

THE RELEVANCE OF THE CONCEPT OF LEAN PRODUCTION IN THE CONTEXT OF THE "NEW ECONOMY"

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Abstract: Among the most important areas, characterizing the "new economy", the authors identified "Industry 4.0" and "Management 2.0". The article discusses how the concept of Lean production retains its significance in the conditions of new paradigms in production and management, known as Industry 4.0 and Management 2.0. In this connection, the main trends in the economy were studied. They determine the changes in the production and management approaches, including the key factors, which cause the transformation of management. Some features of lean manufacturing, the principles of management and organization of production, underlying the concept of Lean production, were also identified. The most significant phenomena in management and production were compared. The studied phenomena determine the future of modern society, with changes in management approaches, which are associated with the spread of the concept of lean manufacturing. As a result, it is concluded that the concept of Lean production is still one of the most popular management approaches, and it does not lose its significance in the context of economy transition to "Industry 4.0" and "Management 2.0".

Key words: Industry 4.0, Management 2.0, new economy, lean manufacturing, Lean production.

1 Introduction

Ichak Adizes in his work (Adizes, 2017), specially prepared for the Russian-language version of HBR magazine, outlines the main changes in society, economics, politics, and their consequences, and states that the main task of management today is the control of changes. The simultaneous influence of a large number of interrelated factors, which rapidly change over a short period of time, form a high level of uncertainty in the results of the implementation of individual management decisions, projects, financial and economic activities as a whole, and impose the heightened requirements for information support of management activities. New ideas and related challenges are primarily reflected in the procedures for the development, adoption and implementation of management decisions (Mullakhmetov, 2016), (Mullakhmetov et al., 2019).

The management theory and practice responded to the challenges of the 21st century with new approaches to management, the main characteristics of which were reflected in the concept of "Management 2.0: new version for the new century", in the more practically oriented "Industry 4.0", and a number of local developments (Hamel, 2009), (Shpurov, 2016), (Rigbi et al., 2019).

Among the most important areas, characterizing new economy, we can distinguish Industry 4.0 and Management 2.0. The concept "Industry 4.0" was first formulated in 2011, as a result of the initiative of German businessmen, politicians and scientists. They defined this phenomenon as "a means for improving the competitiveness of manufacturing industry in Germany, through the enhanced integration of "cyberphysical systems", or CPS, in industrial processes. Now this idea is gradually taking over the world (Shpurov, 2016). Industry 4.0 is based on 9 technological achievements (Lipkin, 2017): autonomous robots, big data, augmented reality, modeling, additive technologies, horizontal and vertical integration, cloud technologies, the industrial Internet of things, information security. Many of the noted achievements are already used in production, but with the introduction of Industry 4.0, they will transform the production process.

In May 2008, the international conference, organized by the Management Lab, with the support of Mc Kinsey & Company, was held in the United States. 35 conference participants, who were management theorists and practitioners, scientists, CEOs and venture capitalists, outlined the plan of upgrade, developing

the concept of "Management 2.0: new version for the new century", which included the 25 largest tasks of management of the 21st century. These tasks cover not only the need to take into account the interests of all participants in corporate relations, including local communities, but also the change of approaches to the formation of hierarchical relations, in which the status and degree of influence do not depend on the position, but on the contribution to the work, the transition to the principles of self-government and self-control, when the assessment of peers is the most important (Hamel, 2009).

Previously, the authors investigated the prospects and problems of Lean production implementation in Russian companies (Sadriev et al., 2016). Let's consider how relevant is the concept of Lean production in the conditions of the economy transition to "Industry 4.0" and "Management 2.0".

2 Methods

As previously noted, the most significant phenomena in management and production, determining the future of modern society, are called Management 2.0 and Industry 4.0. In order to understand how the concept of Lean production is combined with Industry 4.0 and Management 2.0, we consider the main trends in the economy, which determine the changes in the production and management approaches, as well as some features of Lean manufacturing.

The characteristic feature of modern economy is its variability. Moreover, in the last decade, the business environment is changing at an increasingly accelerating pace. This is largely due to the introduction of new technologies, which have already been mentioned above, but are not limited to them. Awareness of the key factors, which cause the changes in management, allows to make the processes of adaptation and transformation manageable, and is one of the conditions for management efficiency in modern conditions. The factors of management transformation make up a number of sustainable groups for their basic causes:

1. Scientific and technological progress, the development of technologies and new activities (technological factors).
2. Qualitative and quantitative changes in labor resources (human capital).
3. Integration processes, intensified by globalization, increasing the speed of information exchange, transport accessibility, etc. (integration factors).
4. Qualitative changes in society, changes in pre-existing system of values, including the increase in the role of spiritual and religious values, the rise of national self-awareness (socio-cultural and moral-ethical factors) (Mullakhmetov, 2018).

Next, we will consider in more detail the changes in management approaches, which are associated with the spread of the concept of Lean production.

3 Results and Discussion

Lean production has a number of fundamental differences from Taylor's traditional management and mass production concept. D. Jones and J. Womack were the first researchers of the Toyota management system. They note that in case of the Toyota Production System (TPS), it's not just about changing of the existing style of production organization - it's about completely different organization culture, fundamentally different management style, and new thinking style for both top and bottom levels of management (Womack, J.P. and Jones, D.T., 2003). Seddon J. notes that the command-and-control style of management, used by many companies, based on giving orders and monitoring their execution, is no longer relevant (Seddon, 2009). Seddon proposes new management approach, in which the

organization is considered as a system. The table shows the main differences between two styles of management.

Table 1. Comparison of command and systemic management approaches (Seddon, 2009)

Management characteristics	Management style	
	Command	Systemic approach
View	Top to bottom, hierarchical	Outside in, systemic
Enterprise organization	Functional	Consistent with demand and value flows
Decision making	Separated from work	Integrated with work
Assessment	Outputs, goals, standards: relative to the budget	Reproducibility, variability: regarding tasks
The role of manager	People and budget management	Action within the framework of the system
The dominant feature in the behavior of managers	Control	Training
Motivation of employees	External	Internal

Seddon associated the new management philosophy with Japanese management, primarily with Toyota (Seddon, 2009). The alternative to Taylor's command-and-control system was Japanese style of management, based on the respect for people and society, the atmosphere of cooperation, interest in new knowledge, and continuous aiming for improvement. Since the 1970s, Japanese management began to undermine the economy of the United States and other industrial powers (Adler et al., 2011). As noted by Kōnosuke Matsushita, the management of the 21st century should be humanistic, system-oriented and aimed not at profit, but at "something that some people do for the happiness of other people" (Matsushita, 2008).

Liker J. identifies the following management features, underlying the Toyota Production System or the Western interpretation of Lean production (Liker & Hoseus, 2017):

- democratic style of management;
- active participation of employees in managerial decision-making, delegation of managerial authority to working groups, quality circles;
- transition from the strictly vertical hierarchy to the flat structure and optimal control system;
- quick response to the demands of company employees;
- removal of barriers between the management team and subordinates.

Today, in the conditions of the "new economy", based on the constant generation of product, technological and organizational innovations, the strategic competitive advantage is formed at the level of business processes, the effective functioning of which depends on the quality of management (Gafurov et al., 2012). The problem of the inconsistency of traditional ordinary management with the current realities of the economy is becoming increasingly obvious. So, new scientific papers appear as a reaction of management theory and practice. Their goal is to find the answer to the question: "How to provide the effective management in a multi-factorial, dynamically changing environment of modern business with a high level of uncertainty?" (For example, the review of the concepts of "strategic flexibility" made by M. Lindgren and H. Bandkhold) (Lindgren and Bandkhold, 2009, p. 9).

V.L. Shper noted that the main goals of the previous management were money (profit), control and manipulation of people, the

pursuit of numbers and indicators. And the main purposes of new management are the quality, understanding of a person, understanding of the system and variability (Sper, 2016). That is, the control and manipulation are replaced by the understanding of people. As Peter Drucker said, "People do not need to be "controlled". The task is to guide people. The goal is to make the specific skills and knowledge of each individual employee as productive as possible" (Drucker, 2018).

In the new conditions of Industry 4.0, there is a rethinking of the basic functions of management. For example, the need to find a balance of conflicting, sometimes mutually exclusive characteristics and trends in the management system is reflected in its subsystems. So the classic dilemma of control is to find a balance between the desire to increase the predictability of staff activities, and the desire to develop their proactive and creative attitude to work, as well as the ability to quickly and adequately respond to changes. If the first involves the strengthening of administration and control, control of actions and behavior of personnel, the second requires mild forms of control, based on the results of activities. The classic dilemma of control in relation to business entities is manifested in the search for a balance of centralization and decentralization in the system of management (Mullakhmetov, 2013).

4 Summary

All approaches of Lean production are reflected in Industry 4.0: maximization of efficiency, minimization of losses, continuous improvements, value chains management, integration of quality into the process, and quick changeovers. But at the same time, they get to a new level - digital. For example, the combination of tools and approaches of Lean production, such as JIT, production smoothing, 5S, jidoka, kanban, with the technologies of Industry 4.0 makes it possible to use the unmanned intra-workshop and inter-workshop transport, industrial robots, means of automation of storage facilities and inventory management, more efficiently. This leads to a full automation of the most production and logistics processes at the enterprises. The companies will be able to create products, designed for the needs of the individual customer, without the increase in cost and time of manufacturing. High-performance and decentralized layer-by-layer printing systems will reduce the transportation distances and available inventories. Additive technologies allow to reduce energy costs by decreasing the number of technological operations, minimizing the amount of consumed materials, and creating lightweight products. The reduction in material consumption, in some cases, can be up to 90%, compared to traditional mechanical technologies (Rüssmann et al., 2015).

Previously, the characteristic features of management, underlying the concept of Lean production, were defined. They are the following: systematic approach, training and internal motivation of employees, democratic style of management, active participation of employees in management decisions, the transition from a strictly vertical hierarchy to a flat structure, removal of barriers between management team and subordinates. These features of Lean production contribute to the solution of Management 2.0 tasks, such as the change of approaches to the formation of hierarchical relations, in which the status and degree of influence do not depend on the position, but on the contribution to the work; the transition to the principles of self-government and self-control. It should be emphasized, that the effective Lean production involves equally active usage of both the "engineering and technology" sub-system, and the "human capital" subsystem, all tools of corporate culture in company management (Sadriev et al., 2016), (Mullakhmetov et al., 2018a), (Mullakhmetov et al., 2018b), (Sadriev et al., 2017)

5 Conclusions

The authors have studied the main trends in the economy, which determine the changes in production and management approaches, including key factors, causing the transformation of management. Some features of lean manufacturing, principles of management

and organization of production, underlying the concept of Lean production, were also identified. It was made the comparison of the most significant phenomena in management and production, determining the future of modern society, which received the generalized name of Industry 4.0 and Management 2.0, with changes in management approaches, which were associated with the spread of the concept of Lean production. As a result, it was concluded, that all Lean production approaches were reflected in Industry 4.0. It was also defined, that the characteristic features of management, underlying the concept of Lean production, contributed significantly to the solving of the main tasks of the 21st century management, which were included in the concept of "Management 2.0".

Thus, it can be concluded, that the concept of Lean production is still one of the most popular management approaches, and it does not lose its significance with the spread of new paradigms in production and management, called "Industry 4.0" and "Management 2.0".

Acknowledgements

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

Literature:

- Adizes, I.: Teoriia i praktika menedzhmenta transformiruiutsia pered litsom novykh vyzovov – i Rossii nuzhno podtiagivat'sia [Theory and practice of management transformation before new challenges – Russia has to catch up]. Harvard Business Review-Rossia, 2017, January–February, pp. 6–10. (in Russian)
- Mullakhmetov, K.: Control in the system of managerial decisions: A conceptual view. Problems and Perspectives in Management, 2016, 14(3), 64-76. doi:10.21511/ppm.14(3-1). 2016. P. 07.
- Mullakhmetov, K. S. Sadriev, R. D. Bikulov, R. A. Khairullin, I. G. Akhmetshin, E. M.: Information assurance of the procedure of development of management decision-making. Paper presented at the Proceedings of the 32nd International Business Information Management Association Conference, IBIMA 2018 - Vision 2020: Sustainable Economic Development and Application of Innovation Management from Regional Expansion to Global Growth, 2019, P.6433-6442.
- Hamel, G.: Menedzhment 2.0: novaia versiiia dlia novogo veka [Management 2.0: a new version for the new century]. Harvard Business Review-Rossia, 2009, P. 91–100. (in Russian)
- Shpurov, I. Industry 4.0. Expert, 40, 2016, P. 27-32.
- Rigbi, D., Sazerlend, D., Takeuchi Kh.: Novyi retsept innovatsii: model' agile. Kak osvoit' model', kotoraiia meniaet samu sut' upravleniia [A new recipe for innovations: agile model. How to master the model which changes management concepts]. Harvard Business Review-Rossia, 2016, P. 39–42. (in Russian)
- Lipkin, E.: Industry 4.0: Smart technologies are the key element of industrial competition. - M.: Ostek-SMT LLC, 2017. P. 224.
- Sadriev, R. D., Mullakhmetov, K. S., Krotkova, E. V. Gabaidullina, L. A.: Introduction of Lean Production at Russian Enterprises: Perspectives and Problems. International Journal of Economics and Financial Issues. 6(S8), 2016, P. 39-48.
- Mullakhmetov, K. S. Technological factors and management transformation in social and economic systems. European Research Studies Journal, 21(3), 2018, P. 230-241.
- Womack, J. P. Jones, D. T.: Lean Thinking. Banish waste and create wealth in your corporation. – New York at al.: Free Press, 2003. P. 397.
- Seddon, J.: Freedom from orders and control. The path to effective service. Transl. from English by A. L. Raskin; under scientific supervision of Yu. P. Adler. - M.: The Advertising Informational Agency Standards and Quality, 2009. P. 232.
- Adler, Yu. P. Maslov, D. V. Nazarova, I. G.: Deming Forum: quality strategy for Russia: collective monograph. under the general editorship of Yu.P. Adler, D.V. Maslov. - Astrakhan: Astrakhan State University, Publishing House "Astrakhan University", 2011.P. 256.
- Matsushita, K. The principles of success. - M.: Alpina Business Books, 2008. P. 126.
- Liker, J.: Toyota Culture. The Heart and Soul of the Toyota Way. Jeffrey Liker, Michael Hoseus; Trans. from English - 4th ed. - M.: Alpina Publisher, 2017.P. 354.
- Gafurov, I. R., Safiullin, M. R., Safiullin, A. R.: The Analysis of Competitiveness Structural Gaps in the Production of Petrochemical Cluster in the Republic of Tatarstan. Kazan: Kazan University. 2012 (in Russian).
- Lindgren, M., Bandkhold, H.: Scenario planning. Communication between the future and strategy. Moscow: Olympe-business, 2009, P. 256. (in Russian).
- Shper, V. L.: The future of Russia = quality of management + modernization of the whole country. Quality and life. 4(12), 2016, P. 134-148.
- Drucker, P. F.: Management Challenges for the 21st Century. M.: Williams, 2018.P. 286.
- Mullakhmetov, K. S.: Control-management. Moscow: Publishing House "Ekonomika". 2013 (in Russian).
- Rüssmann, M.: Industry 4.0. The Future of Productivity and Growth in Manufacturing Industries. Michael Rüssmann, Marcus Lorenz, Philipp Gerbert, Manuela Waldner, Jan Justus, Pascal Engel and Michael Harnisch. The Boston Consulting Group, Inc. 2015. P.22.
- Mullakhmetov, K. S. Sadriev, R. D. Akhmetshin, E. M.: Corporate culture in management systems. European Research Studies Journal, , 21(1), 2018a, P. 519-528.
- Mullakhmetov, K. S. Sadriev, R. D. Bikulov, R. A. Akhmetshin, E. M.: Sociocultural factors of transforming administration and control in the management of economic and social systems under modern conditions. Paper presented at the Proceedings of the 31st International Business Information Management Association Conference, IBIMA 2018: Innovation Management and Education Excellence through Vision 2020, 2018b, P. 3573-3581.
- Sadriev, R. D. Mullakhmetov, K. S. Krotkova, E. V.: Corporate Culture in the Line-Management System. International Journal of Economic Perspectives, 11(4), 2017, P. 652-659.

Primary Paper Section: A

Secondary Paper Section: AH, AE