Implementing Lean Production Management System (LPMS) in the Practice of Russian Organizations

S N Glagolev¹, S M Bukhonova¹, E D Chikina¹

¹Belgorod State Technological University named after V.G. Shukhov
Russia, 308012, Belgorod, Kostukova St., 46

E-mail: atchikina@mail.ru

Abstract. This paper is devoted to lean production management system (LPMS), which is being implemented into various productive and non-productive spheres, as well as used in education, medicine, banking, consulting and social sphere. The article considers the enterprises, which have implemented the lean production system and which are called Lean-enterprises. The stages of implementing LPMS in order to improve the efficiency of production and non-production sectors of the Russian Federation on the basis of Recommendations, developed by the Ministry of Industry and Trade of Russia, are presented. The practice of implementing LPMS in the activity of a nonprofit organization SAI BR MFC is shown; the expected effects of the LPMS implementation are revealed, such as: reduction of a service’s completion time; improving labor efficiency; improving the quality of customer satisfaction; increasing the number of applications, processed by windows of MFC; deepening the assimilation of LPMS methods and tools; increasing the market fluctuation tolerance of MFC.

1. Introduction
At present the lean production system is being implemented in various production and non-production sectors – gas and power, chemical, petrochemical, metallurgical, light and food industries, trade, transport and communications, construction, machine building. It is also used in education, medicine, banking, consulting and social sphere.

Enterprises (companies), which have implemented the lean production system, are called Lean-enterprises [1, 8, 9, 10]. The world top Lean-enterprises include the following: Alcoa Inc. – American iron and steel company of international standard; The Boeing Company – the largest American manufacturer of aircraft, space technologies and military equipment; Ford (Ford Motor Company) – international manufacturer of cars; Austrian Corporation PALFINGER – the largest manufacturer of cranes; Saint-Gobain Company – global leader in creating comfortable space for human living, working and recreation; Toyota Motor – the largest Japanese manufacturer of cars; Volkswagen Konzern – the largest German car-manufacturing corporation and many others.

It should be also noted that the principles of lean production, proved to be successful in Japan [3, 4, 5], are beginning to be implemented by the Russian companies. These are mostly large industrial enterprises – Kama Heavy-Duty Truck Production Plant («KamAZ»), the Russian car-manufacturing company – «GAZ Group» – Public Company «GAZ», the Russian metals company (producing titanium and titanium products) – Public Company «Corporation VSMPO-AVISMA», the Russian aluminum company (the world’s largest manufacturer of primary aluminum and aluminium earth)
«RUSAL» (United Company RUSAL, UC Rusal), «EvrazHolding» (mining company with assets in the Russian Federation, the USA, Canada, the Czech Republic, Italy, Kazakhstan), «EvroKhim» (EuroChem Group AG) etc.

It should be mentioned that all these companies by the moment of implementing lean production had already experienced difficulties – low or no profitability, increase of defect ratio, customer disturbance, low liquidity and insolvency.

Among the first Russian companies, which needed the consultants of lean production, were the Russian Railways, «Russian Post» and Sberbank [7, 11]. They have been implementing the lean production since 2008. Since then, the demand for such consultants (specialists, which implement lean production) has been constantly increasing and the employers show strong interest in them, as it allows avoiding stock and buffer surpluses in production, equipment downtime, and excess motion of employees in shop floors.

According to independent experts, after implementing the lean production concepts the Public Company «Sberbank» had a fourfold increase of retail sales in two years, the queues in its offices were reduced by nearly 40%, the personnel flows around the offices were reduced by 383 km. In the Russian Railways the savings from implementing lean approaches amounted to 560 mln rubles in 2013 and 1 bln rubles in 2014, and in 2017 – 1.14 bln rubles.

The MIC of Russia (the «Kalashnikov» Corporation) has implemented the lean production system through teaching the employees new approaches, methods and tools of working. For this purpose in the corporation an up-to-date laboratory Lean-processes was opened, including a number of module areas for personnel training. Such areas precisely simulate the production processes, and the theoretical classes allow using production analysis visual management system and training about 3 thousands of employees of the enterprise. Later such approach allowed doubling the parts processing speed and increasing labor productivity by 2.5 times. It also reduced the risks of defect and faulty products.

2. Main part

In order to improve the efficiency of production and non-production sectors of the Russian Federation, on direction of the Ministry of Industry and Trade of Russia of 20.06.2017 № 1907 the Order «On approval of the Recommendations on using lean production principles in various sectors of industry» was issued. The developed Recommendations take into account the national peculiarities and standards of Russian companies and are based on organizational and technological principles of production processes. They can be used in any organizations of various branches of industry, which have taken a decision to improve the efficiency of their activity by implementing the LPMS (lean production management system) [2].

Nowadays one of the most active users of lean production is the Russian state holding company, which unites over 360 enterprises of nuclear power sector, – the state corporation in nuclear power industry «Rosatom». It was the Rosatom that implemented LPMS in the Belgorod region, including in the state autonomous institution of the Belgorod region «Multifunctional Center for Provision of State and Municipal Services» (SAI BR MFC).

SAI BR MFC is a nonprofit organization, established for providing state and municipal services, including those in electronic format, on the basis of «one-contact» principle. The visualization is presented in Fig.1.
The center performs methodological and multifunctional support of other MFCs, located at the territory of the Belgorod region; organizes the training and professional development of employees; participates in preparing the list of state and municipal services, provided by the MFC; carries out quality monitoring of provided services; provides additional services to the population (of legal and consulting nature); comprehensive services in real property registration; real property leasing; photographing; copying-and-duplicating services; laminating; courier service; processing of personal data, connected with providing state services; providing free access of applicants to the federal state information system «Gosuslugi»; accepting state fees and other payments for state and municipal services; other types of activity according to the legislation.

The lean production system (LPMS) implementation process in the MFC is performed in three stages.

The first stage is beginning the designing of LPMS with account of the national standards and sectoral and regional peculiarities. At this stage the purposes (financial objectives) are formed, the desired values of performance are set, an order on organizing the implementation of LPMS is issued, the situation centre is formed – a team or committee for implementing the system within the framework of organization, a person in charge of designing and implementing the LPMS is appointed, monitoring activities are developed – analysis, auditing, assessment, control, adjustment, data collection, report preparation.

Here various methods and approaches for implementing LPMS at all stages of the production process or MFC service’s life cycle are used.

Recommendations, developed by the Ministry of Industry and Trade of Russia, suggest the following methods: assessment of the system’s implementation efficiency, cost estimation, value stream mapping procedure (VSM), internal auditing, workspace navigation (5S), visualization,
standardization of work, methodology of error prevention system application [2].

Unfortunately, the Recommendations don’t reveal algorithms of the above-mentioned methods, but only name them. In this regard, each organization should develop its own process of implementing LPMS on the basis of the national standards: GOST R 56020-2014, GOST R 56404-2015, GOST R 56245-2014, GOST R 56407-2015, GOST R 56406-2015, GOST R 56405-2015, GOST R 56906-2016, GOST R 56907-2016, GOST R 56908-2016, GOST R ISO 19011-2012, GOST R ISO 9000-2015, GOST R ISO 9001-2015 [2].

For the optimal utilization of organization’s internal resources it’s necessary to provide the consulting and training of personnel.

So, let us consider the example of implementing LPMS in the activity of SAI BR MFC. Name of project: «Optimizing the process of providing the service «Registration of Russian citizens at place of residence or at place of stay at the territory of the Russian Federation».

Project originator: SAI BR MFC represented by its chief executive. Project manager – specialist in accepting and handing out documents of SAI BR MFC. Project team – specialists of SAI BR MFC, external consultants, specialists. Substantiation of project selection: this service is compulsory, highly-demanded (the number of accepted applications, according to SAI BR MFC, is 24 a day and 574 a month) and socially important. Acceleration of this process would allow reducing the servicing time and increasing the level of customers’ satisfaction and loyalty.

The project scope is from calling the applicant by the slip number till the moment of accepting the application for registration. The current and «desired» (target) performance of the process is presented in Tab.1

**Table 1. Target values of the process «Registration of Russian citizens at place of residence or at place of stay at the territory of the Russian Federation».

| Name of target, meas.unit | Current value | Target value |
|--------------------------|---------------|--------------|
| Reducing the servicing time, min | from 22 min 00 sec to 1 h 07 min 00 sec | from 07 min 47 sec to 23 min 35 sec |
| Time of document processing by an employee, min | not specified | from 05 min 00 sec to 10 min 00 sec |

The planned effect from the project implementation is improving the level of customers’ satisfaction and loyalty.

The second stage is implementing the LPMS mechanism. At this stage the process of implementing the «pilot» variants is carried out and generic solutions are tested, which have already been used and implemented in activities of Lean-enterprises. The purpose of this stage is obtaining generic solutions for further use.

The execution period of implementing lean production management system (LPMS) in the activity of SAI BR MFC:
1. Start – since 20.01.19 to 15.03.19;
2. Current situation analysis, problems recognition, developing the target process map, control – 18.01.19 – 29.03.19;
3. Implementation of improvements – 01.04.19 – 30.08.19;
4. Project closure, report on results – 02.09.19 – 16.09.19.

The expected (planned) effects from implementing LPMS in SAI BR MFC are the following: reducing the service’s completion time; improving labor efficiency; improving the quality of customer satisfaction; increasing the number of applications, processed by windows of MFC; deepening the assimilation of LPMS methods and tools; increasing the market fluctuation tolerance of MFC.

In Fig. 2 the whole process of current state flow mapping of service provision process in the MFC is presented.
As we already mentioned in the previous works, devoted to lean production, one of the most important methods of Lean-management is the Value Stream Mapping, or the current state flow mapping. Here from left to right the whole path of the process «Registration of Russian citizens at place of residence or at place of stay at the territory of the Russian Federation» is mapped.

The arrows denote information flows, which take place along with the process. Both the formal and the informal data exchange are taken into account. The information flows are mapped in free format, just as they actually take place.

Above the lead time is presented – which is the current time of customer service. Below the duration of the whole current process is distributed.

Value stream mapping allows determining the steps, which don’t add any value and are to be removed, or the weak points, where the process can be improved or accelerated, or where costs can be cut or safer working conditions can be provided.

It should be noted that the steps to be removed or the points to be improved are called problems and are denoted on the diagram with «hedgehogs».

So, the «hedgehogs» are the problems, discovered in the process of LPMS implementation. Thus, for example, the problem of errors in documents preparation or return of documents can be solved by upgrading the usage of automation in this service. Such upgrading can include services in automated filling, formation and printing of «coming and going» sheets, automated formation and printing of the statistic slip, automated formation of a signed acknowledgement for an applicant and a list of documents for delivery to the office. The problem of repeated checking of the procedure can be solved by designing a uniform procedure of applicants support at accepting an application for providing a state service «Registration of Russian citizens at place of residence or at place of stay at the territory of the Russian Federation». All solutions of the problems should be provided with their completion periods. According to the data of SAI BR MFC the solving of each problem requires up to one month at average. Some problems require a more comprehensive approach and a longer period of solution from 1.5 to 2 months.

Fig. 3 demonstrates the map of the «desired» (target) state of the organization with account of the discovered problems.
3. Conclusion

Implementation of lean production management system (LPMS) allows cutting losses, reducing manufacturing cycles, increasing the labor productivity, the efficiency of operating activities and the market fluctuation tolerance. But, as the research has shown, such transition requires fundamental changes of not only organization structure of a company, but its organizational culture and way of thinking. At the implementation of LPMS it is also necessary to take into account the already established Russian and foreign practice, the peculiarities and level of competition in the sector, government orders, the integratedness of the industry, life-cycle phases of the product, the structural and technological properties of the manufactured product, the availability of suppliers, the type of production system, the scale of production and so on. We are sure that soon the knowledge and skills of lean production will become the necessary conditions or even requirements for employment.
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