

Підприємництво, торгівля та біржова діяльність

UDC 339

Rudachenko Olha

*Dr.Sc.Ec, Associate Professor, Assistant Professor of the
Department of Entrepreneurship and Business Administration
O. M. Beketov National University of Urban Economy in Kharkiv*

Рудаченко Ольга Олександрівна

*доктор економічних наук, доцент,
доцент кафедри підприємництва та бізнес-адміністрування
Харківський національний університет
міського господарства імені О. М. Бекетова*

Konenko Vitalina

*PhD in Economics, Associate Professor, Assistant Professor of the
Department of Entrepreneurship and Business Administration
O. M. Beketov National University of Urban Economy in Kharkiv*

Коненко Віталіна Володимирівна

*кандидат економічних наук, доцент,
доцент кафедри підприємництва та бізнес-адміністрування
Харківський національний університет
міського господарства імені О. М. Бекетова*

Pyskun Lesia

*Post-Graduate Student of the
Department of Entrepreneurship and Business Administration
O.M. Beketov National University of Urban Economy in Kharkiv*

Пискун Леся Миколаївна

*аспірант кафедри підприємництва та бізнес-адміністрування
Харківського національного університету
міського господарства імені О. М. Бекетова*

**APPLICATION OF THE INNOVATIVE TECHNOLOGIES IN THE
ACTIVITIES OF ENTREPRENEURSHIP ENTITIES IN A
TRANSPARENT ECONOMY**

**ЗАСТОСУВАННЯ ІННОВАЦІЙНИХ ТЕХНОЛОГІЙ В ДІЯЛЬНОСТІ
СУБ'ЄКТІВ ПІДПРИЄМНИЦТВА В УМОВАХ ТРАНСПАРЕНТНОЇ
ЕКОНОМІКИ**

Summary. The article is devoted to a review of the theoretical and methodological foundations for the application of innovative technologies - "lean" in the activities of business entities. The principles of economic transparency are considered, which will ensure transparency, reduce corruption and de-shadowing of investment activities of business entities. The concept and principles of "Lean Production" are investigated, and a description of the key concepts and categories used in "Lean technologies" is given. The problems associated with large stocks and turnover of spare parts at an enterprise, which can be successfully solved using the lean logistics approach, are considered. The key features of lean activities, such as the centrality of employees in the production system, focus on loss avoidance, and continuous process improvement, are highlighted. It is noted that the effectiveness of lean workspace, integrated standardized work, Total Productive Maintenance (TPM) for maintenance management, and the SMED system for optimizing the process of switching between production stages.

The article considers the ideology of Kaizen as an improvement strategy aimed at customer satisfaction as the main criterion of efficiency. The main emphasis is placed on the influence of the human factor on achieving improvements in production. It is noted that the ideology of the Kaizen system involves consistent, small changes aimed at improving all aspects of business activity. Important advantages of this system are its versatility and ease of use.

The basic principles of implementing the Kaizen system are considered,

as well as the benefits of implementing this ideology, such as involving staff in the improvement process, reducing errors and waste, improving product quality and relationships between employees. Particular attention is paid to the use of Lean technologies in production, which can lead to significant improvements in productivity, reduced downtime, cycle time, inventory, defects, and accelerated time to market.

Key words: *entrepreneurship entities, lean technologies, transparency, deshadowing, investments, SMED system, Kaizen ideology.*

Анотація. *Стаття присвячена огляду теоретико-методичних основ щодо застосування інноваційних технологій – «lean» в діяльності суб'єктів підприємництва. Розглянуто принципи транспарентності економіки, які забезпечать прозорість, зменшення корумпованості та детінізацію інвестиційної діяльності суб'єктів підприємництва. Досліджено концепцію та принципи «Lean Production», наведено опис ключових понять та категорій, які використовуються у «Lean-технологіях». Розглянуто проблеми, пов'язані з великими запасами та обігом запчастин на підприємстві, які вдало вирішуються за допомогою підходу бережливої логістики. Висвітлено ключові риси "бережливої" діяльності, такі як центральне значення працівників у виробничій системі, орієнтація на уникнення втрат та постійне вдосконалення процесів. Зазначено, що ефективність "бережливості" робочого простору, комплексна стандартизована робота, Total Productive Maintenance (TPM) для управління обслуговуванням, та система SMED для оптимізації процесу перемикання між стадіями виробництва.*

Розглянуто ідеологію Кайдзен як стратегію вдосконалення, спрямовану на задоволення споживача як основний критерій ефективності. Основний акцент робиться на впливі людського фактора на досягнення покращень у виробництві. Відзначено, що ідеологія системи Кайдзен

передбачає послідовні, невеликі зміни, спрямовані на вдосконалення всіх аспектів підприємницької діяльності. Важливими перевагами цієї системи є універсальність та простота використання.

Розглянуто основні принципи впровадження системи Кайдзен, а також переваги впровадження цієї ідеології, такі як залучення персоналу до процесу поліпшення, зменшення помилок і відходів, поліпшення якості продукції та взаємовідносин між працівниками. Особливу увагу приділено використанню Lean-технологій у виробництві, які можуть призвести до значних покращень у продуктивності, зменшенні простоїв, тривалості циклу виготовлення, запасів, випадків шлюбу та прискоренні виходу нових виробів на ринок.

Ключові слова: *суб'єкти підприємництва, lean-технології, транспарентність, детінізація, інвестиції, система SMED, ідеологія Кайдзена.*

Problem statement. Today, one of the main issues in business is the efficiency of production processes in terms of the length of the production cycle and ensuring their transparency. There is a need to spend a lot of effort on coordinating all auxiliary and service industries to ensure uninterrupted supply of raw materials, electricity, and timely maintenance of equipment and transportation.

A situation with equipment failure at one of the technological stages leads to the possibility of stopping the entire production. Hence, the organization of an uninterrupted and efficient production cycle is of particular relevance and importance for optimizing costs and achieving the best end results. Ensuring transparency of this process is also important in this regard. The production efficiency of most business entities is directly related to the complexity and duration of the production cycle. The longer this cycle is and the greater the number of auxiliary and service industries involved, the less efficient production

is in general.

Thus, business entities need to introduce innovative technologies that will allow them to improve their performance. Yes, the implementation of lean technologies is a rather laborious and time-consuming process that involves staff training, launching the system, appointing those in charge, formalizing all processes and maximizing the plant's distribution.

The relevance of the study is also due to the importance of ensuring the development of business entities in the current conditions of a transparent economy, which will further ensure the process of de-shadowing their investment activities.

Analysis of the latest research and publications. Today, one of the main problems of business development is the lack of implementation of innovative technologies. A large number of scientific works of domestic and foreign authors are devoted to the development and implementation of the latest measures, namely: George M., Nhi, L.K.Y., Ngoc N.M., Tung V.N.D., Truc L.P.T., Nayak R. [1], Haartman R., Bengtsson L., Niss C. [2], Cifone F. D., Hoberg K., Holweg M., Staudacher A. P. [3] Raji I., Shevtshenko E., Rossi T., Strozzi F. [4] et al. However, a detailed study is required to resolve the final problem of ensuring the latest business processes in the activities of business entities, which makes the topic of this publication relevant.

The purpose of the article. The purpose of the article is to review the theoretical foundations for the application of innovative technologies, in the form of lean technologies, in the activities of business entities in a transparent economy, which will also ensure further de-shadowing of their investment activities.

Summary of the main research material. Today, one of the main principles of business entities is to ensure their transparency. Transparency can be ensured by the state regulatory policy. In this case, transparency can be viewed as a tool for regulating business activities and ensuring the effectiveness of interregional and interstate trade and economic cooperation (Figure 1).

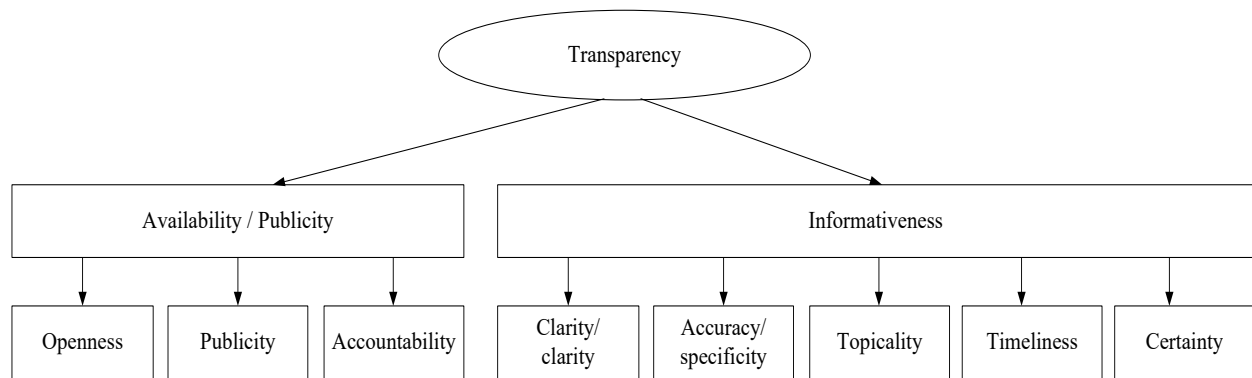


Fig. 1. Interaction of transparency principles in the activities of business entities

Source: developed by the authors

Reducing corruption and ensuring transparency are the most important factors in achieving sustainable economic development. Greater transparency ensures proper decision-making in business activities through quality information. This, in turn, leads to improvements in the system of resource allocation and macroeconomic stabilization, which results in economic growth and development. Therefore, the search for innovative methods, techniques and technologies aimed at improving the performance of business entities is an important task today. Such technologies include the lean methodology.

The concept of "Lean Production" was first used by John Krafcik, one of the co-authors of the book "The Machine That Changed the World". When translated literally, the word "lean" means "thin, lean, poor, scanty," and the author intended the term to imply the absence of all unnecessary things in production [5].

It is also believed that the founder and author of the concept is Taiichi Ohno, who introduced a unique production system for the Toyota Production System Corporation [6]. This system is called "Lean production" in the West. This concept of lean manufacturing, which was introduced in the Toyota Production System, involved the division of operations and processes that add value to the consumer and those that do not. An example of this in a conventional management system is that warehouse costs, as well as all costs associated with rework and

rejects, are passed on to the consumer, even though they have no value to him. In this case, the task of Lean production is to systematically reduce processes and operations that do not add value. In general, the concept of Lean production is based on the elimination of losses, which are shown in Figure 2.



Fig. 2. Losses that are eliminated when implementing the Lean production concept

Source: developed by the authors on the basis of [6-7]

Henry Ford also tried to implement the basic principles of this concept. However, his idea was not accepted [7].

"Lean Production is a system of organizing the production process that makes it possible to produce more products or services with less effort, on smaller production areas and equipment, while fully meeting customer expectations [7-9].

The application of approaches to production in the form of Lean technologies is aimed at solving the following main problems that occur daily in business activities

- reducing the time of product creation;
- achieving high quality at minimal cost;
- avoiding overproduction;
- settlement of supply issues, etc.

Thus, the term Lean Production can be defined as an effective management concept that aims to optimize business processes by maximizing the focus on the interests and needs of the client (market) and motivating each employee [7].

Figure 3 shows the key concepts of «Lean technologies».

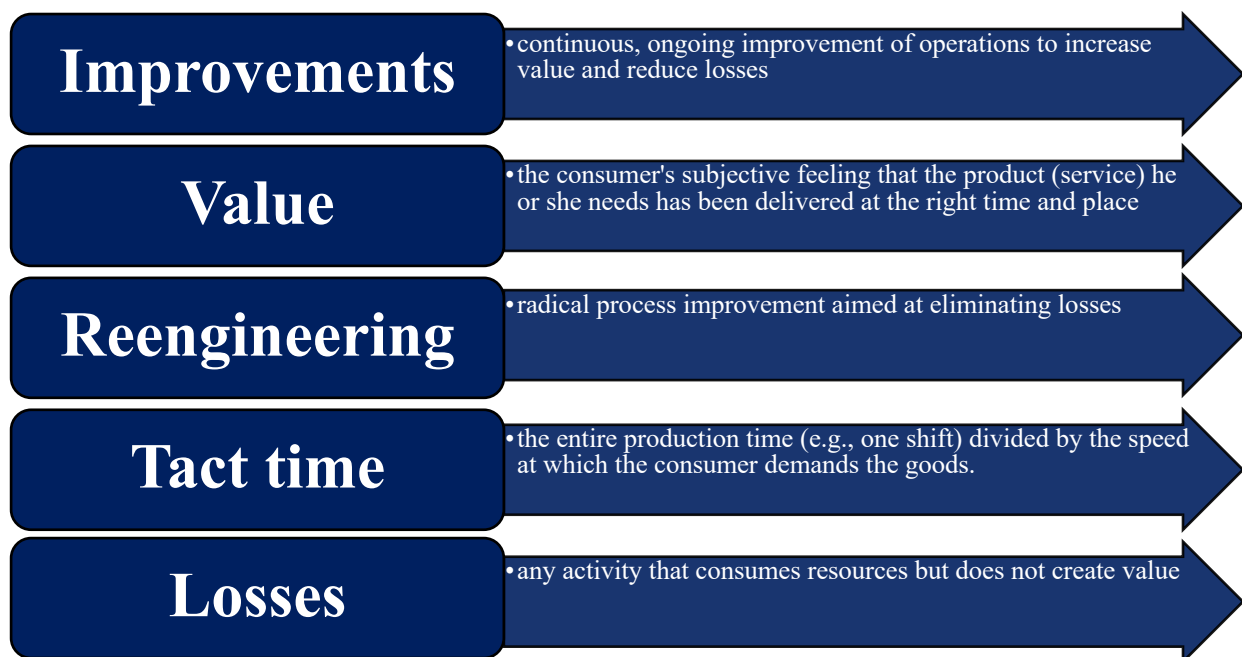


Fig. 3. Key concepts of "Lean technologies"

Source: developed by the authors on the basis of [8-9]

The principles of Lean technologies include determining the value of a product or work that has already been completed and distributing the product value stream, which together constitute certain actions. All the actions that make up the value stream can almost always be divided into three main categories (Figure 4).

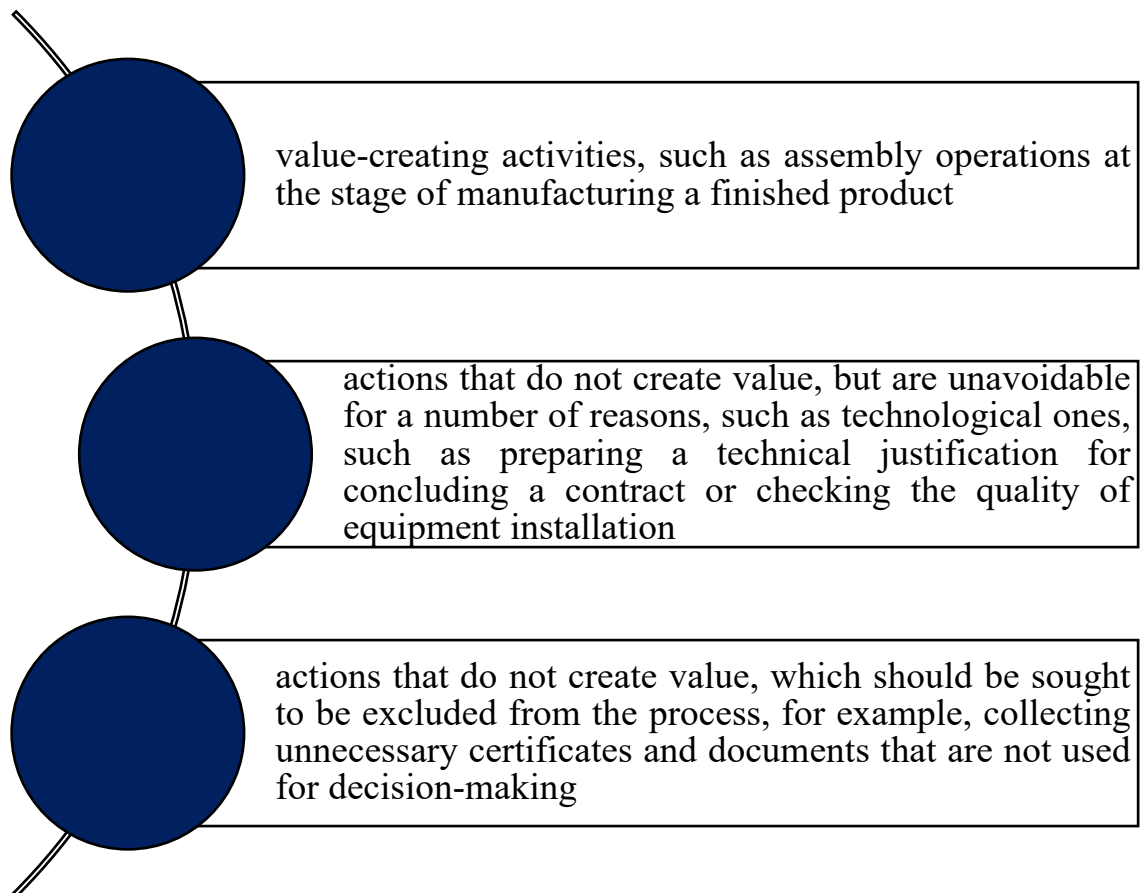


Fig. 4. Main categories describing the value of technologies

Source: developed by the authors based on [10]

The principles that provide for the implementation of Lean technologies suggest that a more efficient and reasonable way to organize the flow when the product. Therefore, it is necessary for management at different levels of management to focus not on the organizational structure and equipment, but on the corporate culture of management, the system of relationships between different levels and departments, the system of employee value orientation and their relationships. However, it is quite difficult to do this, as it is necessary, first

of all, to find financial resources for the purchase of new equipment.

The result of the implementation of Lean technologies is the creation of a "process team", when performers in the process chain are focused not on evaluating the actions of a particular unit, but on the satisfaction of the work performed in front of the client, as a result of which each employee tries to work closely with colleagues, helping each other to minimize certain losses.

An example of the implementation of Lean technologies is The Coca-Cola Company, where the lean production system began to be implemented in 2007, and the full complex was launched in 2008. Throughout this period, the company's management has been trying to optimize various types of operations and business processes. The first and most important thing that was done was the formatting of the equipment. Since this company has a wide range of products, it often has to re-adjust equipment and face large time losses. For this, there is a corresponding tool SMED (Single-Minute Exchange of Dies), which made it possible to divide any process into subprocesses and manage each of them separately, optimizing and reducing costs.

Lean logistics, which uses special modules, helped to solve the problem of large stocks. Inventories in the spare parts warehouse and related processes, such as repairs, maintenance, etc., have also been reduced. The introduction of a special TeAM module - autonomous service - has become the most accessible resource. Sometimes problems that occur frequently and are systemic to prevent them from happening again are solved in the company using the Kaizen method. It should also be remembered that the generation of suggestions for improving equipment and processes is the basis of the entire strategic direction for the transition to truly Lean production, and these suggestions are especially valuable from process participants, employees themselves.

The issues of collecting, monitoring, and analyzing such proposals are usually given a lot of attention from the very beginning and are constantly focused on.

Thus, "lean" entrepreneurial activity is distinguished from others by the following features [10; 12]:

1. The basis of such a production system is people. They are the creative force in the process of producing competitive products, and technology and equipment are only a means to an end. No theory, strategy, or technology can make a business successful; only people can achieve this on the basis of their intellectual and creative potential.

2. The production systems of lean business activities are focused on the elimination of losses and continuous improvement of all processes. All employees of the company, from workers to senior management, are involved in the daily work of preventing all possible types of losses and continuous improvement.

3. Management makes decisions that take into account the prospects for further development, with immediate financial interests not being decisive. The management of such companies does not engage in useless administration - command, unreasonably strict control, employee evaluation using complex systems of various indicators - but exists to organize the production process in a reasonable way, to identify, solve and prevent problems in a timely manner. The ability to see and solve problems in the workplace is valued in every employee, from top management to workers.

Figure 5 shows the key tools of Lean technologies for increasing labor productivity.

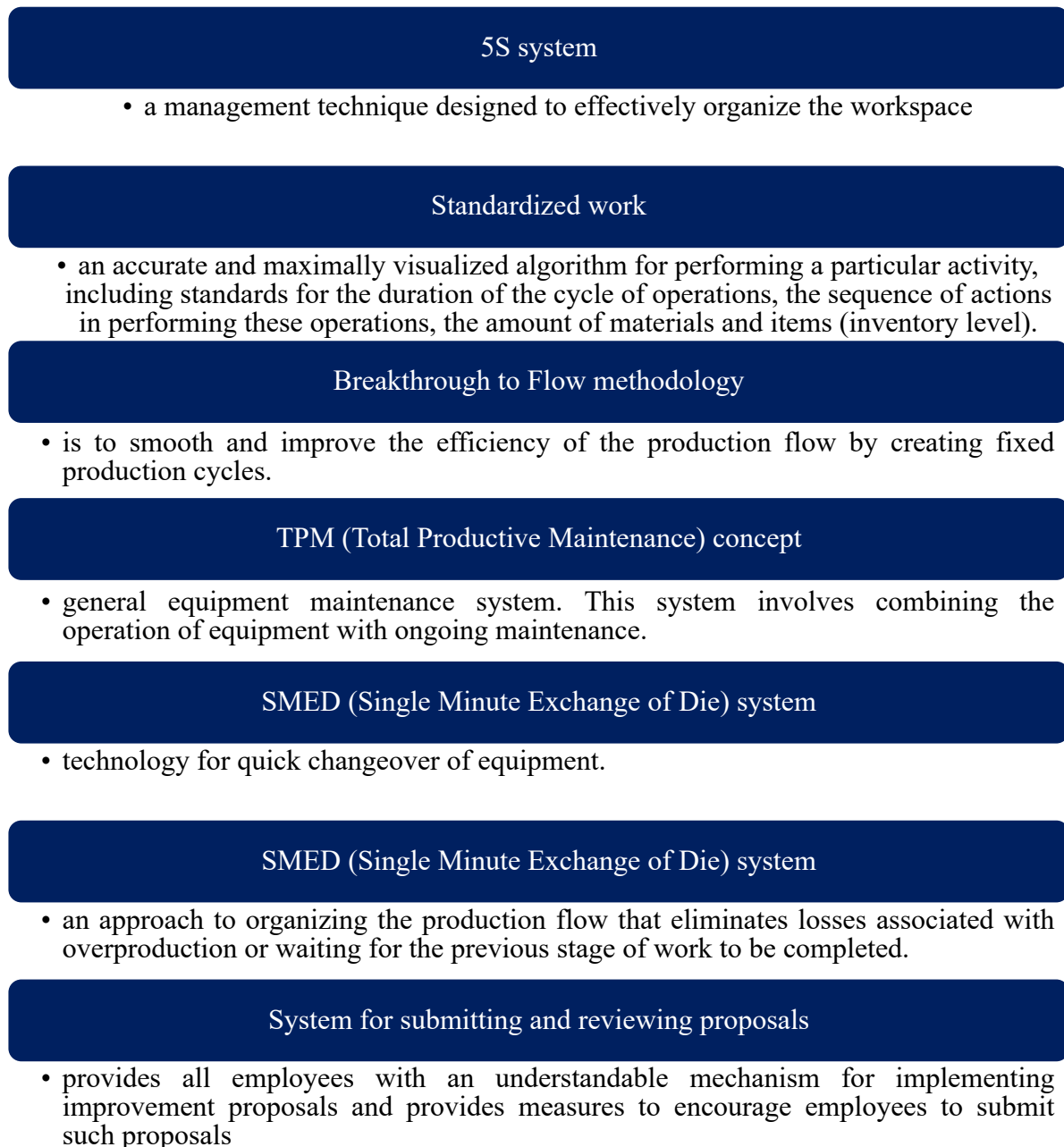


Fig. 5. Key tools of Lean technologies

Source: developed by the authors on the basis of [6-7]

Let's look at some of the key aspects of Lean technologies in more detail.

The 5S system is a management methodology designed to effectively organize the workspace. The name comes from the Japanese words beginning with S (in Japanese), which include [6-7]:

- sorting items and/or documentation at the workplace according to the degree of their necessity and frequency of use, with the elimination of all

unnecessary items;

- systematization, when each item should be in a certain accessible place;
- maintaining cleanliness and order;
- standardization of the workplace organized by previous procedures;
- continuous improvement of the developed standard.

Thus, the 5S system helps to reduce the number of errors in documents, create a comfortable climate, and increase productivity. The undoubted advantage of this tool is the absence of the need to use new management theories and technologies.

It is worth noting that another tool for lean production is the use of comprehensive standardized work. Otherwise, the activity will not produce the expected effect. Within the system, special recommendations are developed that define the step-by-step sequence of any operation. Such recommendations include the following requirements:

- they should be available for quick understanding (use of diagrams, drawings, infographics, photos, etc.);
- they should be constantly updated and actualized in accordance with changes in the procedure for performing operations;
- they should be developed together with employees.

The peculiarity of Total Productive Maintenance is that this concept is based on the transformation of the existing service system into a more advanced one. For this purpose, the following stages are envisaged within the framework of TPM:

- prompt repair - an attempt to improve the existing system by identifying weaknesses in it;
- predictive maintenance - organizing the collection of information about existing problems in the operation of equipment for further data analysis;
- corrective maintenance - improvement of equipment to eliminate the causes of systematic failures;

- autonomous maintenance - distribution of functions to ensure uninterrupted operation between repair and maintenance services;
- continuous improvement - involving employees in the constant search for the causes of losses and suggesting ways to eliminate them.

The SMED system is considered one of the most powerful tools of the Lean concept. It is SMED that allows you to switch between stages of the production process faster, thereby reducing the financial and time costs of production and storage of products.

It is also worth noting that the concept of Lean technologies emphasizes that energy should be invested only in those processes that bring utility and value to the customer, and everything else is a loss. In other words, all Lean techniques are aimed at reducing activities that do not create value. The main components of Lean technologies are shown in Figure 6.

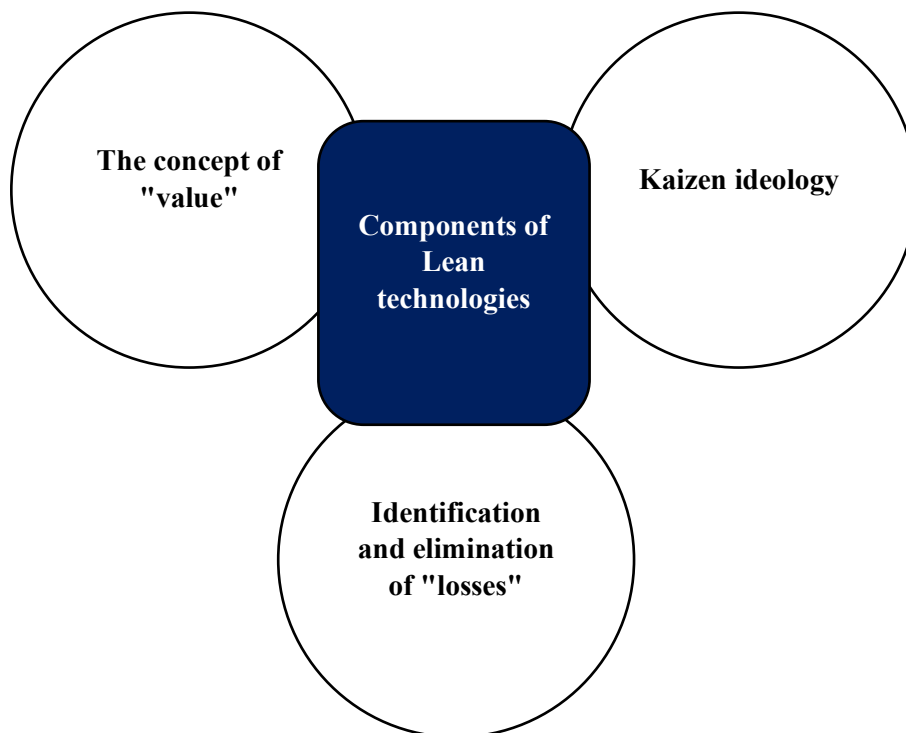


Fig. 6. The main components of Lean technologies

Source: developed by the authors on the basis of [6-7]

The Kaizen ideology is a customer-oriented improvement strategy, i.e., customer satisfaction is considered as the main criterion for performance. An

important aspect of this ideology is that it largely involves the human factor, which creates the prerequisites for increasing the willingness of all employees to accept and participate in changes [13]. The reorganization of activities based on Kaizen ideologies is reduced to minor, gradual changes in the business model of business entities through the use of modern methods of organizing production and ensuring the quality of products and processes [14].

It is also worth noting that the ideology of the Kaizen system is based on the implementation of consistent, continuous, interconnected processes that improve all aspects of business. The great advantage of this system is its versatility and ease of use [15]. The system is suitable both for use in working with individual processes and for improving the entire system of a large organization as a whole. Table 1 shows the basic principles of implementing the Kaizen system.

Table 1

Principles of implementing the Kaizen system

Principle	Characteristics and description
Focus on customers	The main task is to meet the needs of consumers by providing them with products or services
Constant changes	It is necessary to continuously implement changes in all areas of activity - even on a small scale
Creating working teams	Each employee becomes a member of a specific team
Open confession of problems	Any complaint should be treated positively
Building "supportive relationships"	Employee involvement in the process of value creation is extremely important for achieving high performance.
Development of self-discipline	Every employee should have self-control, respect for themselves, their work and colleagues
Self-improvement	Each employee must be responsible for their actions and for the powers entrusted to them
Horizontal development	Personal experience, success and self-realization of each employee are important for entrepreneurial activity

Source: developed by the authors based on [13-15]

Thus, the advantages of implementing Kaizen ideology include the

following:

- 1) minimal costs for using the method;
- 2) use of the method regardless of their size;
- 3) invisibility of changes from the outside;
- 4) involvement of personnel in the process of improvement (change);
- 5) thoroughly studying processes to reduce errors and waste;
- 6) improvement of service, quality of finished products and relationships

between employees.

In general, the use of Lean principles can yield significant effects (several times):

- productivity increase - by 3-10 times;
- reduction of downtime by 5-20 times;
- Reducing the duration of the production cycle by 10-100 times;
- reduction of warehouse stocks - by 2-5 times;
- reduction of defects by 5-50 times;
- accelerating the launch of new products by 2-5 times.

Thus, the Ukrainian market is currently experiencing a significant shortage of specialists with experience in optimizing production processes by implementing lean manufacturing technologies. Lean technologies consider any production in terms of optimizing processes by all employees. This global approach hides the main complexity of the lean manufacturing methodology, as such a specialist must combine the skills of a teacher and a manager, a forecaster and an analyst.

Conclusions. Lean production is the basic concept of management in any activity of business entities, based on the constant striving to eliminate all types of losses. By deploying Lean technologies, an innovative approach to increasing labor productivity can be practically implemented. In essence, the Lean concept is a certain system of views on the organization of production, a kind of production paradigm that makes it possible to implement a number of innovative

methodologies to improve business efficiency (including labor productivity) and create conditions for the transformation and formation of a corporate social culture based on the general participation of personnel in the process of continuous improvement. Such technologies are currently important for doing business, as they primarily ensure the transparency of all business processes and the de-shadowing of investment activities of business entities.

References

1. George M., Nhi L.K.Y., Ngoc N.M., Tung V.N.D., Truc L.P.T., Nayak R. Digital Technologies for Lean Manufacturing. In: Nayak, R. (eds) Lean Supply Chain Management in Fashion and Textile Industry. *Textile Science and Clothing Technology*. Springer, Singapore. 2022. doi: https://doi.org/10.1007/978-981-19-2108-7_10
2. Haartman R., Bengtsson L., Niss C. Lean practices and the adoption of digital technologies in production. *Int. J. Services and Operations Management*. 2021. Vol. 40, No. 2. P. 283-304. doi: 10.1504/IJSOM.2021.118260
3. Cifone F. D., Hoberg K., Holweg M., Staudacher A. P. "Lean 4.0": How can digital technologies support lean practices? *International Journal of Production Economics*. 2021. Vol. 241. 108258 p. doi: <https://doi.org/10.1016/j.ijpe.2021.108258>
4. Raji I., Shevtshenko E., Rossi T., Strozzi F. Modelling the relationship of digital technologies with lean and agile strategies. *Supply Chain Forum: An International Journal*. 2021. Vol. 22, Issue 4 P. 323-346. doi: 10.1080/16258312.2021.1925583
5. Veres C. Conceptual Model for Introducing Lean Management Instruments. *Procedia Manufacturing*. 2020. Vol. 46. P. 233–237. doi: <https://doi.org/10.1016/j.promfg.2020.03.034>
6. Lean Manufacturing. 2023. URL: <https://www.it.ua/knowledge->

- base/technology-innovation/lean-manufacturing (date of access: September 1, 2023)
7. A Brief History of Lean. Official website of the Lean Enterprise Institute (Boston, USA). 2023. URL: <https://www.lean.org/explore-lean/a-brief-history-of-lean> (date of access: September 1, 2023)
 8. Vumek Dzh., Dzhons D. T., Rus D. Mashyna, shcho zminyla svit [The Machine That Changed The World]. Vyd-vo Pabulum i Lin Instytut Ukraina. 2017. 338 p. [in Ukrainian]
 9. Yang M. G., Hong P., Modi S. B. Impact of lean manufacturing and environmental management on business performance: An empirical study of manufacturing firms. *International Journal of Production Economics*. 2011. Vol. 129(2). P. 251–261. doi: <https://doi.org/10.1016/j.ijpe.2010.10.017>
 10. Chavez I. The Power of Lean Manufacturing. *Automation & Networking, Processing & Handling*. 2019. URL: <https://www.manufacturingtomorrow.com/article/2019/01/top-article-of-2019-the-power-oflean-manufacturing-/12739> (date of access: September 1, 2023)
 11. Arnheiter E. D., Maleyeff J. The integration of lean management and Six Sigma. *The TQM Magazine*. 2005. Vol. 17(1). P. 5–18. doi: <https://doi.org/10.1108/09544780510573020>
 12. Dymchenko O.V., Rudachenko O.O., Prasol V.M., Dril' N.V. Strategic management of enterprise development through the use of lean technologies at the regional and state levels. *Komunal'ne hospodarstvo mist*. 2021. Vol. 165. P. 38-42.
 13. Kachalaj V.V. Kaizen framework: experience and prospects of implementation at industrial enterprises of Ukraine. *Biznes Inform*. 2013. Vol. 8. P. 273–276.
 14. Kaur M. Kaizen Costing: A catalyst for Change and Continuous Cost Improvement. *GE-International Journal of Management Research*. 2014.

Vol. 2, № 1. P. 1–16.

15. Singh J., Singh H. Kaizen philosophy: a review of literature. *The IUP Journal of Operations Management*. 2009. Vol. 8, № 2. P. 51–72.