

POSSIBILITIES OF LEAN MANAGEMENT IN THE HEALTHCARE SECTOR OF THE EU – CROATIA IN THE SPOTLIGHT

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Abstract

The history of lean management was conceived in the United States in 1913 by the Ford organization. Over the years, lean management has begun to overflow and be applied worldwide, including in the European Union member states. Lean management is based on five main principles: defining value, adding value, equality, the permanence of production, interruption of the production process and withdrawal, and a constant desire for perfection. The application of lean management in health care is a challenge both for the management of the owners of healthcare institutions and for the functioning of the healthcare system itself. Healthcare organizations face many challenges in monitoring competitors and the costs of providing health care and services. The goal of

both owners and managers is to provide high-quality health services at an affordable price. When lean was adopted in healthcare, several components that included developing a culture of continuous improvement, empowering staff, and reducing waste and unnecessary work were highlighted. There was a focus on improving the value of services provided to patients. Lean management in health organizations can be achieved by considering all the forces and holistic thinking and planning and programming strategies for its implementation that will overcome potential obstacles. The results are numerous and positive and include improving quality, capacity, and safety and ultimately reducing costs. The question that this paper seeks to answer is whether lean management has really taken root in the health care system of the European Union, and especially in the health care system of Croatia.

Keywords: lean management, healthcare sector, costs, patients

JEL Classification: I19, M19

1. INTRODUCTION

Lean management is a business process aimed at creating as much value as possible with superior business processes. Today, it is the most widespread managerial concept applicable in almost all industries. Lean management presents the creation of value that will have almost no amount of waste and shortcomings. The unique feature of lean management is that all tools apply to the entire company or institution, industries, and departments. The concept eliminates all costs that burden the business and do not bring added value or increase the value delivered to the consumer. Lean management is a philosophy of business process management recognizable by its focus on reducing eight types of losses, and its task is to increase value. The characteristic of this management method is contrary to the principle of mass production, which denotes large systems with extensive stocks, large production batches, and interruptions and waiting in the production process. Therefore, Lean management is a set of tools that help identify and continuously eliminate losses, improve product quality, reduce production time, and reduce costs. Types of losses:

1. Overproduction - creating products waiting to enter the market, excessive documentation and copies
2. Waiting - time that material spends waiting for the next operation, waiting for data, waiting for workers, delays

3. Transport - poor mapping, movement of materials within the production and design of the plant, too long paths between operations
4. Excessive processing - poor communication leads to repetition of operations, human mistake
5. Inventories - excessive production creates unnecessary stocks, scrap stocks, excess transport
6. Unnecessary movements - unnecessary movements occur due to a poorly set up work station, poor production plan, or overall poor standard
7. Defective products/scrap – scrap arises due to poor quality control, poor machine maintenance, lack of documentation, low operating standards
8. Employee skills - non-involvement of employees in improving the quality of work, lack of adequate training, unclear individual roles in the company.

Term lean was explained for the first time in the book 'The machine that changed the world' (Womack & Jones, 2012), from the late 1980s, which published the results of International Motor Vehicle Program research, respectively the differences between the Japanese and "western" automotive industries are described, with the term "lean" being used for the organization of production in Japanese car factory Toyota (Womack et al., 2007). Today, lean management is considered the most powerful tool for achieving business excellence. The most widespread managerial concept is applicable in almost every industry. It aims to improve the company's performance, more precisely, the quality and profitability of its production. It is a business system for organizing and managing production, product development, relationships with suppliers and customers, quality control, etc. It is applied in business organizations and non-profit organizations, health care institutions, and all organizations seeking to achieve higher quality products and/or services.

Lean is a production philosophy that, when implemented, shortens the time from customer order to delivery of the finished product, eliminating all sources of waste (losses) in the production process. The basic principle of lean production is to produce precisely what the customer or client wants, i.e., the type, quality, and quantity of products directly dictated by market demand.

The lean management philosophy could be expressed as a desire to creatively integrate existing concepts and innovations to achieve continuous improvement in all segments of the business organization. The lean business organization uses a strategy based on the consumer and creating value for the consumer. It

puts consumers in the focus of its business. It adapts production and all other processes in a way that continuously creates and adds value to products and services that consumers then perceive as desirable. A lean organization is also characterized by a flexible structure, encouraging individual initiative in improving the efficiency and effectiveness of business, effective identification and problem solving, creativity and innovation. The teamwork of all employees, from management to machine workers, forms the basis for shaping such organizations.

The goal of lean manufacturing or service delivery is to eliminate all unnecessary resources and costs at the business level, from manufacturing to administration. It seeks to eliminate bottlenecks and losses in production processes and achieve production and business processes that require less manual human labor, less production and business space, less investment in research and development, thus less capital and less time to make a product or perform the service.

Although health systems differ significantly from the manufacturing industry, there are many similarities in business processes - in both systems, whether it is car manufacturing or providing healthcare to patients. Both employees face complex and complicated processes that provide added value and meet customer or patient needs. The introduction of lean methodology in the health system represents the potential for positive effects on productivity, costs, and quality in the waiting lists for public health services (Kadarova & Demecko, 2016). The application of lean in the healthcare system enables the elimination or reorganization of all activities that do not achieve added value to shorten the time of providing services to the end-user and create a highly arranged and organized business system that is efficient and cost-effective. This enables faster enrollment and admission of patients in various departments of the health care system, quick examination by health care professionals, timely and accurate publication of medical examinations, reduction of other forms of waiting for patients in the health care system, etc. (Mateljak & Kekez-Poljak, 2015).

The question that this paper seeks to answer is whether lean management has really taken root in the health care system of the European Union, and especially in the health care system of Croatia. Have the measures taken achieved the expected results, or is it just an effort to improve the system, which we can rightly call one of the largest public systems in the country. Are there reductions in waiting lists, costs, debts, or inventories?

2. POSITIVE ASPECTS OF LEAN MANAGEMENT IN HEALTHCARE IN GENERAL

Lean management has five main principles on which it is based, and these rules have made it easier to understand the content of lean management (Oberman Peterka & Perić, 2016). The basic principles of lean management (James & Daniel, 2012):

1. Defining values
2. Adding value
3. Equality and permanence of production
4. Interruption of the production process and withdrawal
5. The desire for perfection.

Although lean methodologies originate in the automotive industry, lean applied in healthcare can improve the patient experience while eliminating waste and reducing financial costs. Industrial production and health services are based on critical success factors, of which customer and patient focus are significant. Quality implementation of lean in health systems achieves efficient functioning of the health system that causes a balance between the needs and expectations of end-users, namely (WHO, 2010):

- improving the health status of individuals, families, and society,
- protection of the population from all health threats,
- protection of users from the financial consequences caused by sickness benefits,
- fair access of users to all health centers.

Lean thinking aims primarily to create value for the end-user. In the case of the health system, the end-user is the patient. Organizations in health systems that have applied the lean methodology focus on patients, process improvements, and innovation.

For the health care system to provide quality services to the user, it is necessary to constantly strive for the maintenance and improvement of essential business processes and the effective implementation of the lean concept.

It can be established that the application of the lean methodology in the health care system remarkably allows to improve the efficiency and shorten the service life cycle of the end-user.

By implementing the lean methodology in the health system, the quality of service and productivity of physicians increases while the costs of the health system decrease. Lean is valuable for healthcare facilities because patient care processes have improved and reduced unnecessary losses. The lean methodology also achieves better patient flow between different departments of the health institution (Karuppan et al., 2016). Therefore, it can be concluded that by achieving a balance between the needs and expectations of end-users, a well-organized health system, meeting all user requirements, as defined by the World Health Organization, will achieve efficient use of all necessary resources - financial, material, information and human, that causes (WHO, 2010):

- the speed of providing health services to patients
- providing a broad and integrated package of medical services to clinical and public health institutions responsible for addressing the health problems of the population
- high standards, norms, and guidelines ensure patients' access to the health care system and achieve fundamental quality dimensions, such as safety, efficiency, integration, continuity, and focus on the patient.

Thus, it can be said that the basic positive principles of the lean methodology are reducing costs, reducing inventories, increasing efficiency, adding added value to products and services, and streamlining business processes. The question is to what extent the lean methodology is represented in health care, considering that these are giant systems with high requirements, public use, a large number of users, and a massive number of employees.

The proven benefits of using the lean methodology (according to the different types of lean methodologies used) in healthcare systems are reflected in the benefits to patients and healthcare facilities. The benefits to the patient are as follows (Kadarova & Demecko, 2016):

- speed of service provided, reduction of waiting
- reduction in time to the level of the abolition of waiting, improvement of diagnosis and treatment
- reducing treatment error, improving patient orientation, improving the quality of health care
- speeding up treatment.

The benefits of a health facility, on the other hand, are (Kadarova & Demecko, 2016):

- increasing productivity, reducing costs, and freeing up jobs
- increasing patient satisfaction
- reducing treatment errors, improving productivity and control
- rational use of equipment.

All of the above categories can be calculated and displayed. The reduction is most often presented as a reduction in waiting time or waiting days, to the classic display of cost reduction and inventory reduction. These units of measurement provide a solid basis for the effectiveness of applied lean management in health care.

3. APPLICATIONS OF LEAN MANAGEMENT IN HEALTHCARE ON THE EXAMPLE OF PRACTICE OF EUROPEAN COUNTRIES AND THIRD COUNTRIES

In a highly competitive world, all industrial and service sectors work tirelessly to save costs and improve market position. Healthcare organizations face even more challenges in monitoring competition and the cost of providing medical services. Providing high-quality medical service at an affordable price is the goal of owners and managers (Abdallah, 2014). Many organizations have used quality initiatives to achieve this challenging goal, but this journey has not always been successful (Shortell et al., 2019).

While the manufacturing sector has enjoyed the benefits of lean management implementation for decades, practical implementation in a healthcare organization is not easy, but it is achievable. Considering internal and external forces and how holistic thinking is vital, and intelligent implementation strategy must be devised to overcome obstacles to implementation. Research shows the importance of leadership and support of senior management, but also the importance of the role of physicians in the implementation of lean. Doctors can be a big hurdle if they are not appropriately involved. Research shows that the success of implementation in healthcare can be achieved similarly to that in the manufacturing industry. However, the service nature of healthcare organizations needs to be taken into account. Once a good understanding of the internal environment is created, an appropriate holistic approach can be applied. Con-

tinuous monitoring is the last condition for the success of the implementation (Abdallah, 2020).

Lean management promises improved quality, capacity, and safety while keeping costs down. When Lean was adopted in healthcare, several components were highlighted. Common focuses include developing a culture of continuous improvement, employee empowerment, and waste reduction, focusing on improving the value of services received by patients. Concentrating on these values is expected to reduce costs, increase security, and improve the quality of care (Rotter et al., 2017).

Lean philosophy is a set of fundamental ideas that include two components: a commitment to lean principles and a commitment to continuous improvement. Lean principles refer to a comprehensive set of principles to transform workplace culture. This includes eliminating waste, improving patient flow, service providers, and supplies, and ensuring that all processes add value to customers. Furthermore, Lean Principles suggest that problems are identified and addressed by first-line staff members, as it is believed that the people who do the work are best suited to create solutions. Commitment to continuous improvement refers to recognizing that lean does not appear as a single intervention but instead requires a commitment to continuous improvement of the workplace (Rotter et al., 2017).

Lean management affects health professionals' morale, motivation, and job satisfaction. In recent studies, lean management has improved morale and job satisfaction among primary care physicians and medical assistants at a non-profit clinic in the United States. After conducting lean management, the data collected by the survey in the clinic suggest higher levels of job satisfaction and personal motivation at work among employee after lean management intervention. The intervention included the redesign of the physical workplace and workflow improvement inspired by lean management associated with increased employee engagement and participation in decision-making (Mahmoud & Churruca, 2021).

Similar results were recorded in an American teaching hospital. They were considered the result of lean management's philosophical foundations that promote giving employees ownership of their work and valuing their perspectives (Collar et al., 2012). Employee participation, supportive leadership, and regular staff meetings were linked to improvements in job content (i.e., level of impact

on work, the opportunity for development, job meaning, commitment, and recognition) in a second study conducted in two Swedish cardiology departments (Ul Hassan et al., 2014). A bottom-up approach to lean management and collaborative tools such as value flow mapping has promoted employee participation and was considered the catalyst for improved well-being when supported by other resources and used by all professional groups (Lindskog et al., 2016). Nurses at a private medical center also indicated increased job satisfaction after applying lean management principles in their telemetry unit (Nelson Peterson & Leppa, 2007). Among the reported benefits of this intervention was an 85% reduction in the distance staff members walked during their shifts (Mahmoud & Churruca, 2021). Lean-inspired reform has also helped reduce overtime, provided nurses with routine rest, and created conditions that allow them to pursue their professional values (Mahmoud & Churruca, 2021). A study conducted in two Swedish hospitals and one health practice showed that standardization of work and lean management are positively associated with improved job satisfaction among staff (Lindskog et al., 2016). Similar findings were reported in a Senegalese hospital that used lean management methods to clean and improve hygiene and overall workplace cleanliness (Kanamori et al., 2015). In a New Zealand study, morale improvement was also experienced by staff working in three emergency departments who adopted lean management, standardization, and value flow mapping (Mahmoud & Churruca, 2021).

Lean management is increasingly used in hospitals. However, the impact of lean management on staff has not been systematically synthesized (Mahmoud & Churruca, 2021). On the one hand, lean management is considered a comprehensive organizational philosophy aimed at systematic waste management (Abdallah & Alkhaldi, 2019).

On the other hand, lean management is considered a tool for organizations that often implement one or two waste management practices in one processor on a small scale (e.g., one department or a specific unit). Although the division of lean management implementation could effectively achieve desired performance and efficiency goals, there is little evidence of the long-term sustainability of such gains. In particular, these approaches often neglect key elements of lean management implementation, such as employee engagement and participation (Mahmoud & Churruca, 2021).

Data collected in the academic operating room showed that the implementation of lean management did not impact intraoperative teaching activities (Collar, 2012). The authors of this study argued that lean management could provide additional opportunities for high-value training by increasing operating room capacity and reducing low-value, time-consuming activities such as unnecessary or redundant administrative work. However, the authors did not provide any data supporting this hypothesis (Mahmoud & Churruca, 2021). Overall, studies holistically investigating cases of lean implementation in healthcare, taking into account its socio-technical and human dimensions, remain rare (Mahmoud & Churruca, 2021).

Healthcare professionals have used various lean tools in the last two decades (D'Andreamatteo, 2015). Many organizations have succeeded in reducing costs, minimizing errors, and improving profitability, but success is not always the result of lean implementation (Grabau, 2012). Lean implementation in healthcare has experienced different results. Barnabè and co-workers said the actual effect of lean management is still a mystery, as some see success in it and some do not (Barnabe et al., 2022).

4. CASE STUDY OF LEAN MANAGEMENT IMPLEMENTATION IN THE HEALTHCARE SYSTEM OF THE REPUBLIC OF CROATIA

The health care system in each country has specific characteristics based on which the primary and secondary processes are performed. Each of them aims to provide service to the end-user as soon as possible and to make him fully satisfied with the service.

Lean methodology in the health system of the Republic of Croatia is still in its infancy, and Croatia is investing more and more in the digitalization of health care. However, much remains to be done to develop the health care system to the extent that it has intelligent hospitals. The main issue today is that lean management in the health system of the Republic of Croatia is precisely what has improved in health care through the implementation of lean management.

The health care system of every country, including Croatia, is required to (Stoiljković, 2013):

- improve patient care,

- ✦ reduce mortality,
- ✦ reduce waiting lists,
- ✦ reduce drug consumption and length of stay of patients in hospitals,
- ✦ cost control,
- ✦ compliance with state regulations,
- ✦ increase competition,
- ✦ implement new procedures and capabilities,
- ✦ solve the problem of an increasing number of uninsured,
- ✦ deal with an increase in the number of people aged 65 and over,
- ✦ stop the continuation of the growth of health care costs and start to reduce those costs,
- ✦ procurement of new technologies and equipment that are expensive,
- ✦ address the shortage of medical staff.

The current health care system cannot solve the current demands and accumulated problems. Therefore, a change is needed that will reduce costs, shorten the duration of the process, and reduce or eliminate errors in the processes of providing health care. These changes are the implementation of lean management in the health system.

The implementation of lean management in the health system of the Republic of Croatia has led to the creation of various digital channels and e-services to facilitate access to health care. The first of these channels is the e-health platform. E-health is the result of investing in the digitalization of the health system. With the help of e-health, patients can get an insight into the order list, request a free appointment, or send a request to cancel orders. This has relieved the burden on hospital counters where people order because now all this can be done from their own home using a computer.

But regardless of the fact how much e-health has relieved hospital counters and contributed to shortening waiting times, the question is, what about the elderly who need health system services? The process of ordering via e-health is quite complicated for them, and they have to seek the help of others to order a medical examination. E-health has reduced overproduction (less documentation is needed), reduced patient movement in hospitals, relieved hospital counters, no recurrence of using e-health, reduced waiting for medical examinations, and medical staff can be more focused on providing health services.

The ordering process has the following steps (HZZO, 2022):

- + registration on the website of the Croatian Health Insurance Institute
- + select the institution where the medical examination is to be performed
- + offer the desired examination date
- + creating an order

With the help of e-health, patients can also get insight into the applications for compulsory health insurance, which is much more effective than going to the Croatian Health Insurance Institute institution and getting the desired information there.

Given the further development of digitalization, the Croatian Health Insurance Institute (HZZO) has developed a new e-service, "Open Orders," for citizens, through which orders can be checked on the lists of orders for individual health procedures. The new e-service enables the search for free appointments and canceling a previously scheduled medical procedure without calling the phone or going to a health institution, which is essential because it frees up space for other patients (HZZO, 2022).

Furthermore, the e-prescription service is an example of an additional investment in the digitalization of the Croatian healthcare system. So far, Croatia, along with the Scandinavian countries in Europe, has most successfully applied the e-recipe and thus achieved a reasonable basis for developing other digitization projects in health care. The e-prescription is information about the medicine prescribed for the patient and is saved on the patient's online account. The electronic record is transferred from the doctor to the pharmacist and then to the institution that reimburses the medicine, i.e., the National Health Fund (NFZ). With the further development of the e-prescription project, the digitalization of Croatian healthcare is now focused on changes in the payment method in healthcare.

The implementation of the Lean methodology aims to achieve and achieve the process of monitoring the health of the patient remotely (especially patients suffering from cardiovascular diseases). Easy-to-use and straightforward active heart monitoring systems have already been designed and tested globally. However, Croatia still has a lot to invest in the digitalization of its health system to achieve this (Stojiljković, 2013).

In operating health care institutions, some activities add value to the service and activities that do not add value when providing services to the patient. At the beginning of the process of implementing the Lean methodology in the

health institution, it is necessary to identify and eliminate or reorganize the implementation of activities that do not create added value and reorganize the implementation of activities that do not create added value but are necessary for basic organizational tasks that do not create added value and do not affect the execution of such tasks of the organization at all (losses). As already pointed out, a loss is considered any activity in a process that does not add value but prolongs it and makes it more costly. As in other service industries, there are everyday activities in the health care system. The most important is surgery, as the task or work activity is the only one that adds value to the process. Some activities gain value in the process, and these are control - quality control of inputs, processes, and outputs, storage - stocks of resources or semi-finished products waiting for the next operation or stock of output, downtime or waiting in the sequence of operations, i.e., tasks, transport - the movement of inputs, people or information from one operation to another (Mateljak & Kekez-Poljak, 2015).

Considering that the implementation of Lean management in the health care system has just started in Croatia, Croatia still has much room for improvement. Looking at the five principles of lean management, it is clear that, for the time being, the principle of recognizing the flow of value is represented in the health system of the Republic of Croatia because the health system has recognized its losses in the business process. Implementing Lean management wants to eliminate them, which is especially true of the transparency of waiting lists for health services. The pull principle also characterizes the pull system because the patient comes to seek medical services, and medical services are not pushed toward the patient. I believe that the health system of the Republic of Croatia should still work on a uniform and continuous flow of production and the pursuit of perfection.

Unnecessary movement of medical staff, long waiting lists, long waiting of the patient for a medical examination, excessive documentation, malfunction of medical equipment, and lack of communication are just some of the problems that occur in the health system of Croatia and which can be solved by lean management implementation. The goal that should be achieved by implementing Lean and solving these problems is to reduce costs in the healthcare system. The advantages of the Lean methodology are that its implementation detects all losses that negatively affect the operation of the health system, and they are eliminated. Lean management in the health system of the Republic of Croatia requires further digitalization of the system, which will affect the

processes in the health system, i.e., their improvement. Better digitalization of hospitals would reduce queues, eliminate unnecessary writing of the same notes on the patient in many places, would be better coordination and scheduling of medical staff, which would reduce waiting lists but also unnecessary costs because the doctor would be able to handle a higher number of patients per day, etc. Lean management also requires preventive maintenance of medical equipment, which reduces the number of failures of medical equipment. The quality of health care providers would increase, and thus patients would be more satisfied and, consequently, less frustrated. A lean environment would bring better service delivery, more satisfied patients, better patient flow through the system, a well-designed pull system, reduce service deficiencies, and make medical staff work more synchronously. Such a Lean environment would reduce losses and unnecessary accumulation of stocks that occur in the health system of the Republic of Croatia.

5. CONCLUSION

Healthcare systems are generally complex systems where the same business processes often occur in different ways. These are systems characterized by a large number of employees, complex procedures, a large influx of consumers of health services, the complexity of services, and often high costs of service delivery and system maintenance. In other words, national health systems can be characterized as sluggish systems in which the introduction of change is a process that takes longer than, for example, manufacturing industries. The application of lean management in health systems is an urgent need to reduce the financial burden on the system, reduce the periods for providing the service and lead to increased satisfaction of the end consumer, the patient. Several operational steps need to be met to implement lean management in healthcare effectively. The first of them is the involvement of all stakeholders in the health system or health institution. The second step is the full involvement of management. The third step is to avoid too much testing or piloting the application of lean management in specific structures of the institution. The last operational step for the successful introduction of lean management is the standardization of business processes. In recent years, the Croatian health care system has been moving towards increasing the quality of business processes, which also means raising process standardization.

The application of the principles of lean management in the Croatian health care system has not left too many results so far. The digitalization of the ordering system has led to transparency and better information, but has it resulted in a reduction in waiting lists? This is a question that cannot be answered one-sidedly. The application of lean management in the Croatian health care system is of great need. Mainly to reduce costs, reduce waiting times, reduce service times, reduce inventory, and increase the utilization of available resources. From the position of management in general, health systems are the systems that pose the most significant challenge for management and leadership in an efficient manner. Therefore, in conclusion, lean management as a form of management in health care is the best form for effective rationalization and increase the system's effectiveness.

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