga Institute of KFU, Elabuga, Russian Federation, elvir@mail.ru

Abstract

The lean concept supposes new approaches to production arrangement and management; accordingly, subsystems and management system elements, technologies and implementation methods for particular functions should change. Thesis objective: developing recommendations to improve the control function in the Russian companies introducing the lean management system. For this purpose, key changes in managed items and in the composition of control arrangement within the lean management system were studied; the key factors resulting in changes at different management levels were detected. The research methodology is structured so that the distinctive features of lean management and changes in the position and role of control are studied in the beginning in comparison with traditional management. Afterwards, the control function is studied in the companies having successfully introduced the lean management system (Toyota and KAMAZ). In the course of the study, it was found that the role of self-management and self-monitoring of workers is growing in the lean management system on the basis of positive corporate culture coordinated with the company's strategy. At the operational level, the control is based upon an elementary model – comparison with standards. It serves as the basis for implementation of a number of specific instruments of the concept – visual control and integrated quality. For efficient introduction and functioning of lean management, it is necessary to create leadership-based culture targeted at continuous improvement; and the existing systems, technologies and management methods are to be changed (adapted) on this basis. At the same time, the traditional objectives of control are to be transformed depending on the internal structural medium to harmoniously regulate the personnel relationships. To efficiently achieve the objective, the management system should contain both a managerial control system and a cultural instrumentality based on social impact.

Keywords: control, efficiency, management levels, lean management, corporate culture, Toyota, KAMAZ.

Introduction

Control is the most important management function closely related to other functions; it is involved in implementation of all other management functions, and it provides information on success in realizing both other functions and the management process in general. Without particular control procedures, the other management functions cannot be efficiently effected (Mullakhmetov, 2015).

The control activity is aimed at upgrading management efficiency through provision of high-quality and relevant information on a problem while managerial solutions are being prepared; tracking the course of solution implementation and timely escalation of essential digressions to the management team; evaluating the success in implementing solutions based on the analysis of digressions from planned results after the implementation is completed (Mullakhmetov, 2016).

The previous researches showed that the management style practiced in Russia is the main obstacle against project success in the lean production area. The central essential problem is that in Russia lean management is more often deemed as a set of tools for upgrading business efficiency (Sadriev *et al.*, 2016a). Thus, optimization of business processes and improvements targeted at elimination of losses cannot be effectively realized in Russian enterprises without creating a control system adapted to the lean management concept. The management practice in introduction of lean management predetermines various types of control, such as organizational, legislative, indicative and financial (economic). Most of lean tools and principles pertain to the operational management level (Sadriev *et al.*, 2016a). At the same time, control should be included at all management levels, and items under control and objectives will be different at each level. For efficiency upgrading in management of the Russian companies, it is reasonably necessary to study more thoroughly the transformation of the structure of functions and controlled items in the lean management system.

Methodology

The research methodology is structured so that the outset includes research into characteristic features of lean management and changing the position and role of the control function in contrast to traditional management. Afterwards, the control function is studied in companies having successfully introduced the lean management system, such as Toyota and KAMAZ. Conclusions are formed based on the research results. The Toyota Company was taken as a reference entity and the developer of this concept. Research into its experience enables us to understand the way of transforming items and structure of the control function within the lean management system. KAMAZ is one of the first major Russian companies introducing the lean production concept. Comparison of the practice in these two enterprises makes it possible to find problems in introduction of such concept in the Russian companies, to determine key factors affecting the control function, and to develop recommendations for control efficiency upgrading on this basis. The information base of the research comprised open sources, such as publications, company websites, and corporate documents.

Toyota's experience shows that a number of instruments are associated with the control function in the lean management system. At the operational management level, the most important instruments are visual control and integrated quality. Visual control is such location of instruments, details and production condition indicators with which any person can understand the system condition at first sight (Womack, 2014). In turn, the principles underlying the integrated quality are the quality embedded in the process; the three DON'Ts (don't take, don't do, don't transfer defects); independent view (each quality loop is managed by different persons, the following loop checks the previous one); detection and elimination of the source reasons for emergence of defects; prompt communication between the point of defect detection and the point of its appearance; Kaizen process of continuous improvement.

Control at the Toyota enterprise is comparison with the standard, which makes it possible to detect any digressions and to evaluate the outcome. The control focus should be transferred to prevention of defects. Source control, self-monitoring and subsequent checkups are very effective in this case, as well as the use of poka-yoke devices (Hitoshi Takeda, 2008).

Toyota applies quality control and manufacturing volume control.

Manufacturing volume control is an instrument which helps to reveal and reduce production costs, and to track the level of current production costs. The outcome is a diagram of hourly output volumes which makes it possible to coordinate the activities of managers, foremen and craftsmen to increment

profits and to reduce expenditures. Manufacturing volume control contributes to solving three major problems:

- workers, foremen and managers obtain specific and demonstrative display of the production course, which makes it possible to specifically discuss the situation and the ways to improve it ;
- it helps to meet the delivery terms;
- it enables tracking production costs (Hitoshi Takeda, 2008).

Since overproduction is not acceptable in the Toyota company for any reason, defects should be avoided in general. For this purpose, preventive control is effected, which encompasses three strategies:

- source control – finding defects in the source of their emergence;
- self-monitoring – workers are responsible for finding and eliminating defects;
- subsequent control – workers check each other's work.

Inspecting the sources of defects makes it possible to prevent defects by managing conditions affecting the product quality. Sorting control and informative control aimed at identifying defects and reducing the frequency of their occurrence may also be realized. Monitoring maps are used as an important means for statistical process management.

An important method making it possible to ensure the required quality is total inspection. Although selective control is statistically justified, it cannot warrant absolute quality of products, i.e. absence of defects, in reality.

Self-monitoring, subsequent control and source control can be realized by using poka yoke devices. The poka yoke device itself pertains not to the control system, but to the method for detecting defects and errors as used with a definite control function. Control is a purpose, and poka yoke is only a method. Poka yoke is a device enabling achievement of one-hundred-percent product quality due to defect prevention (Hitoshi Takeda, 2008).

With any production rate, Toyota's reserves are very small, thus, when the enterprise is functioning, workers are looking for problems: whether or not there is noise from any machine, whether or not workers do wrong movements? Workers are thinking of improvement from 8 a.m. to 5 p.m. It is development of a special way of thinking that underlies effective control in Toyota (Singo, 2010).

The structure of the control function at the Russian enterprises introducing the lean management concept will be studied through the example of KAMAZ. The Chief Executive Officer of KAMAZ PJSC, Y. Klochkov, noted that KAMAZ solves the problem of transparency and manageability of processes by introducing SFM (Klochkov, 2012).

SFM (Shop Floor Management) is the operational management system based upon the Lean principles. Semantic translation: process management from the point of value creation. The most important SFM components are the KPI by quality, process rhythm, labour costs, corporate culture and personnel involvement.

KAMAZ and its partners introducing the lean management principles into operational production management include such basic elements as:

- Shop Floor Management. SFM components: KPI, structured problem solving, visualized execution of instructions through the T-card system, supervision of presence and distribution of personnel, hourly control of process rhythm, stepwise quality control.
- The Go&See method is one of the ways to realize visual management based upon the manager's presence at the point of value creation.
- Standardization and work with information stands.

It should be noted that in Russia, Lean is introduced in conditions of poor management and in a specific business environment with underdeveloped market structures (Sadriev et al., 2016b). In Russian companies, the greatest complexity is introduction of humanistic management principles, and companies often adopt only Lean instruments without changing the dominating authoritarian style of management, thus disfiguring the philosophy basis of this concept.

In Toyora, developing a specific way of thinking is the basis for efficient control, and in KAMAZ PJSC, control methods of instrumental and organizational nature dominate. Such situation is largely predetermined by evolution of the control function within the management system, by perception of control in the Russian reality (Mullakhmetov *et al.*, 2015), as well as by the features of human capital in Russian companies (Sharafutdinov *et al.*, 2017).

Results and Discussion

The first researchers into the Toyota management system, D. Jones and J. Womack, note that in the case of Toyota Production System (TPS), the issue is not just changing the dominating style of production arrangement, but some completely different arrangement culture, a fundamentally different management style, and a new way of thinking of managers at all management levels (Womack and Jones, 2003). J. Seddon says that the management style based on issuing orders and supervising their execution, to which many companies still adhere, is becoming redundant (Seddon, 2009). This style is opposed by Seddon presenting another approach to management in which a company is regarded as a system. Seddon associates the new management philosophy with Japanese management, primarily in the Toyota Company (Seddon, 2009).

In the lean management system, due to developed delegation of functions, the control function is divided between the management levels based on the self-management and self-monitoring principles. The role of managers is primarily limited to training, leadership and development of a system which would foster internal motivation of the personnel.

Thus, lean management fundamentally changes the methods for control implementation. E. Deming said that the duties of managers, controllers and craftsmen should be shifted from achievement of numeric indicators to the quality (Deming, 2017). Similarly, K. Hopper and V. Hopper affirm that when an indicator becomes a purpose it is no longer a good indicator (Hopper and Hopper, 2007). But it does not mean that lean management does not apply indicators for efficiency evaluation. Only operation principles are changing with these indicators. Achievement of numeric indicators is ceasing to be a defining goal of management.

According to the publication (Liker and Hoseus, 2017), the managerial procedures in Toyota are standardized and clearly specified (which makes it possible to realize system control of their execution – authors' note). But in the lean management system, the control function is not limited only to checkup for compliance with standards. In the new management paradigm, the traditional control functions are transformed depending on the priority of the objective to develop the internal structural medium to harmoniously regulate the relationships between employees of the company, and on creation of conditions in which obligatory adherence to the specified standards is natural and voluntary for employees (Shinkevich *et al.*, 2017).

Summary

1. In lean management, control items and objectives are diversified by management levels, which requires various strategies, systems, technologies and control methods to be used.

At the operational level in which most of principles, methods and instruments are used, lean control is based upon the simplest model – comparison with standards (Mullakhmetov, 2005). On its basis, a number of specific lean instruments of which the most important ones are visual control and integrated quality are implemented. The strategy of personal control effected by supervisors (vertical

control) is being transformed into self-monitoring and mutual control (horizontal control) due to highly developed delegation.

At the superior management levels, as the lean philosophy is developing, a change for control strategies based on performance results and cultural control should be realized (Mullins, 2003).

2. To introduce the concept successfully, it is necessary to develop a lean philosophy and a specific culture based on leadership and search for continuous improvement. It is necessary to revise the managerial control methods dominating in Russian companies and to establish effective balance between “hard” and “soft” methods. The traditional control objectives should be transformed by taking into account the internal structural medium harmoniously regulating relationships in the personnel, which is the key to success of the lean concept.

3. According to Toyota’s experience, the basis for effective control is developing a specific way of thinking aimed at continuous improvement and prevention of any digressions. The company’s control system operates in accordance with the general management principles, and it conforms to the requirements for effective control systems (Mullakhmetov, 2013, p. 170-187).

4. The changes occurring in the society and economy, the trends and dynamics of changing the medium properties require replacement of the existing management paradigm which is irrelevant for today’s environment. The lean philosophy and methodology is a successful response to today’s challenges due to combining stability and flexibility of management.

Conclusion

Lean management is a new concept of management. Based on the system approach, all management subsystems should be changed. While supervision in traditional management is one of the most demanded functions and the predominant feature in managers’ behavior, the lean management system fosters self-monitoring and mutual control of workers. The role of managers is primarily reduced to training, leadership, as well as to formation of a system which would promote internal motivation of the personnel.

Chasing for numbers, coercion, constant inspections by managers are being changed by “soft” control methods which, at the strategic level of management, contribute to developing the lean ideology – a specific culture based on leadership and search for continuous improvement. The traditional control objectives are being transformed depending on the priority of developing the internal structural medium harmoniously regulating the relationships in the personnel, and on creation of conditions in which people are proud of their work, and in which obligatory adherence to the specified standards is natural and voluntary for workers.

Acknowledgements

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University.

References

- Deming, E. (2017) *The Exit from the Crisis: A New Paradigm of Managing People, Systems and Processes* (9th ed.). Moscow: Alpina Publisher. 417 p. (In Russian).
- Hopper, K., Hopper, W. (2007). *The Puritan Gift. Triumph, Collapse and Revival of an American Dream*. L.; N.Y.: I.B.Tauris & Co Ltd.

Klochkov, Yu.P. (2012, May 2). KAMAZ: we began irreversible changes. The Business portal "Production management". Retrieved November 1, 2017, from <http://www.up-pro.ru/journal/prozvodstvennye-sistemy/klochkov-kamaz.html>

Layker, J., and Khosesus, M. (2011). Corporate Culture of Toyota: Lessons for Other Companies (4th ed.). Moscow: Alpina Publisher. 354 p. (In Russian).

Mullakhmetov, K.S. (2005), 'Some approaches to management control,' *Management in Russia and abroad*, 6, 3-9.

Mullakhmetov, K.S. (2013) Control-management. Moscow: JSC Ekonomika Publishing House.

Mullakhmetov, K.S. (2015), 'Some approaches to the development of the management control concept,' *Journal of Advanced Research in Law and Economics*, 6(1), 128-137. doi:10.14505/jarle.v6.1(11).15

Mullakhmetov, K.S. (2016), 'Control in the system of managerial decisions procedures: A conceptual view,' *Problems and Perspectives in Management*, 14(3), 64-76. doi:10.21511/ppm.14(3-1).2016.07

Mullakhmetov, K.S., Nazmiev, E.F., and Akhmetshin, E.M. (2015), 'Control in the system of public administration in Russia,' *International Business Management*, 9(7), 1732-1736. doi:10.3923/ibm.2015.1732.1736

Mullins, L.J. (2003). Management and organisational behavior (pp. 889). Minsk: New knowledge.

Sadriev, R.D., Mullakhmetov, K.S., and Akhmetshin, E.M. (2016b), 'Russian business medium: Competition problems,' *International Journal of Economics and Financial Issues*, 6(8Special Issue), 30-38.

Sadriev, R.D., Mullakhmetov, K.S., Krotkova, E.V., and Gabaidullina, L.A. (2016a), 'Introduction of Lean Production at Russian Enterprises: Perspectives and Problems,' *International Journal of Economics and Financial Issues*, 6(S8), 39-48.

Seddon, J. (2005). Freedom from Commands and Control: Rethinking Management for Lean Service. New York: Productivity Press.

Sharafutdinov, R.I., Gerasimov, V.O., Yagudina, O.V., Dmitrieva, I.S., Pavlov, S.V., and Akhmetshin, E.M. (2017), 'Research of human capital in view of labour potential of staff: National companies case study,' *Paper presented at the Proceedings of the 29th International Business Information Management Association Conference - Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth*, 839-852.

Shinkevich, A.I., Kudryavtseva, S.S., Sadriev, R.D., Mullakhmetov, K.S. (2017). The institutional environment of domestic enterprises in the conditions of transformation of openness of national systems: monograph. Kazan: Publishing house of the Kazan state national technology university. 285 p. (In Russian).

Singo, S. (2010). Studying of production system Toyota from the point of view of the production organization. Moscow: IKSI. 312 p.

Takeda, H. (2006). The Synchronized Production System: Going Beyond just-in-Time through Kaizen. London; Philadelphia: Kogan Page. 263 p.

Womack, J.P. (2014). *Lean Production: How to get rid of losses and to achieve prosperity of your company*: translated from English (8th ed.). James P. Womack, Daniel T. Jones, Moscow: Alpina Business Books. 472 p. (In Russian).

Womack, J.P., Jones, D.T. (2003). *Lean Thinking. Banish waste and create wealth in your corporation*. New York: Free Press, 397 p.