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DEVELOPMENT AND IMPLEMENTATION OF STRATEGIES FOR MODERNIZATION OF EXPORT-IMPORT ENTERPRISES: FROM TECHNOLOGICAL AUDIT TO INCREASING INTERNATIONAL TRADE VOLUMES

The research object in this paper is strategies of production modernization in export-import enterprises. This research examines various approaches to modernizing production at these enterprises with particular emphasis on technologies implementation.

While export-import enterprises modernization has been studied by scholars, this work is focused on current challenges posed by contemporary geopolitical conditions and globalization. The issue addressed in the research revolves around the need to develop and implement strategies for modernizing production in export-import enterprises, taking into account the impact of geopolitical factors and the situation in global market.

The research confirms importance of introducing modern technologies and technical upgrades to enhance production efficiency at these enterprises, particularly through conducting technological audits. The results of this research validate that modernizing production leads to increased competitiveness for enterprises in international market. New technologies implementation and product quality improvement create a foundation for increased demand for the goods and services provided by these enterprises. These findings have significant practical application potential and can serve as guidance for regulators and enterprise managers striving to enhance their competitiveness and stability in the face of growing geopolitical and market turbulence.

The strategies for production modernization proposed by the author can be practically applied under the circumstances where export-import enterprises encounter escalating geopolitical challenges and dynamic shifts in global market.

Keywords: production modernization, export-import activity, technological audit, modernization strategies, international trade.

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1. Introduction

Today's globalized economy forces enterprises, especially those engaged in export and import, to constantly adapt to the growing demands and competition in international markets. Growing competition, new trade relations, tariffs and trade agreements create a need for enterprises modernization to preserve and increase their competitiveness [1]. In the conditions of growing requirements and limited resource potential, enterprises look for ways to reduce costs and increase production efficiency. The research results can provide valuable recommendations for optimizing business processes. International markets require compliance with high quality and safety standards [2]. Research can indicate how modernization can help meet these standards and thus provide access to global markets, as well as improve quality of their products and reduce production costs, which contributes to increased export volumes.

The modern world faces global challenges such as climate change, pandemics and wars [3]. Modernization can help enterprises adapt to these challenges and ensure more sustainable development [4].

Considering the challenges export-import-oriented enterprises face in the context of globalization and, in particular, the aggression of the Russian Federation, it becomes obvious that production modernization becomes a necessity that can determine future existence and success of such enterprises. This requires a deeper analysis to determine exactly how technological modernization can help in this context, which confirms the relevance of the chosen research topic.

Analysis of the flow of information points to several key issues that have not yet been fully resolved:

1. Insufficient innovation and technological retreat (many export-import enterprises lag behind in using modern technologies and innovative approaches, and some of them

still support outdated production methods, which limits their competitiveness).

2. Financial constraints (modernization may require significant financial costs, especially for small and medium-sized enterprises, and not all enterprises have the opportunity to obtain the required resources for introduction of new technologies).

3. Increasing qualifications of the labor force (new technologies may require specialized skills and qualifications that are not always available in labor market, and enterprises may face problems in attracting and training staff).

4. Lack of information and consultation (enterprises may not be sufficiently informed about technologies or methods that will be most efficient for their production, which may complicate the modernization process).

5. Legal restrictions and regulation (some regions and areas of activity may have restrictions and regulations that make it difficult to introduce new technologies or production methods).

6. Resource heterogeneity (resources for modernization may be unevenly distributed among different enterprises and industries, which leads to unequal competition conditions).

Considering these challenges, research in modernization strategies of export-import enterprises is extremely important to develop efficient approaches and recommendations that will help enterprises in addressing these challenges and achieving a stable and competitive position in international markets.

The aim of this research is to identify and analyze patterns related to development and implementation of modernization strategies in export-import enterprises in the context of their technological audit. In practice, this research will contribute to development and implementation of efficient modernization strategies for enterprises engaged in export-import activities, with an emphasis on technological audit. This will enable enterprises to increase their competitiveness on the international market and achieve improvements in production efficiency.

2. Materials and Methods

The research object is strategies for production modernization at export-import enterprises. The scientific search process was carried out using theoretical methods, as well as analysis of scientific literature and statistical data. Statistical programs such as R: and Microsoft Excel, as well as ChatOpenAI (ChatGPT), a type of artificial intelligence, were used to analyze and process information in order to clarify certain concepts and terms.

The research was conducted based on analysis of scientific literature and statistical data available at the time of the research. Experimental data were not involved, since the research was based on analysis of available information and literary sources.

3. Results and Discussion

In modern conditions of economic development, modernization strategies and everything related to them can be considered as the main foundation activity of economic systems is based on at various levels, such as organizations, industrial groups and the economy as a whole. This position is confirmed both in practical sphere and in theoretical approaches to innovative activity and innovative development formulated by scientists.

Modernizations are considered as an efficient way to achieve competitive advantages of a firm. At the same time, it is noted: «Competitiveness of an individual country depends on inclination of its industry to innovation and modernization» [5].

Modernization policy is studied as a key factor in socio-economic development of the state and economy competitiveness [6].

As noted in the paper, the strategy for modernizing production of export-import enterprises is based on a technical analysis, which it is proposed to consider in more detail. History of technological audit development spans for more than two decades and is characterized by conduct of scientific research and research activities carried out both by individual scientists and at the level of scientific and commercial teams.

There are a number of definitions of «technological audit» in scientific literature. Technological audit is an operation of objective assessment of the innovation potential as an object of commercialization [7]. Ambiguity in interpretation of the term «technological audit» is related to its relative novelty, since it began to be used in Western Europe from the beginning of last decade of the of the 20th century. Most often, a technological audit is understood as a comprehensive assessment of the enterprise aiming at identifying technologies and assessing their potential as an object of commercialization. In the scientific literature, when conducting a technological audit, checking the technological processes, methods, techniques and procedures used in the organization in order to assess their productivity and efficiency are emphasized.

Technological audit is a search for ideas, technologies, and objects of intellectual property in enterprises, their further commercialization by ensuring legal protection and transfer of these technologies. The main purpose of technological audit in organizations is to check efficiency of technological methods, techniques and procedures used in order to assess them and improve productivity. In this context, technological audit is an integral part of the overall strategic planning of organization and is its integral component. General sequence of actions in the course of technological audit is shown in Fig. 1.

General process of technological audit can be divided into several successive stages. The initial stage, determination of the audit purpose and object, determines target orientation of the research. Next, at the stage of collection and analysis of information, all required information is collected to assess the state of the technological process. After that the stage of assessment of identified problems comes, when analysis and identification of shortcomings in the technological process is carried out. Based on these identified problems, specific recommendations for their improvement are developed. After that, a cost-benefit analysis is conducted to assess the cost of recommendations implementation compared to the expected benefits. All audit results are formalized in a report to be submitted to the audit customer and other stakeholders. The final stage is implementation of recommendations for improving the technological process, which completes the audit cycle and contributes to improvement of the organization's functioning. The sequence given by the author may vary depending on specific conditions and tasks of the technological audit but it gives a general idea of the process.

For comparison, sequence of actions in the course of technological audit was developed, namely, for a production enterprise carrying out export-import activities, shown in Fig. 2.

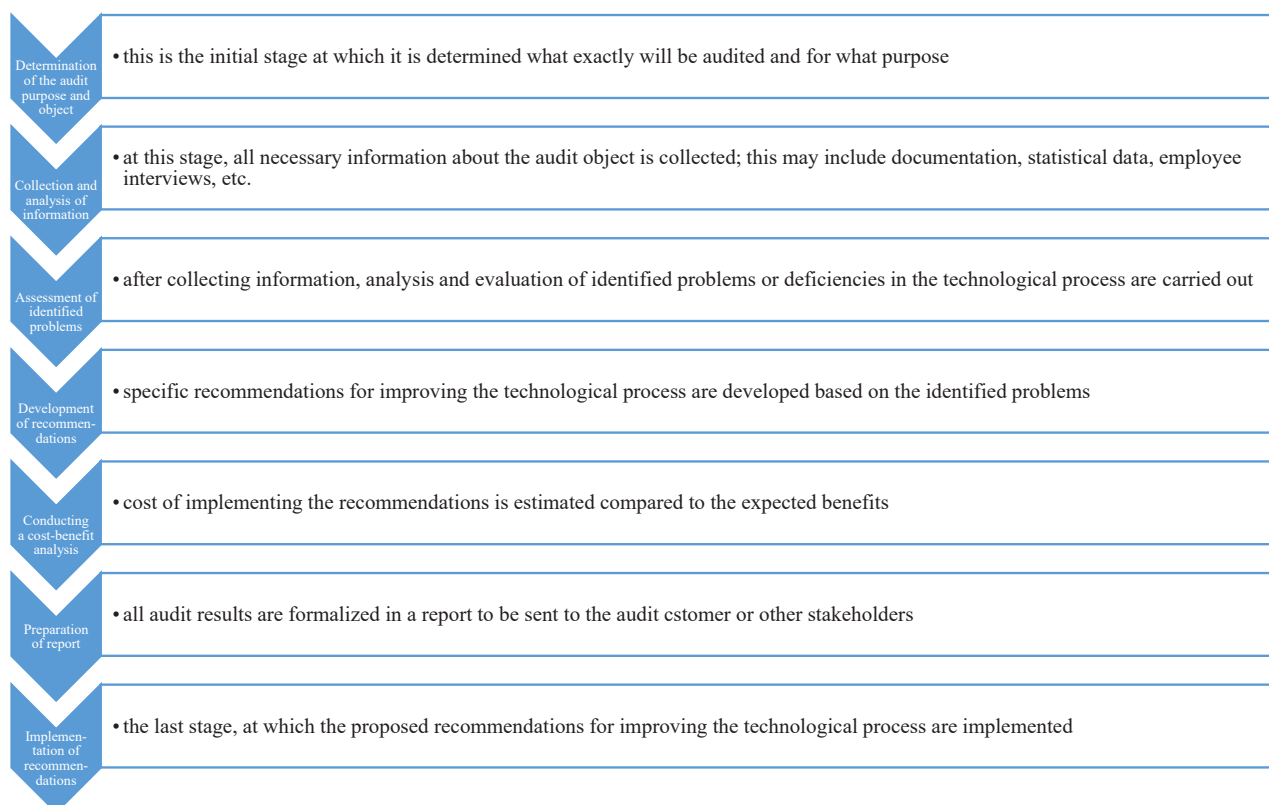


Fig. 1. General sequence of actions in the course of technological audit

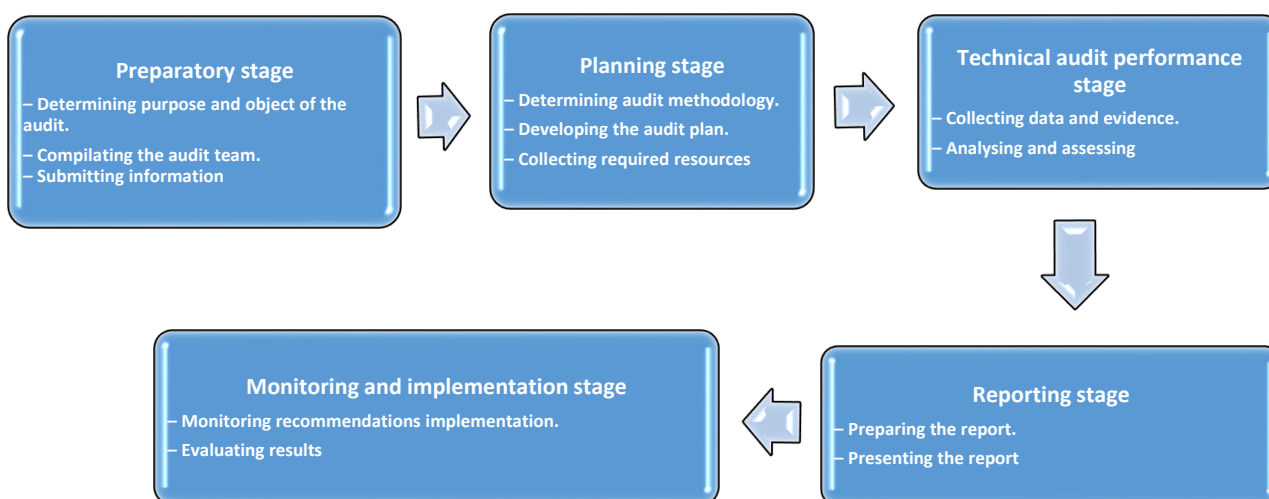


Fig. 2. Sequence of actions in the course of technological audit, namely, for a production enterprise carrying out export-import activities

At preparatory stage, the audit purpose and object is determined, and a team is formed that will conduct the audit and collect the required information about the enterprise, the industry and its export-import activities. This includes determining exactly what will be audited, such as production lines, equipment, and processes. At the planning stage, audit methods and techniques are chosen, a detailed plan of operations to be performed during the audit is developed, and access to the required resources is ensured. The stage of the audit involves conducting audit procedures to collect information and analyzing the current state of technological processes, identifying shortcomings and developing recommendations. After the audit is completed, a written report is prepared containing the audit results, including identified problems and recommendations. The

report is submitted to the enterprise owners and other stakeholders. At the last stage, there is monitoring of the recommendations implementation, monitoring of changes implementation and assessment of their impact on technological processes. This sequence of actions helps carry out a comprehensive technological audit at a manufacturing enterprise engaged in export-import activities.

The process from technological audit to increasing the volume of international trade is complex and multi-step [7]. At the initial stages of the audit, the state of technological processes is determined, problems are identified, and recommendations for their improvement are formed. Further monitoring and implementation of these recommendations contribute to improving production quality and efficiency. This, in turn, can lead to increased competitiveness of the

enterprise and increased volume of international trade. This process requires cooperation between many parties and a systematic approach but it can become an important step for development of export-import activities of the enterprise in international market [8].

The following strategies for modernization of production of export-import enterprises can be distinguished:

- *Technological modernization*: Includes introduction of new technologies, equipment and innovative production methods to increase productivity, quality and products competitiveness.
- *Optimization of logistics processes*: Development of efficient logistics and supply systems that allow reducing the cost of goods transportation and storage as well as shorten the time of delivery to customers.
- *Expanding the product range*: Development of new products or improvement of existing ones allowing the enterprise to expand sales markets and attract more customers.
- *Environmental modernization*: Implementation of environmentally friendly technologies and processes that help reduce the negative impact of production on the environment and meet requirements of sustainable development.
- *Expanding sales markets*: Identification of new markets for products export, conclusion of international agreements and development of distribution networks to increase the volume of international trade.
- *Management optimization*: Improvement of the enterprise management system, including financial management, resource management and personnel management, which helps to improve the operations efficiency.
- *Increasing personnel qualifications*: Development of skills and knowledge of employees, which allows the enterprise to implement modern technologies and best practices.
- *Creating strategic partnerships*: Concluding agreements with other companies, research institutions or government organizations to jointly solve problems and implement innovations.

These strategies can be applied separately or combined depending on the specific goals and conditions of the enterprise. Analysis of production modernization strategies at export-import enterprises indicates significant opportunities for increasing competitiveness and success in international markets for enterprises [9]. The choice of a specific strategy should be based on the needs and capabilities of each enterprise as well as on analysis of international markets and competitive environment.

Let's consider modernization strategies developed by the author at export-import enterprises. These directions

were named: Technological Efficiency Strategy (TES) and Market Expansion Strategy (MES). The major features of these strategies, advantages, disadvantages and examples of successful application are illustrated in Table 1.

In Table 1 comparison of different production modernization strategies at export-import enterprises highlights two key strategies: «Technological Efficiency Strategy» and «Market Expansion Strategy». Both strategies are aimed at achieving competitive advantage and increasing international trade volumes but they have different approaches and emphases. Technological Efficiency Strategy focuses on improving production efficiency and product quality. This strategy involves advanced technologies implementation, internal processes optimization, and cost reduction. It contributes to increasing competitiveness in the international market owing to high-quality products and reducing production costs. Market Expansion Strategy is aimed at increasing the volume of international trade through expanding geography of exports and imports. It requires development of marketing and sales strategies for entering new markets. This strategy helps to expand the customer base and increase sales.

When choosing a modernization strategy, enterprises must consider their current resources, goals, and specifics of their business. In addition, they can combine both strategies to achieve a comprehensive increase in competitiveness and international trade volumes.

The research results on production modernization strategies at export-import enterprises have direct practical application for enterprises engaged in international trade and seeking increase in its volumes. Businesses can use the research results to determine the optimal modernization strategy matching their needs and capabilities. For example, if the research indicates importance of technological modernization, the enterprise can develop a specific plan for introducing new technologies. Applying modernization recommendations and strategies can help businesses increase their competitiveness in international markets. New technologies, logistics optimization and other measures can reduce costs and improve product quality. The research results may indicate potentially profitable markets for expansion of export-import activities. Businesses can use this information to develop strategies for finding and developing new markets. Management optimization recommendations can be applied to improve internal management of the enterprise. This may include optimization of financial processes and efficient use of resources. If the research indicates importance of environmental upgrading, businesses can use these recommendations to reduce their negative impact on the environment and meet sustainable development standards.

Table 1

Modernization strategies at export-import enterprises

Modernization strategy	Main features	Advantages	Disadvantages	Examples of successful application
Technological Efficiency Strategy (TES)	<ul style="list-style-type: none"> – Focus on increasing production efficiency through introduction of advanced technologies. – Emphasis on optimization of internal processes 	<ul style="list-style-type: none"> – Increasing labor productivity and reducing costs. – Product quality improvement 	<ul style="list-style-type: none"> – High costs for introduction of new technologies. – Requires significant investment and changes in production process 	Company XYZ improved production with robotics and automation, which increased production volumes by 30 %
Market Expansion Strategy (MES)	<ul style="list-style-type: none"> – Expanding the geography of export and import by opening new markets. – Focus on marketing and sales development 	<ul style="list-style-type: none"> – Expanding the customer base and increasing sales volumes. – Possibility of diversification of risks in case of economic difficulties in one market 	<ul style="list-style-type: none"> – Requires significant efforts in development of marketing and logistics competencies. – Risk of unawareness of local markets 	ABC company expanded its sales network in European countries and increased export volumes by 50 % with the help of marketing campaigns and logistics solutions

Therefore, the research results are valuable guidelines for practice and can help enterprises to improve their activities in international markets, increase accounting and investment in enterprise modernization, as well as increase their competitiveness and sustainability in the global economic environment. The results of this research can serve as an important tool for enterprises engaged in export-import activities. They will tell you how to optimize production, efficiently use technological capabilities and ensure sustainable growth in the modern world.

Economic conditions, legislation and other factors may change over time, which makes some research results limited in time [10]. The research was based on available data, information and resources. Lack of up-to-date data limits the analysis accuracy and objectivity.

In this regard, the conditions of martial law in Ukraine had a significant impact on the research conduct and its results. Specifically, this was reflected in limited availability of data and resources, impact of legislative changes and legal context, changing economic environment, and consideration of safety and ethical issues in conducting the research.

Prospects for further research could be extended to a more detailed analysis of each of the modernization strategies, including their impacts, advantages and disadvantages for enterprises in different industries and settings. Since geopolitics can significantly affect export-import activities, research can include analysis of the impact of geopolitical events and risks on modernization strategies. Research can examine how different regions of the world require different modernization strategies due to differences in economic conditions, cultural features, and trading partners.

Research should be conducted on how rapidly changing conditions in international markets affect the choice and efficacy of modernization strategies. The listed areas of research can contribute to development of better understanding of modern challenges and opportunities for export-import enterprises in the modern globalized world.

4. Conclusions

The results obtained upon this research indicate importance of production modernization strategies in export-import enterprises for achieving sustainability and competitiveness in international markets. The research highlighted significance of technological audit as a key tool for implementing these strategies.

The results also indicate the importance of analyzing and choosing the optimal modernization strategy depending on the specifics of the enterprise and industry. The research identified certain regularities in the process of finding and implementing modernization strategies.

It has also been shown that scientific research in this field is of great practical importance, since it provides companies with information and tools to improve efficiency and competitiveness in international markets.

Therefore, the results obtained emphasize relevance and importance of modernization strategies for export-import enterprises in the modern conditions of the global economy. The research adds new data and insights to production modernization strategies and technological audits in export-import enterprises. The data obtained can be used in training students, masters, and other scientists in business and economics. The research results provide

enterprises with information that can help them take justified decisions about modernization and introduction of new technologies. Analysis of research results can help enterprises avoid possible problems and mistakes in modernization process. The results obtained can attract investors interested in developing enterprises introducing innovative technologies and modernize production. Thus, the results obtained have practical applications for business and can contribute to improving the efficiency of export-import enterprises.

Conflict of interest

The author declares that she has no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this paper.

Financing

The research was conducted without any financial support.

Data availability

The manuscript has no associated data.

Use of artificial intelligence

The author used artificial intelligence technologies, namely ChatOpenAI ChatOpenAI (ChatGPT), within the permissible limits to provide her own verified data described in the research methodology section.

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