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## **THE ROLE OF INTRODUCTION OF THE CONCEPT "ECONOMIC PRODUCTION" IN INDUSTRIAL ENTERPRISES IN THE DEVELOPMENT OF SMALL BUSINESS**

**Abstract.** *In this article, the author explores the importance of introducing the concept of "economic production" in industrial enterprises in the development of small business. The research methodology is based on the review and analysis of the scientific literature on the digital transformation of society, mobile education, educational robotics, the use of software tools for the development of thinking. The article also summarizes the specifics of developing students' environmental thinking and lean manufacturing skills in the process of designing a mobile automated device in an environment of creative, interdisciplinary, knowledge and research activities aimed at preparing highly qualified professionals for the future economy.*

**Keywords:** *lean manufacturing, waste type, environment, waste, workspace, rational use.*

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## **РОЛЬ ВНЕДРЕНИЯ КОНЦЕПЦИИ «ЭКОНОМИЧЕСКОЕ ПРОИЗВОДСТВО» НА ПРОМЫШЛЕННЫХ ПРЕДПРИЯТИЯХ В РАЗВИТИИ МАЛОГО БИЗНЕСА**

**Аннотация.** *В статье автор исследует важность введения понятия «экономичное производство» на промышленных предприятиях в развитии малого бизнеса. Методология исследования основана на обзоре и анализе научной литературы по цифровой трансформации общества, мобильному образованию, образовательной робототехнике, использованию программных средств для развития мышления. В статье также обобщены особенности развития у студентов экологического мышления и навыков бережливого производства в процессе проектирования мобильного автоматизированного устройства в среде творческой, междисциплинарной, познавательной и исследовательской деятельности, направленной на подготовку высококвалифицированных специалистов для экономики будущего.*

**Ключевые слова:** *бережливое производство, вид отходов, окружающая среда, отходы, рабочее пространство, рациональное использование.*

**Introduction.** Due to the difference between the production sphere and the material sphere, approaches to the organization and management of an enterprise have a number of differences. Therefore, the application of quality management systems (QMS) and methods of increasing efficiency will depend on various factors. The problems facing the enterprises of the service sector: low productivity, high production losses, poor quality of service, constant shortage of material,

human and financial resources can be solved with the help of the "lean manufacturing" system.

**Literature review.** Under these conditions, domestic and foreign researchers as well as M.Agranovich [1], M. Fritsch, M. Wyrwich [2], F. Gault [3], M. Janelli [4], M.Hamada, M. Hassan [5] , S.D.Karakozov, NI Ryzhova [6], Ya. Kuzminov [7], P. Sorokin, I. Froumin, A. Lavrinenko [8], N. Shmatko and others substantiate the need to change the content, methods and organizational forms of educational work. The didactic process in the era of automation and globalization should be focused on solving the problems of the country's socio-economic development in the context of the fourth industrial revolution and the emergence of the digital economy.

As noted in their works by CE Mora-Luis, J. Martin-Gutierrez [9], the basis of the digital economy is the synthesis of the existing material production (new materials, automated design / production) and digital technologies, which supports the widespread use of artificial intelligence models and development of the Internet of things. According to the authors, "smart products" will be the norm in a world where intelligent computerized devices (robots), systems consisting of them, get the opportunity to interact in the preparation and deployment of automated production processes. The nature of the new industrial, or technological (digital) revolution places special demands on the highly skilled professionals of the future. E. Ya. Varshavskaya, E. S. Kotyrlo, Ya. Kuzminov, P. Sorokin, I. Froumin [10] reasonably conclude that graduates will need a high level of mathematical literacy for employment; thorough natural science and humanitarian training. The authors, when disclosing the essence of the professions of the future, focus on abilities that are called "competencies of the XXI century": fundamental theoretical knowledge, competencies in the field of technology (creativity, communication, self-organization, initiative, critical thinking, etc.).

**Analysis and results.** Today, the role of small business and private entrepreneurship in the economic development of the world is growing, and it is playing an important role in optimizing the market structure and providing

employment. It is estimated that in post-industrial and industrial countries, this sector accounts for three-quarters of GDP and at least 80 percent of the working age population.

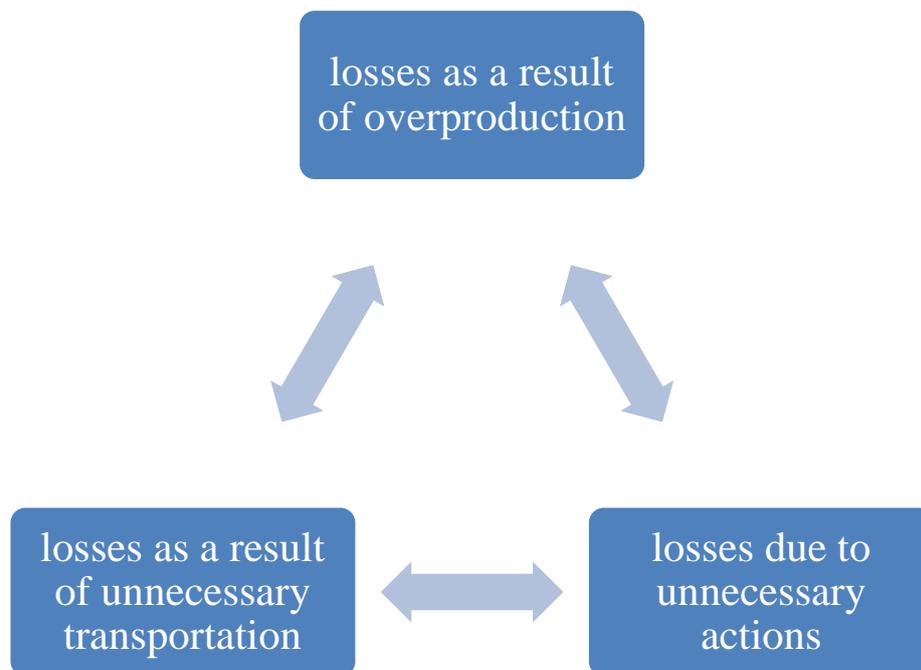
The development of small business and private entrepreneurship is one of the priorities in our country, which plays an important role in further increasing employment, achieving GDP growth, creating a modern business and competitive environment, and ensuring the sustainable development of the economy.

As the environmental situation worsened, governments in various countries began to demand that industrial companies take a responsible approach to the negative impact on the environment. Bare production allows you to reduce the resources spent to support the economy, which not only has a positive impact on the cost of the product, but also prevents many problems in the long run. To do this, instead of increasing production capacity, it is necessary to focus on more rational use of resources, while increasing the consumption of raw materials [1].

Lean Production is the concept of managing manufacturing enterprises based on continuous efforts to eliminate all types of waste (meaning “lean”, “lean”, “lean”). The concept is based on the principles of Toyota and allows you to organize the production of products with minimal costs in the shortest possible time, and at the same time achieve the level of quality required by the customer. In the 1950s, the creator of the Toyota production system identified 7 types of losses. (Figure 1).

The eighth was written by Jeffrey Licker in his book Toyota Way Development, which described it as “the unfulfilled creative potential of employees” [2,3,4]. To reduce confusion, it is enough to emphasize the aspects that you need to focus on first:

- ✓ Complexity - eliminating or reducing the number of complex technological solutions because they are, as a rule, more expensive and more difficult to manage;
- ✓ Labor - reducing “unnecessary” actions of workers;
- ✓ Overproduction - the production of the required amount of products for immediate delivery to the consumer, instead of loading warehouses;

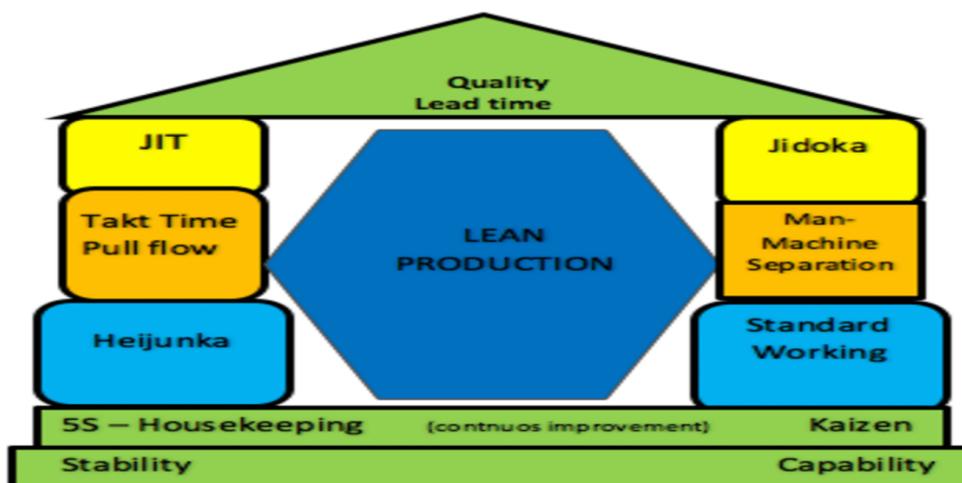


**1-picture. The main type of losses of the creator of the Toyota production system in the 50s of the twentieth century**

- ✓ Space - rational use of space due to easier placement of equipment, conveyors, workstations and reduction of storage space;
- ✓ Energy - rational use of energy, energy-efficient production;
- ✓ Disadvantages - minimization of defects due to a more perfect technological cycle;
- ✓ Raw materials - striving for one hundred percent use of raw materials and minimization of industrial waste; all materials must be converted into the final product.
- ✓ Idle time - to prevent equipment failure, production should go in a well-coordinated single flow;
- ✓ Time - Eliminate equipment delays, long adjustments, or forced failures.
- ✓ Transportation - the elimination of unnecessary steps to move materials, people or data that do not affect the final value;
- ✓ Occupational safety - eliminating or reducing the risk to employees.

Energy efficiency can be improved by efficient use of the workplace, reducing the need to transport recycled products from one department to another, and reducing the number of defects that need to be eliminated. Reducing the

amount of raw materials consumed can be achieved by carefully controlling the materials, reducing the number of defects and the amount of industrial waste.



**Figure 2. The structure of the concept of "Lean production"**

If materials are used in a timely manner and not stored in a warehouse, this reduces the risk of deterioration and the associated economic losses. It also allows you to reduce warehouse inventories and occupied areas accordingly.

Lean Philosophy: Based on the principle of “waste is a lost resource”, waste disposal suggests that companies reduce the amount of industrial waste that leads to higher costs.

### **Conclusions**

The implementation of this policy will be achieved through a continuous assessment of costs in all production processes, the involvement of staff in resource savings, the development of measures for the processing and reuse of materials. The key is a systematic approach and continuous improvement. Naked production also affects non-production improvements, i.e., allows:

- ✓ increase supply reliability;
- ✓ reduction of technological life of production;
- ✓ Improving the overall quality of products.

Today, the concept is shared by global industry leaders such as Ford, Boeing, Airbus, GE, Scania, Alcoa, Xerox, and hundreds of local businesses. In summary, many industries, such as machinery, are less environmentally friendly by nature, and lean technologies make environmental protection measures financially beneficial for the company itself due to energy efficiency and rational use of raw

materials. The positive effect of reducing damage to the environment also avoids additional charges from producers who consume a lot of resources or have high emissions of harmful substances. Not only has naked production become a dominant trend in the global economy, but it can significantly reduce resource consumption, make industrial companies more environmentally friendly, and in addition, this strategy has become financially attractive.

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