



(RESEARCH ARTICLE)



The use of Lean management to optimize business processes in the enterprise

Vetoshko Evgenii *

CEO of "Mir Extreme" LLC, Commercial Director of "Automarket Plus" LLC, Sole Proprietorship, Bryansk, Russia.

International Journal of Science and Research Archive, 2024, 13(02), 180–185

Publication history: Received on 23 September 2024; revised on 30 October 2024; accepted on 02 November 2024

Article DOI: <https://doi.org/10.30574/ijrsra.2024.13.2.2106>

Abstract

The article examines the problems of using Lean management, which is significant in fierce competition, economic challenges, and shocks. Industrial enterprises are forced to look for effective methods of optimizing production. Traditional approaches that rely on reducing staff or increasing the load on equipment demonstrate their inconsistency in the long term. Within the framework of the conceptual provisions of lean management, a fundamentally different view is proposed on improving the efficiency of business processes through systematic detection and elimination of losses. There are contradictions among scientists between the theoretical models of integration of the considered tools and the practical results of their application. There are serious disagreements about the universality of the methods and the possibility of their adaptation to specific business conditions. Based on this, the purpose of the study is to systematize the existing ideas, taking into account the existing differences in views and judgments. As a result, it was found that the successful implementation of Lean management requires consistency: not only technical aspects are fundamental, but also the transformation of corporate culture. Based on the characteristics of advantages and limitations, the determining success factors are identified: management involvement, gradual change in production culture, and continuous staff training. The materials of the article are of practical value for company executives, production optimization specialists, and consultants.

Keywords: Lean management; Business processes; Operational efficiency; Production optimization; Value stream

1. Introduction

In the current economic landscape, enterprises face the need to maximize operational effectiveness with minimal resource expenditure. The concept of Lean management, which originated in Toyota's production system, embodies a revolutionary approach to addressing this challenge.

Given the intensifying competition and economic instability, traditional optimization tools based on staff reductions or increased equipment utilization often yield only short-term results, with negative consequences emerging in the long run. There is a clear contradiction between the need for sustainable improvement in business processes and the limitations of existing approaches to production optimization. This highlights the necessity of exploring the potential of Lean management as a systematic tool for enhancing managerial actions.

2. Methods and Materials

This article employs comparative analysis, characterization of specific cases (examples from foreign and Russian practices), as well as methods of systematization and generalization.

In contemporary scientific literature, the conceptual framework of Lean management is examined from various perspectives. D.D. Antonyuk [1] explores the historical prerequisites for the emergence of lean management, providing

* Corresponding author: Vetoshko Evgenii

a theoretical "foundation" for understanding the evolution of this field. F. Alp and B. Akalin [4] conducted an extensive bibliometric analysis of publications from 1996-2022, identifying key trends.

Significant attention is given to the practical aspects of integrating this approach. For instance, N.N. Pytyev and G.I. Yakovlev [3] characterize the role of Lean management in cost management, emphasizing resource conservation. Ch. Ma [7] investigates the nuances of applying lean management principles in the real estate sector, particularly through the lens of targeted expense regulation. T. Ye and D. Yu [10] trace the evolution of thought within this field regarding supply chain operations.

A.R. Akhmetshina and A.V. Abramova [2] propose a systematic approach to lean production process management, an aspect also reflected in the works of E. Ratter and S. Nader [8], who explore the synergy between Lean management and Total Quality Management. L.Ch. Wester and M. Hitka [9] focus on management tools specific to production sites.

Of particular interest is the work by O. Ayaad et al. [5], which describes the potential of lean management in healthcare to improve service quality and optimize time management. Ö. Demirtaş and B. Kaya [6] discuss the topic within the context of modern management approaches.

The literature reveals discrepancies between theoretical models of Lean management implementation and practical outcomes across various industries. There is ongoing debate regarding the effectiveness of integrating these tools with other conceptual developments. To be more studied aspects include the impact of national and corporate cultures on successful implementation, specifics of deployment in the context of digital transformation, long-term effects, nuances of application in small and medium enterprises, and the role of the human factor. These observations indicate the need for further research in these areas.

3. Results and Discussion

The philosophy of Lean management is based on identifying and eliminating production waste, defined as any activities that do not add value for the end consumer. Practice shows that, in an average production process, only 20% of operations truly transform the product into what the client is willing to pay for, while the remaining 80% represent various types of waste [3, 8]. These include primarily:

- Overproduction;
- Excessive inventory;
- Unnecessary transportation;
- Equipment downtime.

Lean management is founded on key principles articulated by Taiichi Ohno in the Toyota Production System. The first principle is defining value from the perspective of the end consumer, which the producer forms as a product or service that meets the client's needs at a specific cost and within a designated time frame.

The second principle involves identifying the value stream, which encompasses all activities necessary to transform raw materials into a finished product—from concept development to production launch, from order acceptance to delivery.

Finally, the third principle, ensuring flow continuity, is essential. Eliminating downtime, delays, and bottlenecks reduces the production cycle time and minimizes work-in-progress volume.

Within Lean management, which focuses on waste elimination, process efficiency enhancement, and creating maximum value for the client, numerous functions are highlighted (Fig. 1).

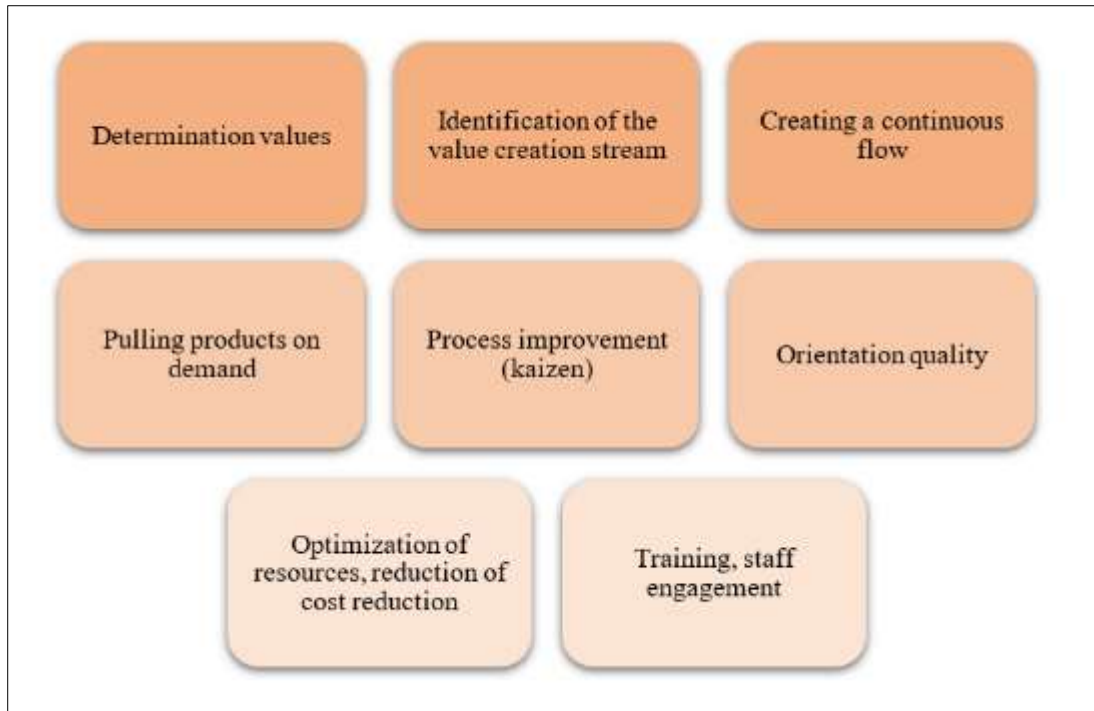


Figure 1 Functional characteristics of Lean management [1, 9]

The most essential function involves clearly defining what constitutes value for the client. Companies analyze consumer demands, focusing on aspects of the process or product that are genuinely important for meeting these needs. Emphasis is also placed on analyzing all stages of product creation or service delivery, from raw materials to final delivery to the client. The primary goal is to identify steps that do not add value (waste) and eliminate them. Creating a continuous flow is a function aimed at ensuring seamless process operation without downtimes, delays, or inventory build-up. This entails logistics optimization and cycle time reduction.

Within Lean management, a pull system is implemented, in which products are manufactured only in response to actual demand rather than forecasts. This helps avoid overproduction, quality decline, and financial losses. One of the key functions is continuous process improvement. All employees are engaged in seeking opportunities for enhancement, contributing to greater efficiency and flexibility within business structures. Quality control is conducted at each stage of the production process. Lean management relies on methods that prevent defects rather than correcting them later.

There is also a clear focus on minimizing resource use—both material and human—to achieve maximum productivity while reducing costs. Emphasis is placed on employee training, engagement, and fostering conditions for innovative thinking. Workers not only perform their duties but actively participate in process modernization. Thus, each function described is aimed at ensuring flexibility, eliminating waste, and enhancing company competitiveness, with a clear focus on satisfying customer needs.

Successful implementation of Lean technologies requires a step-by-step transformation of production culture. The first step involves value stream mapping. This tool visualizes the entire production process, including material and information flows. Based on the resulting map, problem areas and sources of waste are identified.

The next step involves organizing the workspace according to the following system:

- Sorting tools and materials,
- Maintaining order at workstations,
- Keeping spaces clean,
- Standardizing procedures,
- Improving established rules.

Regarding modern developmental features, the following changes are highlighted (Fig. 2):

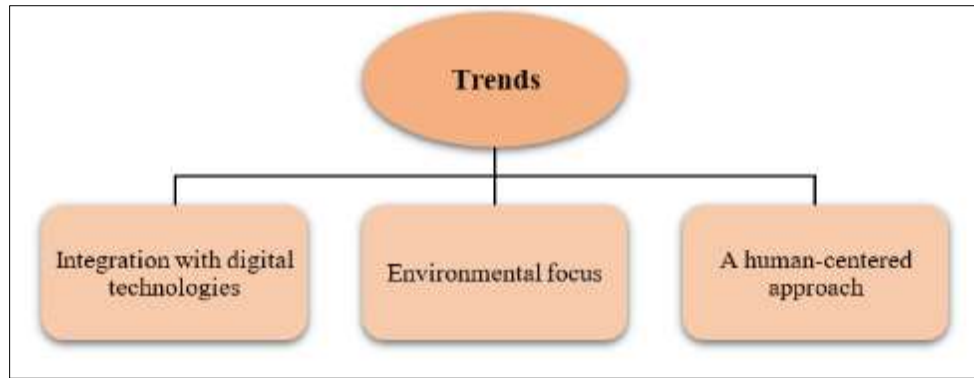


Figure 2 Key trends in the transformation of Lean management [2, 6, 10]

Thus, the integration of Lean production principles with digital technology capabilities is proposed:

- Using IoT sensors (referring to the Internet of Things) to monitor production processes;
- Applying predictive analytics to prevent equipment failures;
- Implementing digital Kanban boards.

Another perspective involves Lean & Green—a concept that combines Lean production principles with ecological sustainability:

- Waste minimization,
- Reduced energy consumption,
- Use of eco-friendly materials.

A significant trend also involves the development of concepts focusing more on the human factor, including:

- Workplace ergonomics,
- Development of personnel competencies,
- Establishment of continuous improvement systems.

It is appropriate to now examine specific examples. Toyota represents one of the earliest and most notable demonstrations of successful Lean management implementation. In the 1950s, the company developed a system that became foundational to the corresponding concept. As a result, Toyota significantly reduced costs, minimized inventory, and decreased defect rates, leading to improved quality and competitiveness.

In the early 2000s, General Electric began actively implementing Lean principles to enhance operational performance and reduce costs. A key strategy involved employing Six Sigma tools in combination with Lean, which enabled GE to optimize production and service processes, shorten order fulfillment times, and reduce error and defect rates. This positively impacted quality, and customer service, and reduced operational costs [7].

KamAZ, Russia's largest truck manufacturer, actively implements Lean management to enhance productivity and product quality. The plant introduced a "just-in-time" system, which helped optimize logistics, reduce equipment downtime, and lower storage costs for materials. Additionally, the enterprise employs kaizen tools for continuous process improvement, which led to increased productivity on assembly lines and reduced defect rates.

SIBUR implemented Lean management to optimize production processes. As part of the initiative, projects were carried out to shorten repair times, improve equipment utilization, and reduce waste. Through such integration (visualization, standardization of work operations, elimination of bottlenecks), SIBUR achieved higher operational efficiency and improved safety performance metrics [2].

Despite the benefits and positive effects described above, implementing Lean production is associated with several challenges. A primary obstacle is employee resistance to change. Workers fear that optimization may lead to layoffs, while middle management resists altering established management methods. Overcoming these obstacles requires extensive explanatory work and demonstration of initial successes on pilot sites.

Another significant barrier is a superficial approach to Lean tools integration. Some enterprises limit themselves to superficial changes, such as displaying information boards and introducing new reporting forms, without fundamentally changing production culture. This approach not only fails to deliver the expected results but also discredits the very concept of Lean production.

Based on the analysis, Table 1 presents the author's perspective on the systematization of the advantages and limitations of the approach under consideration.

Table 1 Highlighting the advantages and limitations of using Lean management to optimize business processes in an enterprise (compiled by the author)

Category	Advantages	Limitations
Efficiency	Reduction in production costs through waste elimination and resource optimization. Improved productivity due to standardization of operations and workflow enhancement.	Requires significant time for analysis and restructuring of all processes, which can slow initial implementation. Standardization is not always easily achievable, especially in companies with high levels of product customization.
Quality	Improvement in product quality through control at each stage of the process and reduction of defects. The application of "just-in-time" techniques reduces inventory storage costs.	Dependent on employee engagement and skill levels, complicating long-term quality maintenance. Issues with suppliers or supply chain disruptions often disrupt production schedules, leading to product shortages.
Flexibility	Faster adaptation to market changes due to flexibility in production processes. Rapid response to customer needs through reduced production cycle times.	Lean is oriented towards stable processes, so substantial restructuring may be required with abrupt market changes. Excessive bureaucracy from improper implementation can reduce business flexibility and responsiveness.
Employee Involvement	Active involvement of all employees in continuous improvement fosters motivation and labor efficiency. Training in Lean tools contributes to professional development and skill enhancement.	Lean success heavily relies on corporate culture and management support; without readiness for change, implementation fails. Risk of resistance to change from personnel, particularly in companies with a long history of traditional management methods.
Safety	Reduction of production risks due to process standardization and improved workplace organization.	Excessive standardization and a focus on efficiency may sometimes overlook the human factor, negatively affecting occupational safety.
Customer Orientation	Creation of customer value by focusing on key needs and reducing non-productive costs.	Lean sometimes focuses too narrowly on current customer demands, potentially missing long-term trends and needs, which can limit business development.

Lean management is characterized by numerous advantages, including significant productivity increases, cost reductions, and improved product quality. Its focus on waste elimination, combined with continuous process improvement, enables enterprises to respond flexibly to market transformations and disruptions, enhancing customer orientation. Employee involvement in the improvement process strengthens their motivation and encourages professional development, which positively impacts company efficiency.

Nevertheless, implementing Lean management requires considerable effort, especially during the preparation and adaptation phases. It is essential to consider notable limitations, primarily the need for thorough business process restructuring, dependence on personnel qualifications, corporate culture, and potential risks associated with limited flexibility in the face of rapid external changes.

4. Conclusions

The implementation of Lean management requires a deep understanding not only of its tools and methods but also of the lean production philosophy. This represents a complex but necessary step to enhance the competitiveness of

modern economic entities. The success of this process depends on a systematic approach, engagement across all employee levels, and consistency in achieving set goals. Under these conditions, lean production becomes a truly powerful tool for optimizing business operations and activities.

Current trends indicate the integration of Lean management principles with digital technologies. The use of the Industrial Internet of Things (IIoT) facilitates the automation of data collection on production processes. Machine learning aids in identifying non-obvious sources of waste. Augmented reality technologies simplify training personnel in new work standards.

Ultimately, the success of this integration depends on careful planning, management support, corporate culture, readiness for change, and constant adaptation to evolving business conditions.

References

- [1] Antonyuk D.D. The history of the emergence of lean management / D.D. Antonyuk // *Per aspera ad astra. Collection of scientific articles of international scientific hearings.* – Stavropol: 2024. – pp. 335-337.
- [2] Akhmetshina A.R. Scientific management system of lean production processes in the organization / A.R. Akhmetshina, A.V. Abramova // *Economic sciences.* – 2024. – No. 233. – Pp. 125-131.
- [3] Pytyev N.N. Lean production and resource conservation in the cost management system of enterprises / N.N. Pytyev, G.I. Yakovlev // *Economics and entrepreneurship.* – 2023. – No. 8 (157). – Pp. 1378-1382.
- [4] Alp F. Bibliometric analysis of graduate theses on Lean management (1996-2022) / F. Alp, B. Akalin // *Sağlık ve Sosyal Refah Araştırmaları Dergisi.* – 2023. – Vol. 5. – No. 1. – Pp. 114-125.
- [5] Ayaad O. Adopting Lean management in quality of services, cost containment, and time management / O. Ayaad, R. Al-Dewiri, L. Kasht, B. Qaddumi, M. Ayyad // *Asian Pacific Journal of Cancer Prevention.* – 2022. – Vol. 23. – No. 8. – Pp. 2835-2842.
- [6] Demirtaş Ö. Lean management approach from contemporary management approaches / Ö. Demirtaş, B. Kaya // *International Journal of Management Studies and Social Science Research.* – 2023. – Vol. 05. – No. 1. – Pp. 25-41.
- [7] Ma Ch. Analysis of Lean management of real estate projects oriented by target cost management / Ch. Ma // *Transactions on Economics, Business and Management Research.* – 2024. – Vol. 6. – Pp. 312-316.
- [8] Ratter E. The use of Lean management tools in production companies with implemented Total Quality Management (TQM) / E. Ratter, S. Nader // *European Research Studies Journal.* – 2022. – Vol. XXV. – No. 3. – Pp. 357-368.
- [9] Wester L.Ch. Shopfloor management – a tool of Lean management / L.Ch. Wester, M. Hitka // *Management Systems in Production Engineering.* – 2022. – Vol. 30. – No. 3. – Pp. 238-245.
- [10] Yu D., Ye T. Tracing the Lean thinking in supply chain management: a comprehensive main path analysis / T. Ye, D. Yu // *International Journal of Lean Six Sigma.* – 2023. – Vol. 14. – No. 2. – Pp. 483-513.