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LEAN PRODUCTION OF "TOYOTA" AS AN INTEGRATED SYSTEM OF OPERATIONAL PERFECTION

Abstract. The relevance of the study of the lean production is of great importance, as its implementation demonstrates new methods of management of all production and logistics processes aimed at achieving quality, successful use and a number of means of their application after World War II. The article analyzes the Toyota Production System, which formed the basis of dozens of books on "lean production". The purpose of the article is the theoretical and practical principles of Toyota lean production as an integrated management system and achieving operational excellence as a condition for success in its application in the automotive industry both in production and services. Objectives of the study: 1. To find out the definition of value and the flow of their creation as a set of actions aimed at forming frugal thinking. 2. To form the concept of lean production as a strategy of perfection. 3. To reveal the global significance of "Toyota's philosophy" as the most profitable industry among car manufacturers. 4. To investigate the Toyota Production System as a foundation for lean thinking and frugal production. This goal determined the application of general scientific methods – analysis, synthesis, comparison, induction and deduction, scientific abstraction, analogies and scientific generalizations, logical and historical analysis in the framework of systemic and cross-cultural approaches, forecasting and modeling, literature review of scientific sources. It has been proved that lean production is one of the brightest examples of the "Japanese miracle", the basic principles of which include: determining the value of a good or service for the consumer; determining the flow of value creation; loss control; ensuring the continuity of the flow of value creation; "Extraction" of production; constant improvement. The authors, using the experience of working with leading companies in the United States, Germany and Japan, including Pratt & Whitney Porche Tesco, note

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that the principles of lean production have allowed them to: to increase productivity almost by two times; speed up the release time; halve production space; reduce inventories with virtually no financial loss. The practical significance of this topic is that economical production as a philosophy of "Toyota" guarantees the effect and success of many companies and manufacturers.

Keywords: *lean production, Toyota, operational perfection, productivity, achievement of success*

Introduction. The relevance of the study of lean production is of great importance in the modern world because its implementation demonstrates new methods of management of all production and logistics processes aimed at achieving quality, successful implementation and a number of means of their application after World War II.

Guided by the experience of working with leading companies in the US, Germany and Japan, including Pratt & Whitney, Porche, Tesco note that the principles of lean production have allowed them to increase productivity almost by two times, speed up production time, halve production space and reduce inventory with almost no financial losses, using effective methods of working with value and their components, to form the conditions for creating teams and using structural functions of quality in product design, what principles to use and make the company economical. The analysis shows that the theory and practice of lean production is able to cover all technological industries and their scope for directing the process of change, using Agile-management (J. Appelo, 2019, 432 p).

The book Thrifty Production was first published in 1996 before the 1997 recession and the 1998 financial thaw. The purpose of the book was to highlight ways out of the crisis, to create real long-term value in any business activity in order to reconsider their strategies and start a new path. Businesses, such as lean production, led by Toyota, have served as the most powerful tool for dealing with losses in any organization, challenging other firms, succeeding and gaining real value for their customers, opening up a whole new world of opportunities for to make a big leap from mass production to lean, using strategic innovations (O. Buhaichuk, 2019).

Analysis of recent research and publications. Lean manufacturing as an effective management concept, the essence of which is to optimize business processes by maximizing the interests and needs of the customer (market) and taking into account the motivation of each employee. The introduction of the Lean-production methodology ideally solves a number of major problems that most companies face every day and every hour to achieve high quality at minimal cost, reduce production time, avoid overproduction, regulate supply issues (V. Voronkova, 2019).

The author of the concept of lean production is considered to be Tahiti Ono, who developed a unique production system for Toyota Corporation – Toyota Production System (TPS), which in the West is called Lean production. Henry Ford once tried to convey the principles of lean-production to the business community, but his ideas were not accepted at the time. By introducing the methodology of lean-production first in the world, the Japanese once again demonstrated their talent not so much to generate new ideas, but to develop existing ones.

Tahiti Ono (1912-1990) – CEO of Toyota, was a supporter of the fight against losses, which was unknown to human history. He identified seven types of muda, which were present literally everywhere, proving the daily observations of the activities of any typical organization, as there are a lot of losses around. Lean thinking is a powerful antidote of muda, it helps to determine the value, in the best sequence looking for the actions that create it, for the most effective performance of work. Lean thinking also makes it possible to enjoy work, creating immediate feedback from efforts to turning the mood into values, – say James P. Womak, Daniel T. Jones, Daniel Rus. A machine that changed the world. History of lean-production – dark weapons of "Toyota" in automobile wars (P. James, 2017, p. 17).

In short, lean production is called "lean" as it allows you to create more and more, spending less and less human effort, less equipment, less time and space,

getting closer to giving customers exactly what they want. Toyota's Production System has formed the basis of dozens of books on "lean", including two bestsellers – "The machine that changed the world: the history of lean production" and "Lean thinking". Former Toyota employees are valued in almost every industry around the world, they are hired due to their knowledge and experience.

Highlighting previously unsolved parts of the general problem to which this article is devoted.

Summarizing the principles of lean production, it was necessary to develop a concept of sound leadership for managers who sought to overcome the daily chaos of mass production, using specific methods used for specific activities in technology offices, procurement departments, sales departments and factories by specialized product development teams, price planning, schedule and production structure. The Japanese have published many books describing specific techniques and conceptual work, trying to bring isolated developments into a single whole. The quintessence of lean production can be reduced to the following five principles:

1) accurate determination of the value of each product;

2) determining the flow of value creation of this product;

3) ensuring a continuous flow;

4) enabling the customer to extract the value of the product from the manufacturer;

5) the pursuit of perfection.

A clear understanding of these principles and their relationship helps managers to take advantage of lean production while maintaining a stable exchange rate. Lean production companies are developed not only in Japan, but also in America and Europe, where measures have also been taken to make mass production lean in the context of the entire value stream – from raw materials to finished products, from supply orders to the development of a start-up concept in search of perfection (V. Voronkova, & T. Teslenko, 2020).

The purpose of the article – the theoretical and practical principles of lean production of "Toyota" as a holistic management system and the achievement of operational excellence, as a condition for success in its application in the automotive industry in production and services.

Formulation of the main material. 1. To find out the definition of value and the flow of their creation as a set of actions aimed at forming frugal thinking. 2. To form the concept of lean production as a strategy of perfection. 3. To reveal the global significance of "Toyota's philosophy" as the most profitable industry among car manufacturers. 4. Investigate the Toyota Production System as the foundation of the movement for lean thinking and lean production, influencing the development of the digital economy (V. Voronkova et al., 2020).

To solve the research problems, we use the method of analysis and synthesis, which helped to break down lean production, as the object of study, into elementary components, determine the relationship between its components, and then reveal the correlation between them to show it as a whole. The synthesis was facilitated by correlation analysis, which helped to explore the constituent components in their interaction, to enrich the epistemological structure of lean production through lean thinking, based on values.

According to our hypothesis, we intend to decompose this chain of transformations of the phenomenon of lean production, which includes four stages, namely: 1) origin; 2) formation; 3) functioning; 4) introduction into the system of economic activity of the automobile industry (S. Winchester, 2019, 448 p).

Also important is the method of modeling, based on the creation of a model that identifies instrumental operations, techniques, stages of process development, establishing the reliability of components, modes, techniques, practices that allow to understand the discourse of the subject and object of study. The subject of the study is the philosophy of lean production of "Toyota" as a holistic management system.

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The object of study is the conditions for achieving operational perfection. Even before the company decides on the appearance of the new model, Toyota is trying to assess possible options and anticipate all potential problems with the manufacturer and design. A separate "training sketch" is created for each variant of the car, using the quality and design process, as a result of which "Toyota" has become a successful self-learning organization, and for a century went where it is (M. Goodman, 2019, 592 p).

1. Defining the value and flow of their creation as a set of actions aimed at forming a lean thinking and culture of production

In fact, the force field of lean production is a value that can only be determined by the end consumer. And this only makes sense when it comes to a specific product (good or service, or often all together), which at a certain cost and at a certain time meets the needs of the customer. Value is created by the manufacturer, but, according to the consumer, this is what the manufacturer exists for. Top managers pay a lot of attention to the organization, technology, key competencies, strategic intentions to improve ways to reduce staff, extract additional profits from consumers and their suppliers of raw materials. Most executives at companies such as Toyota have begun the costing process by asking how they can design and manufacture a product in Japan to meet societal expectations of long-term employment and maintaining relationships with suppliers in the context of management tasks (P. Drucker, 2000, 276 p).

Based on the above, it becomes clear that lean production should begin with the fact that it is necessary to determine consciously the value in terms of a particular product that has certain characteristics and a certain value. The best way to do this is a dialogue with certain consumers, a rethinking of all the company's activities related to the manufacture of the product through teamwork. The analysis showed that no manager will be able to implement all this at once, but it is very important to form a clear vision of how to do it. Otherwise, the understanding of value will inevitably be distorted. The specificity of these innovations is that the flow of value creation is a set of all the actions necessary for a particular product (product, service or all together) to go through three important stages of management, inherent in any business:

1) problem solving (from concept development and working design to the release of the finished manufacturer);

2) management of information flows (from receiving the order to drawing up the detailed schedule of the project and delivery of goods);

3) physical transformation (from raw materials to the moment the consumer receives the finished product).

Determining the entire value creation stream for each product is the next step in building lean manufacturing, which is seldom included in the process, but almost always shows how large the size of the "muda" ("mura", "mudi") is. All actions that make up the value creation stream can almost always be divided into three categories:

1) a large number of actions that create value;

2) actions that do not create value, but are inevitable given a number of circumstances;

3) actions that do not create value, which can be immediately excluded from the process (muda of the second kind).

Lean production must move forward, go beyond the firm, which serves as a standard budget unit worldwide, and look at the situation as a whole as a full set of actions that create a product – from concept through product design to the finished product. The organizational mechanism of this product is what we call a lean enterprise, the creation of which requires a new way of thinking about relationships between firms, transparency of all stages of value, and this requires a complete reorganization of ideas about the proper organization of work – say James P. Womack, Daniel T. Jones, Daniel Russ in their study "The Machine that changed the World. The history of lean-production – dark weapons of "Toyota" in car wars" (J. Womack, 2019, p. 243).

The movement towards the development of lean production is already noticeable today and in the future it will only intensify. All work on the design, ordering of components and delivery of the product must be performed in one continuous flow. An alternative to lean production is to rethink the role of functional services, departments, and the entire system so that everyone contributes to value creation so that employees have a personal interest in the flow of value. Therefore, it is necessary to rethink the role of the firm, functional services and professions, as well as the development of a cost-effective strategy.

Toyota's operating culture is a set of fundamentals invented, discovered or developed by a specific group to overcome the problems of external adaptation and internal integration, which have justified themselves and proved their relevance, so they can be used to train new members and are the right way to think, perceive and feelings about problem solving (K. Michio, 2017, 432 p).

Thus, the philosophy of "Toyota" in connection with the development of the concept of value penetrates to the depth of fundamental assumptions about the most effective ways to "think, perceive and feel" the problem. Toyota's philosophy was invented, discovered and developed as talented cedar engineers and Toyota engineers learned to overcome the problems of external adaptation and internal integration for decades. To address these challenges, the company conducts seminars on its philosophy, based on the transfer of the culture of the philosophy of "Toyota" to new employees through daily work, following the example of leaders who are formed by this culture.

2. Development of the concept of lean production as a strategy of perfection

The movement in this direction is so powerful that the question has arisen about the development of the concept of lean production as a strategy of perfection. The first obvious effect of changes in organizational work – from departments to product teams and flow – is manifested in a significant reduction in time between concept development and product release, between sales and delivery, between the receipt of raw materials and sales of finished goods to consumers. After the introduction of the flow method, the design time is reduced from a few years to a few months, the processing time of orders is reduced from days to hours, and the production itself requires several hours instead of weeks or months. If as a result of management efforts the time of product development is not halved, the processing time of the order is not reduced by 75 %, and the period of physical processing can not be reduced by 90 %, the company is clearly wrong (M. Kaiku, 2017, 432 p).

Lean production allows you to change freely the sequence of production of any product and thus respond to changes in demand. The organization must learn to define the value correctly, to see the whole flow of value creation, to add it continuously to the product at each stage of the flow, which will allow the consumer to understand the process of improving value, which is reduced to perfection. The most important incentive to improve lean production is transparency, which is called "open card management", which is based on financial transparency and material remuneration of employees as two key elements.

The lean thinking of the company's employees gives hope for perfection. Transforming classic mass production into economical allows you to double the productivity of the entire system, reduce production time and inventory by 90 %. The time of launching a new product on the market is halved, and for a small additional fee the consumer becomes available a significantly larger number of modifications of the product. This impressive effect is due to radical improvements in the flow of value creation (N. Vitalina et al., 2019).

Then the processes of continuous improvement come, which move the company to perfection more slowly. Such improvements can double productivity again in two or three years, halve inventory, level of errors, and production cycle time, and these improvements can go on indefinitely if leadership develops the right strategy. Therefore, lean production is a means of combating the prolonged economic stagnation that has engulfed Europe, Japan and North America. Traditionally,

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organizations and industries are trying to achieve economic growth through new technologies and intensive training. However, not everything is comforting. In recent years, there has been a revolution in the use of robots, new materials, microprocessors, personal computers and biotechnology (V. Melnik, 2019).

However, the volume of domestic product per capita (i.e. the share of value per capita on average) in all developed countries has not increased at all. The problem is not in the new technologies themselves, as they cover a very small part of the economy. Very few companies, like Microsoft, can grow into business giants in a short time. Most businesses in construction, housing, transportation, food, manufacturing and services are changing much more slowly, they may not change at all unless ways are found to create value and apply new technologies through teamwork. New technologies and human capital can drive growth in the long run. The development of the concept of lean production as a strategy of perfection ensures that this growth will be achieved in the next few years and may even make the introduction of some "new technologies" unnecessary.

Lean production is an available immediate solution that can produce the desired results, and therefore, managers must develop for themselves the concept of value defined by the consumer, find the right understanding of value, for which to dialogue with the consumer using personal mobility. The ability to attract new customers, increase sales quickly, constantly return to the question of values and see if you can further improve your understanding of value – all this is necessary for the continued success of lean production (O. Nesterenko, & R. Oleksenko, 2020).

Thus, during the analysis of approaches to the development of the concept of lean production as a strategy of perfection, approaches to which are based on rationalism and skill, we came to the realization that its implementation will result in a stable process of continuous improvement.

Thus, we have theoretically proved that we must further reproduce by cognitive means that the most important task of the introduction of lean production will be to determine the value, which is based on:

1) the establishment of target costs, which are based on a certain amount of resources and labor costs required for the production of a product with certain technical characteristics;

2) determination of target costs for development, acceptance of the order and production activity which can act as criterion for check of correctness of each administrative step in a value creation flow;

3) the global importance of the "Philosophy of Toyota" as the most profitable industry among car manufacturers.

The task of this section is to reproduce systematically the parametric characteristics of the global significance of the "philosophy of Toyota" as the most profitable industry among car manufacturers in the context of achieving operational perfection. The world turned its attention to Toyota in the late 1980th, when it became clear that Japanese quality and productivity had their own characteristics. Japanese cars have served their owners much longer than American ones, says K. Jeffrey Leikner in Toyota's Philosophy (2019, p. 21).

Understanding the success of Toyota and its quality improvement systems does not mean that you can immediately change your company, which has a different culture and operates in a different environment. However, Toyota can be a source of inspiration and an example of how important it is to have commitment and support at the leadership and value system that goes beyond instant profits. Toyota is an example of how the right combination of philosophy, processes, people and problem-solving skills can form a learning company. Toyota's strength is not in car design, but in ensuring that its processes are consistent and that the product is integrated, that it builds cars faster, more reliably and at an uncompetitive price, that it solves problems in an amazing way and competes with new competitors.

We would like to note, that at the same time, this step will show a positive

trend that "Toyota" is the most profitable industry among car manufacturers, the key characteristics of which include:

1. Toyota's annual profit, which exceeds the profits of General Motors, Chrysler and Ford, which is the highest annual profit of the car manufacturer in the last 10 years. The profitability ratio of net profit is 8.3 times higher than the industry average.

2. For decades, Toyota has been the number one carmaker in Japan. In North America, the company until recently was fourth after the "Big Three", which is increasing production capacity, while American manufacturers are closing plants, reducing volumes and relocating production abroad.

3. "Toyota" has created a "lean production" (known as "production system" system "Toyota" (TSA). Over the last 20 years in every industry transition could be observed on the philosophy and methods of "Toyota" supplies.

4. Toyota has the fastest product development process in the world, it only takes a few months to build a new model of car or truck, while its competitors spend 2-3 years on it.

5. Colleagues and competitors around the world consider Toyota the best company in its class in terms of quality, productivity, production speed and flexibility. Toyota cars have been at the top of professional ratings and consumer reports for many years.

The success of "Toyota" is based on its reputation with high quality products, because "Toyota" longer serve without repair, while American cars in a year or two in need of repair, and the "Toyota" consistently holds the first position in the ranking of quality and endurance.

The success of "Toyota" is the result of high business standards, perfect production as strategic weapons, methods of improving quality. These include the following terms: "when, it is necessary", Kaidan, the flow of single products, Jidoka, Heijunka, which helped to spread the revolution of "lean production". Toyota's continued success is due to the use of these tools and is a consequence of its business philosophy. Success grows out of companies' ability to nurture leaders, build teams and culture, develop strategies, build strong relationships with suppliers, and learn more.

"American Auto" Company had a lot to do to make its extravagant supplier development center bear fruit. The main problems were sewn deep into the system. Its people themselves lacked development, and the management style of the "whip and gingerbread" method did not involve an understanding of the business processes of suppliers. The company had to earn the right to be a leader so that its suppliers could go to it to learn. Finally, in the process of reducing costs, the company "killed" the project to create a supplier development center. Suppliers responded only positively to the demanding but honest partnership with Toyota. In 2003, Toyota took first place in 17 parameters – from trust to capabilities. It is followed by Honda and Nissan, and only then Chrysler, Ford and General Motors. The power of the supplier network goes far beyond information technology – it is the power of ingenuity and sincere relationships, – says Liker Jeffrey K. in the work "Philosophy of Toyota. 14 principles of a coordinated team" (2019, p. 279).

When Toyota started constructing cars, it did not have the resources and equipment to make thousands of car parts itself. The young engineer Aiji Toyoda at the beginning of his career at Toyota, was given the task of finding suppliers of quality spare parts to establish a partnership with them. At that time, the company's production volumes were very small, there were days when no car came off the assembly line, because Toyota lacked quality parts. Toyota was well aware of the need for reliable partners, but at that time Toyota could offer suppliers one thing – the opportunity to increase production together and work together for mutual benefit in the long run. Like Toyota employees, the suppliers began to join a large family that grew and studied the Toyota Production System. Suppliers have also proven their sincerity and willingness to adhere to high standards of quality, cost

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and delivery. For Toyota, respect meant high expectations from suppliers, honest opportunities and training (O. Punchenko et al., 2021).

Problematic is the question of the formation of the Toyota Production System as the foundation of the movement for lean thinking and lean production, in the context of which is its theoretical understanding, which includes many components or components. It includes the company's unique approach to production, which became the basis for the lean production movement, which emerged as the most popular trend of the late twentieth century (along with the "six sigma" theory). The lean movement has become widespread, but most attempts to apply its principles in practice have long been sporadic. The reason is that almost all companies pay too much attention to tools, such as 5S, but do not have an understanding of cost-effectiveness as a holistic system that must become an organization's culture.

In most companies that try to implement the lean philosophy, top managers are rarely interested in day-to-day operations and continuous improvement – an integral part of this philosophy. Lean production is the end result of applying the Toyota Production System to all parts of the production process.

James P. Wumek, Daniel T. Jones, Daniel Russ defined lean production as a process of five stages (2017, 388 p.):

1) determining the value for consumption;
2) determining the value creation flow;
3) construction of a continuous flow;
4) value creation (flow of single products);
5) creating a system of "extraction" of the product by the consumer and the pursuit of perfection.

To become a lean producer, you need to focus on the flow of value creation. This flow should be continuous and work on a system of "extraction", which focuses on consumer demand and in short intervals provides the production of only what is needed for the next operating cycle. Behind all this is a culture, each member of which seeks to grow constantly. Focusing on the "flow" guarantees the global success of "Toyota" in the XXI century.

This means that in each of its horizons the main tools of economy, including SMED, which takes a specific form as an object of knowledge, and includes rapid equipment setup, standardization of work, system "extraction" and protection against errors that create flow and maintain culture continuous improvement of its employees.

Philosophical analysis of the subject of this study allows us to clarify the nature, essence, content of lean production, specified by 14 principles (terms) of "Toyota", including:

Problem solving: continuous improvement and learning.

1. Always use comprehensive training – Kaizen.
2. Check with your own eyes to understand in detail – Genbutsu.
3. Make decisions by consensus.
4. Educate leaders is the company's philosophy.
5. Respect, develop and challenge people and companies.
6. Respect, challenge and help your suppliers.

Employees and partners: respect, challenges and growth.

7. Create a process in the form of a continuous flow.
8. Use a traction system to avoid overproduction.
9. Solve workloads – Heijunka.
10. Create a culture of stopping production in case of a quality problem – Jidoka. Process: elimination of losses (muda).
11. Standardize tasks for continuous improvement.
12. Use visual inspection to identify problems.
13. Use only reliable and proven technologies.

Philosophy: long-term thinking.

14. Management decisions should be based on a long-term philosophy,

even if it is necessary to sacrifice short-term financial goals (O. Nesterenko, & R. Oleksenko, 2020).

The philosophy of "Toyota" and its production system has formed a production method used by the company – a double helix of "Toyota's" DNA, which defines the management style of the company that makes it unique and which can be applied in any organization to improve the system of a business process: from sales to product development, marketing, logistics and management (T. Teslenko, & V. Zadoia, 2021).

Its content is revealed as a set of processes of objective, subjective, subjectified and objectified nature of economic, managerial and educational cycles, aimed at training employees in this production system, including the work of all departments and the system formed as a whole.

Here is an example from logistics. Close cooperation has been established between suppliers of parts, Transfrate and assembly plants. A coordinated flow passes through the cross-docks: the parts move to the factories, and from there the containers are returned for filling. Toyota, which is working hard to align the plant's schedule, is aligning the supply of parts to the warehouse. A uniform schedule is an additional factor in equalizing the flow of parts from suppliers through the cross-dock to the factory and the balance of containers that go to the factory full and return to suppliers empty.

As a result, Toyota has achieved the goal of establishing delivery on a "when needed" basis; the cross-dock system has helped to reduce significantly transport costs; Transfrate steadily improves operations and reduces costs, as do other Toyota divisions. Transfrate has not only successfully solved the issue of logistics on a "when needed" basis for Toyota, but has also become a successful international company and serves as an example of a cost-effective transportation system. Toyota is interested in its suppliers achieving the same craftsmanship and efficiency in their production as it does. In addition, reducing Toyota's costs is impossible without reducing suppliers' costs.

The principle of Toyota's philosophy is as follows: Respect all your partners and suppliers – set them challenging tasks and help them to improve. Therefore, Toyota is considered a role model in terms of building relationships with suppliers as one that is ready to learn and grow with its partners. Thanks to this, we managed to create a unique learning business partnership, which is the highest form of lean production, – says Liker Jeffrey K. in the work "Toyota's philosophy. 14 principles of a coordinated team" (N. Valevska, 2019, p. 399).

Conclusions from the study and prospects for further exploration in this direction.

Thus, we present an important conclusion for the purpose of our study, the author of the work that "Toyota" for decades has created a lean culture and achieved in this regard skills in the application of these methods. Lean thinking in the understanding of Toyota's philosophy implies a much deeper cultural transformation than most companies can imagine (T. Teslenko, 2021).

Managers of firms and companies can improve their business processes by using the concept of lean thinking and production:

1) elimination of losses of time and resources;
2) embedding quality in all production processes;
3) search for cheap but reliable alternatives to expensive new technologies;
4) improvement of business processes;
5) creating a culture of learning for continuous improvement in order to improve the quality, efficiency, speed of production.

Many executives feel that Toyota's experience cannot be applied outside of Japan. However, companies are working on this right now – the creation of organizations in different countries around the world, studying to transfer knowledge about the production-friendly philosophy (T. Teslenko, 2020).

Toyota's lean production philosophy as a holistic management system and operational excellence is a detailed plan of management philosophy that describes

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specific tools and methods that will help you to become the best in your industry in terms of cost, quality and service.

The procedural approach to the analysis of the levels of lean production as a complex system of economic reality should be supplemented by the epistemological dichotomy "subjective-objectified", which sets its prognostic vision. Toyota's philosophy is a vision and inspiration for any organization that seeks to be successful in the long run, which includes leaders as actors in the process and the excellence of the organization that needs this implementation of lean manufacturing principles. As an example, we can the international organization Canada Post Corporation, CCP, which began to implement the principles of austerity and went through three stages until it became a successful corporation owned by the government.

Thus, the idea of lean production must embody the perfection, efficiency and perfection of all cycles of this process, which has undergone three stages of transformation into integrity and is enshrined in the economic ideal of production of the XXI century.

The first stage is "point Kaizen", or attempts to apply different methods at different points in the flow of value creation.

The second is a global systematic analysis of the value creation flow and change.

The third stage is the creation of a lean enterprise, which with managed to make a significant breakthrough the help of lean techniques and tools.

Toyota uses the knowledge gained through Genchi Genbutsu to make informed decisions and become a learning organization. Toyota believes that the way to decision-making is as important as the quality of the decision, and to do so comprehensively consider everything, including alternative solutions. That is why the allocation of time and effort for this is mandatory. The secret to easy and near-seamless implementation of new initiatives at Toyota is detailed pre-planning, which is based on problem solving and decision-making to every detail.

Toyota's excellence is in every detail, for which decisions must be made slowly, jointly and carefully, considering all options, and implemented quickly and immediately, and when the proposal reaches senior management, it is already so honed that it is actually a ready-made solution. The search for consensus is a belief in reason, and Toyota's best approach is a group decision approved by management. The general rule is to strive to involve the maximum number of employees.

Thus, "lean production" is one of the clearest examples of the "Japanese miracle", the basic principles of which include: determining the value of goods or services to the consumer; determining the flow of value creation; loss control; ensuring the continuity of the value creation flow; "Extraction" of production; constant improvement. The authors, drawing on the experience of working with leading companies in the United States, Germany and Japan, including Pratt & Whitney Porche Tesco, note that the principles of lean production have allowed them to increase productivity almost by two times; speed up the release time; halve production space; reduce inventories with virtually no financial loss.

Lean production as Toyota's philosophy guarantees effect and success.

Undoubtedly, the prospect of further exploration in this direction will include the philosophy of lean-production.

Conflict of Interest and other Ethics Statements

The authors declare no conflict of interest.

References

Buhaichuk, O. (2019). Strategies of information and innovation activity development at enterprise in digital conditions. *Zaporizhzhia National University, 1*(78), 75-85.

Cherep, A., Voronkova, V., Andriukaitiene, R., & Nikitenko, V. (2020). The concept of creative digital technologies in the tourism business in the conditions of digitalization. *Zaporizhzhya National University, 5*(82), 196-209. (in Ukrainian).

Drucker, P. (2000). *Management tasks in the XXI century.* Moscow. (in Russian).

Goodman, M. (2019). *Crimes of the future: everything is interconnected, everyone is vulnerable and what we can do about it.* Kyiv: Ranok, Fabula. (in Ukrainian).

Jurgen, A. (2019). *Management 3.0. Agile management. "Leadership and management of teams".* Kharkiv: Ranok, Fabula.

Liker, J. (2019). *Philosophy of Toyota. 14 principles of a good command.* Kyiv: Our format. (in Ukrainian).

Melnik, V. (2019). Agile-management 3.0 concept as a factor of technological progress development in the digital society. *Zaporizhzhia National University, 1*(78), 130-139. (in Ukrainian).

Michio, K. (2017). *Physics of the future.* Lviv: Litopis. (in Ukrainian).

Nesterenko, O., & Oleksenko, R. (2020). Social philosophical reflection of the individual legal education philosophy as the basis for the democratic society functioning. *Zaporizhzhia National University, 4*(81), 165-181. (in Ukrainian).

Nikitenko, V., Andriukaitiene, R., & Punchenko, O. (2019). Formation of sustainable digital economical concept: challenges, threats, priorities. *Zaporizhzhia National University. 1*(78), 141-153. (in Ukrainian).

Punchenko, O., Voronkova, V, & Vodop'yanov, P (2021). Care as a global problem of humanity and its relationship with other global problems. Humanities studies: Collection of Scientific Papers. *Zaporizhzhia National University, 7*(84), 39-47, https://doi. org/10.26661/hst-2020-7-84-05. (in Ukrainian).

Teslenko, T. (2020). *Theoretical foundations of philosophy of economics in the context of new enlightment worldview 2.0,* Trebisov, Slovenska republika.

Teslenko, T. (2021). Science-epistemological evolution of the understanding-category apparatus of the philosophy of the economy as a new philosophical knowledge. *Humanities studies: Collection of Scientific Papers. Zaporizhzhia National University, 4*(81), 126-144, http:// humstudies.com.ua/article/view/209399. (in Ukrainian).

Teslenko, T., & Zadoia, V. (2021). Breakthrough technologies as a factor of formation of information economy in the conditions of digitalization. *Humanities studies: Collection of Scientific Papers. Zaporizhzhia National University, 7*(84), 48-57, http://humstudies. com.ua/article/ view/234351. (in Ukrainian).

Voronkova, V., & Teslenko, T. (2020). Formation and development of digital technologies as a factor in the implementation of the fourth industrial revolution. *Journal of the Belarusian State University. Philosophy. Psychology, 2,* 4-11, https://journals.bsu.by/index.php/ philosophy/ issue/view/211. (in Russian).

Voronkova, V., Teslenko, T., Nikitenko, V., & Bilohur, V. (2020). Impact of the worldwide trends on the development of the digital economy. *Amazonia Investiga, 9*(32), 81-90. https://www. amazoniainvestiga.info/index.php/amazonia/issue/archive.

Winchester, S. (2019). *Perfectionists. How engineers created the modern world*. Kharkiv. (in Ukrainian).

Womack, J., & Jones, D. (2019). *Lean production. As a manufacturing system, Toyota will help prevent material loss and ensure the prosperity of your company.* Kharkiv: Ranok, Fabula. (in Ukrainian).

Womack, J., Jones, D., & Rus, D. (2017). *A machine that changed the world. The history of line production – Toyota S dark weapons in car wars.* Kyiv: Pabulum, Lean Institute Ukraine. (in Ukrainian).

Zhuravel, K. (2019). Concept of flexible management at enterprise in digitalization and lean production conditions. *Zaporizhzhia National University, 1*(78), 98-107. (in Ukrainian).

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ОЩАДЛИВЕ ВИРОБНИЦТВО "TOYOTA" ЯК ІНТЕГРОВАНА СИСТЕМА ОПЕРАЦІЙНОЇ ДОСКОНАЛОСТІ

Анотація. Актуальність дослідження теми ощадливого виробництва набуває великого значення тому, що його впровадження демонструє нові методи менеджменту та керування всіма виробничими та логістичними процесами, направленими на досягнення якості.

У статті проаналізовано Виробничу Систему "Тойоти", яка лягла в основу багатьох праць на тему "ощадливості". Мета статті дослідження теоретичних і практичних засад ощадливого виробництва "Тойоти" як цілісної системи управління та досягнення операційної досконалості, що в свою чергу, є умовою досягнення успіху при її застосуванні в автомобільній галузі як у виробництві, так і сфері послуг.

Завдання дослідження:

1. З'ясувати визначення цінності та потоку їх створення як сукупності дій, націлених на формування ощадливого мислення.

2. Сформувати концепцію ощадливого виробництва як стратегії досконалості.

3. Розкрити глобальне значення "філософії Toyota" як найбільш прибуткової галузі серед автомобільних виробників.

4. Дослідити Виробничу Систему "Тойоти" як підгрунття руху за ощадливе мислення і ощадливе виробництво.

Поставлена мета визначила застосування загальнонаукових методів – аналізу, синтезу, порівняння, індукції та дедукції, наукової абстракції, аналогій та наукових узагальнень, логічного та історичного аналізу в рамках системного та кроскультурного підходів, прогнозування та моделювання, літературного огляду наукових джерел.

Доведено, що "ощадливе виробництво" (lean production) – один з яскравих прикладів "японського дива", до основних принципів якого відносяться: визначення цінності товару або послуги для споживача; визначення потоку створення цінності; боротьба з втратами; забезпечення безперервності потоку створення цінності; "витягування" виробництва; постійне вдосконалення. Автори зазначають, що принципи ощадливого виробництва дозволяють їм майже вдвічі збільшити продуктивність праці; прискорити час випуску; удвічі скоротити виробничі площі; зменшити запаси практично без фінансових втрат.

Практичне значення виконаних досліджень полягає в тому, що ощадливе виробництво як філософія "Тойоти" гарантує ефект і успіх.

Ключові слова: *ощадливе виробництво, "Toyota", операційна досконаліть, продуктивність, досягнення успіху*

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