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OPTIMIZATION OF LOGISTICS BUSINESS PROCESSES IN THE ARMED FORCES OF UKRAINE

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Purpose. The purpose of the article is to analyze the problematic issues of logistics business processes optimization and justify the need for the implementation of information systems and technologies into the logistics management of the Armed Forces of Ukraine.

Design/methodology/approach. a set of scientific methods was used, among some: theoretical generalization – to characterize the specifics of military logistics; historical and logical – to reveal the historical progress of military logistics; structural and logical analysis – to identify problems in the organization of business processes in the Armed Forces; modeling – to build a model for optimizing the logistics process; graphic – to visualize individual results; algorithmization – to represent the stages of SAPR/3 implementation; abstract – to systematize scientific achievements and formulate conclusions.

Findings. Optimization problems of logistics business processes in the Armed Forces of Ukraine are analyzed. Modern conditions require a radical change in outdated approaches to the formation of logistics business organizations, including the defense area. Examining the impact of logistics business processes on the financial security of defense enterprises, the study notes that there are both horizontal and vertical conditions and factors of such an impact. It is argued that an important factor in the development of logistics systems today is the active implementation of automated management decisions that lead to the formation of electronic logistics, which is important in the face of rapid changes in the unit's location and active hostilities. The need to implement an automated management system in the logistics system based on Accelerated SAP (ASAP), which combines technological and management parts in the form of three main components: 1) synchronization of customer business priorities (depending on industry) with specific SAP solutions through industry business value maps of the Solution Explorer tool; 2) project management maps (route maps) with the main stages and actions on them; 3) design, development, testing and operation using SAP Solution Manager.

Practical implications. It was found that as a result of the implementation of the SAP R/3 program it is possible to increase the efficiency of logistics, speed up the execution of operational tasks, as well as speed of receiving and processing information. To better organize logistics processes in the Armed Forces of Ukraine, the authors propose to create the service of monitoring the support component of the defense industry, which should include the head of the service, a technical support specialist, a rear support specialist, a medical support specialist, and an information support specialist.

Originality/value. The logistical support of the Armed Forces is aimed at meeting the needs of the troops with the means of subsistence they need, maintaining combat capability, and conducting combat operations. To optimize the logistics processes in the Armed Forces of Ukraine was proposed to create a service of monitoring the support component of the defense industry. The implementation of information innovation in the form of the SAP R/3 program will help increase the efficiency of logistics.

Key words: logistics; military logistics; logistics business processes; logistics costs; monitoring system service; electronic logistics; information logistics systems; SAP R/3 Software.

Paper type: Research paper.

Formulation of the problem

The crisis processes in the economy of our country require the highest-level leaders of the state to implement effective management methods in all areas of activity. The problem of material support of the defense sphere of Ukraine in the conditions of intensification of the military actions in the east of the state is especially acute. In particular, in the authors' opinion, it is important now to optimize business processes in the logistics of the Armed Forces to minimize costs, optimize the management, and reduce supply processes. Therefore, the authors focused on building a model for optimizing the logistics process in logistics and the introduction of information innovation.

Analysis of recent research and publications

Usually, scientists, taking into account the feasibility of logistics, suggest using their adjustments in defining the word "logistics", as the interpretation of this term may further affect the process of organizing logistics and the division of powers between the departments connected in a single supply chain.

Currently, the terminology of military logistics is constantly evolving. The variety of its definitions is caused by the use of different terms in the description of the same essence or phenomenon in this area. This is primarily related to the researcher's affiliation to different logistics schools or his distinguishing individual aspects of the logistics process or the system as a whole. Despite the diversity of its interpretations, the main purpose of military logistics is to support military operations and the armed forces (troops) involved.

According to scientists [1; 2], the main tasks of military logistics are: maintaining military power and promoting the movement of troops; supply of food and other material and technical means to the army; organization of medical care (evacuation and treatment of the wounded); deployment of forces and facilities.

The authors agree with the definition of V. S. Kyvliuk's that military logistics is a type of management activity, which is based on the formation of the most appropriate conditions for meeting the needs for material resources and goals of the Armed Forces of Ukraine by determining the source of their fulfillment, the identification and accounting of needs, their actual implementation in the process of research and development work and production, coordination of the dynamic conformity of "life cycles of armaments and military equipment", the introduction of the movement of material resources to the final consumer. As an economic object at the state level, it is the system of a set of bodies and persons, who have economic power in their hands, make decisions and implement programs on a state scale, and dispose of state property [3].

In general, military logistics has a long history and is considered a developed area in the modern world. The generalization of the historical progress of military logistics made it possible to single out some of the most important events, namely: Admiral A. T. Mahan (1880) introduced logistics into military terms; J. Thorpe (1917) developed military logistics in two directions: theoretical logistics and practical logistics; Rear Admiral H. Eccles (1950 – the work "Operational Logistics of the Navy", 1959 – the work "Logistics in National Defense") made a certain adjustment of the concepts, structure, and tasks of military logistics, including the needs of NATO, having summarized the rich experience of World War II. According to Eccles, logistics is interpreted quite broadly as a link between the economy and the country's Armed Forces, besides that, three groups of factors have a decisive influence on military success: political, economic, and military.

Currently, the direction of research in military logistics is diverse: from models of the integrated military logistics supply chain, which unites the entire system of military support (rear support system, information and service system of troops) [4; 5] to the relationship between military and commercial logistics in terms of their goals in the supply chain management, which unite the management of procurement, inventory, warehousing, transportation, the necessary networks, information flow, technology, and security management [6; 7]. The armed forces of many countries have their research institutes that work on the invention of logistics for the benefit of the army, respond to market changes, use "civilian" decisions, adapting them to their needs.

Hypothesis formulation and goal setting

The purpose of the article is to analyze the problematic issues of logistics business processes optimization and justify the need for the implementation of information systems and technologies into the logistics management of the Armed Forces of Ukraine. The authors suggest the possibility of optimizing logistics processes in the Armed Forces and the use of information innovations.

Research methodology

Information, theoretical and methodological basis of the study were domestic regulations, works of scientists studying the problems of logistics, business processes, military affairs.

To achieve the goal, the article uses a set of scientific methods that have ensured the conceptual integrity of the study, including methods: theoretical generalization – to characterize the specifics of military logistics; historical and logical – to reveal the historical progress of military logistics; structural and logical analysis – to identify problems of interaction between enterprises of the defense industry; modeling – to build a model for optimizing the logistics process in logistics; graphic – to visualize individual results; algorithmization – to represent the stages of SAPR/3 implementation; abstract – to systematize scientific achievements and formulate conclusions.

Main part

Logistics is implemented using military and civilian capabilities. Civil means are planned for use when it is justified operationally, economically and is possible in the existing legal conditions [8].

That is why, in the authors' opinion, it is logistics business processes with the help of which the resources being at the disposal of the armed forces are managed. The place and role of military logistics are shown in Fig. 1.

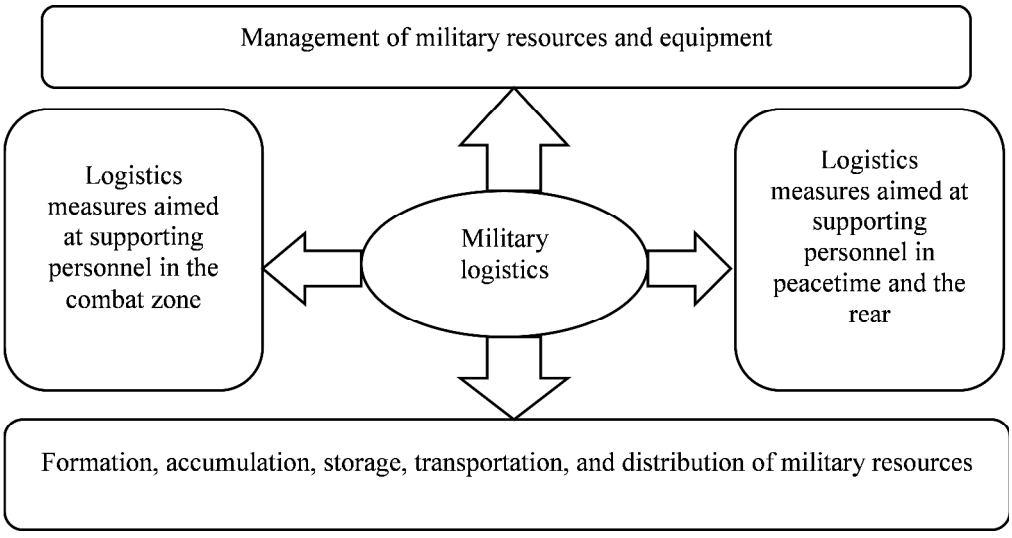

Fig. 1. Role of military logistics in the resource management of the Armed Forces (developed based on [8])

The current stage of logistics development is characterized by full integration associated with the development of transport service in logistics; using the concept of quality total management, which has made logistics one of the most important tools in competition. It is characterized by the following main factors [9]:

1) the globalization of the world economy has allowed economic entities to cooperate in a single economic world space through the use of the latest communications and transportation;

2) the global scientific and technological progress has accelerated the integration and strengthening (consolidation) of the elements of logistics infrastructure into a single logistics system, promoting the use of modern computer and innovative technologies in the management of logistics processes.

Thus, during its emergence and formation, logistics as science formed a common set of tools (models, methods, and rules) to solve the issues of system effective management – a network and flow of objects in time and space (goods, information, finance, and people) that are a major asset for consumers by ensuring the achievement of balanced economic, social, and environmental goals.

The globalization of economic relations, the internationalization of production, the openness of national economies, the liberalization of world trade, technology transfer have made competition global. At this time, the aggravation of contradictions and increased competition are observed at almost all levels, in all segments and types of the world and national markets.

The most important position in the modern global economy is occupied by the largest multinational companies (Microsoft, IBM, Apple, Intel, GE, Samsung, etc.).

Such innovative corporations determine the globalization advantages of the world's leading countries (USA, EU, Japan, and China) in modern conditions. They can attract significant investment in competitive innovation projects, the successful implementation of targeted financial strategies [10].

Therefore, the authors present the most relevant forms and processes of innovatization that are used in the logistics system and are relevant for the implementation in the Armed Forces: electronic data interchange (EDI) [11]; goods coding system; electronic money transfer; satellite monitoring system of truck location [12]; artificial intelligence system [13].

The types of information systems used in logistics today are as follows: S&OP (Sales & Operation Planning) − a system of planning sales and operation activity; ERP (Enterprise Resource Planning) − the enterprise resource management system (ERP = MRP II + FRP + DRP), where not only materials and time of work centers but also the financial resources of FRP are the subject of planning, DRP − the distribution resources management; CALS (Continuous Acquisition and Lifecycle Support) − a system of continuous development and support of a product life cycle (goods or services); FP&S (Factory planning & Scheduling) – a system for planning technological processes and creating calendar schedules; SRM (Supplier Relationship Management) – a system managing relationships with suppliers; CRM (Customer Relationship Management) – a system managing relationships with customers; CMS (Content Management System) – a document circulation management system; PDM (Product data management) – the organization of electronic archives and document circulation management (the following technologies are generalized in the systems: engineering data management (EDM), document management (Product information management – PIM), TMS (Transportation Management System) – transportation management system, vehicle safety systems, WMS (Warehouse Management System) – a warehouse management system, FMS (Fleet management systems) – fleet management systems, CTMS (Container Terminal Management) – container terminal management [14]; MRO (Maintenance, Repair and Overhaul) – a vehicle and armament management system; GIS (Geographic information system) – geographic information systems; GTS (Global Trade Services) – foreign trade and trade support systems (including customs clearance); DRP (Distribution resource planning) – a distribution resource management system, SCM (Supply Chain Management) – supply chain management; HRM (Human Resources Management) – personnel management; FRP (Finance Requirements Planning) – a financial management system: financial accounting and reporting, management accounting, banking, accounting, etc. [15]. These and other systems should also be used in the logistics of the Armed Forces, which will help reduce time and resources.

Today, the management of logistics activities in the Armed Forces is performed by SC "Ukroboronprom" [16], the creation of which was caused by the situation characterized by the inadequate efficiency of state property management using command-and-control methods, the dispersion of enterprises between several management bodies, and not always appropriate distribution and use of budget funds.

The state concern "Ukroboronprom" is a strategic manufacturer of armaments and military equipment in Ukraine. The concern unites more than 100 state-owned enterprises and plants in the main strategic branches of the state's defense industry. The Concern includes enterprises in aircraft construction and aircraft repair, engine and turbine construction, artillery and radar systems, shipbuilding; rocketry; the manufacture of ammunition and armored vehicles. "Ukroboronprom" has more than 10 design bureaus engaged in development, design, and research, and 6 special export companies. The Concern's enterprises employ about 67.000 highly qualified employees, most of whom have higher degrees in mechanical engineering, applied mathematics, physics, etc.

However, modern conditions require a radical change in outdated approaches to the formation of logistics business organizations, including the defense area.

One way to increase the logistics system efficiency is, of course, to reduce logistics costs.

There is no doubt in the opinion of O. P. Tiapukhin's [17] that the most important aspect of logistics is the need to assess the economic effect, as the use of traditional methods is complicated by the multi-directionality of the results: firstly, all elements of the logistics system benefit, and secondly, it is necessary to take into account the benefits received by consumers who meet the needs of this logistics system.

Besides, studying the impact of logistics business processes on the financial security of defense enterprises, it should be noted that there are both horizontal and vertical conditions and factors of such an impact.

Thus, the problems of the "horizontal" interaction of defense industry enterprises with the environment (state/foreign countries, competitors) are as follows:

– imperfection of legislative and regulatory support;

– foreign policy and foreign economic problems;

– institutional problems.

The problems of the "vertical" interaction of defense industry enterprises with the environment (customers/intermediaries, suppliers) are as follows:

– financing on a residual basis of measures of state target programs for the development of the defense-industrial complex;

– critical level of depreciation of fixed assets;

– a significant number of state-owned enterprises and a lack of clearly established mechanisms for their structuring;

– low level of profitability of defense projects implemented in the interests of public customers;

– insufficient financial firmness and stability of state-owned defense enterprises;

– a small number of closed domestic production cycles of VFR and MSW, which is required by the Armed Forces and other components of the defense forces;

– low investment attractiveness of defense industry entities and projects in the field of defense production and insufficient compliance of the products of defense industry enterprises with EU standards.

Thus, the financial security of Ukrainian defense industry enterprises is significantly affected by some negative conditions and factors, including *external ones* (termination of the cooperation with Russian defense companies, loss of Ukraine's control over defense companies located in the Crimea and Sevastopol, and some areas Donetsk and Luhansk regions) and *internal* institutional and organizational, and economic ones (lack of budgetary resources for technical equipment of the Armed Forces and other law enforcement agencies of Ukraine; the unbalanced structure of the main productions of the defense industry and limited budget resources, which are annually directed in the field of reform and development of the defense industry; general underdevelopment of the domestic market of defense products and a significant reduction in the scientific and technical potential of the defense industry of Ukraine, etc.) [18].

Undoubtedly an important factor in the development of logistics systems today is the active implementation of automated management decisions that lead to the formation of electronic logistics, which is important in the face of rapid changes in the unit's location and active hostilities.

It is the incompleteness of the processes of formation of the most important elements of a market economy, including the national market of electronic logistics, that determines the relevance of further systematic research on the mechanisms of its creation and development in the countries with economies in transition, to which the international community includes the former Soviet Union (Ukraine, Russia, Belarus, Kazakhstan, Georgia, etc. except the Baltic countries), a part of Central and South America, Central Africa, and others.

It is important that in many respects our country in recent years has begun to exceed the average level of groups of low- and middle-income countries. However, despite some achievements, Ukraine lags far behind the average level of European and Central Asian countries (whose indicators are higher due to the number of technologically advanced countries among them) [19], not to mention the United States.

On September 14, 2020, the Decree of the President of Ukraine № 392/2020 approved the National Security Strategy of Ukraine, the main principles of which include: development of defense and security capabilities to prevent armed aggression against Ukraine; development of strategic relations with key foreign partners, first of all with the European Union and NATO and their member states, the United States of America, pragmatic cooperation with other states and international organizations based on the national interests of Ukraine; strengthening the capabilities of the Armed Forces of Ukraine and other bodies of the security and defense sector. Great importance is also attached to the improvement and development based on the modern technologies of logistics systems of the Armed Forces of Ukraine [20].

Besides, within the framework of military cooperation, automated processes should be implemented to support the receipt, storage, accounting, control over the movement and use of weapons transferred to the Armed Forces of Ukraine by foreign countries. Given the experience of developing such automated systems in the armed forces of the world's leading countries, the measures to create and implement an automated system of logistics management for the Armed Forces of Ukraine should be based on industrial ERP systems for military use, widely used in the armed forces of leading countries and NATO. Such a platform, for example, is SAP for defense. The development of the automated command and control system of the Armed Forces of Ukraine should be carried out under the implementation methodology of SAP – Accelerated SAP. In general, the corporate methodology Accelerated SAP (ASAP) offers a comprehensive range of tools that combines technological and management parts in the form of three main components:

– synchronization of client's business priorities (depending on the industry) with specific SAP solutions through industry business value maps (value maps) of the Solution Explorer tool;

– project management maps (route maps) with the main stages and actions on them;

– design, development, testing, and operation using SAP Solution Manager.

To properly ensure logistics activities in the rear support of the Armed Forces, it is necessary to form an optimal model of its process, which would provide a positive financial result of the "Ukroboronprom" holding and accelerate the turnover of working capital and release appropriate funds.

In the process of forming the above model, it is important to take into account the procedure of setting the price of products, works, or services for defense purposes, as it will impose certain restrictions on the formation of the holding's financial result. According to the resolution of the Cabinet of Ministers of Ukraine as of August 8, 2016, No. 517, the company's profit in price may not exceed 5 % of its costs for the purchase of components (semi-finished products), works from other businesses, as well as 30 % of the rest costs as part of the production cost of products of own production. The specific weight of purchased components in the latest samples of weapons and defense equipment on average is 70 % of their total, and the rest – only 30 %, which affects the level of profit. At present, the estimated profits of defense industry enterprises are 10 %, and the real level is even lower given the inflation rate.

The established level of profit significantly limits the opportunities for the development of producers of defense products. Despite this, the Ministry of Defense of Ukraine to save the financial resources allocated for the purchase of weapons and military equipment approved the "Guidelines on common

approaches in the application of certain provisions defined by the Resolution of the Cabinet of Ministers No. 517 as of 08.08.2016" (under registration number 2591/y/2 as of 18.10.2016), where the established profit levels (5 % and 30 %) were further reduced [21].

Different conditions create a situation in which the logistics system of the Armed Forces of Ukraine does not have the capacity and resources to respond in a timely and prompt manner to the needs of the army. Therefore, to ensure the speed and quality of logistics business processes, the authors offer a system of optimization measures, which should be used at different stages of logistics, namely:

1) measures aimed at strengthening the stability of internal reserves of the defense industry (organizational, economic, technical, technological, and financial);

2) measures aimed at strengthening the stability of the defense holding in the external environment – adaptation to changes in market conditions and risk management;

3) general organizational measures aimed at both rapid response and effective management of the internal logistics potential of the Armed Forces.

To better organize logistics processes in the Armed Forces of Ukraine, the authors propose to create the service of monitoring the support component of the defense industry, which should include the head of the service, a technical support specialist, a rear support specialist, a medical support specialist, and an information support specialist. The general sequence of works is given in Fig. 2.

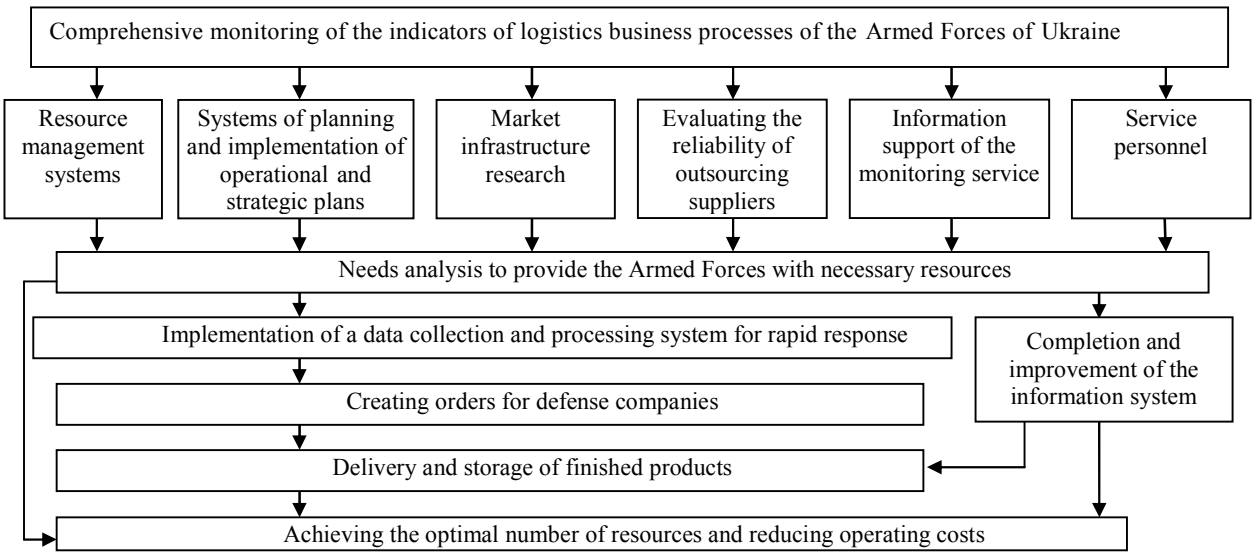

Fig. 2. Model of the logistics process optimization in the rear support of the Armed Forces

In addition to the above sequence of actions to implement the model of the logistics process optimization in the rear support of the Armed Forces, the authors note that in the presence of a positive economic effect, which is to reduce costs, in particular through a centralized and rapid response to the needs of individual subdivisions and military units, which will allow using the latest technologies, high-performance equipment; improving the product quality and management to achieve the optimal number of resources and reduce operating costs.

In the world of e-logistics, national borders are losing their former significance. For example, through the auction "ProZorro" you can buy (sell) goods from any country in the world. Competition in the global market is sharply intensified due to the development of e-logistics by traditional companies owing to the emergence of new business partners.

Electronic systems make it possible to search for suppliers on a global scale, and after concluding contracts to control the execution and shipment of orders through the Network, to maintain deliveries on time, to cooperate more effectively. Electronic technologies provide the Ministry of Defense of Ukraine with effective interaction with suppliers. Electronic technologies open new opportunities for restructuring

the industry and corporate value chain. Placing orders for materials and components through electronic document management systems forces manufacturers to switch to delivery on time, to reduce inventories, and produce exactly as many products as required by the Armed Forces. This allows responding more flexibly to changes in demand. An electronic enterprise resource planning (ERP) system and an electronic production management system (MES) are used to manage the supply chain, from ordering to execution. The transition to electronic systems reduces costs so that the defense industry can produce personalized goods at a cost at the level of mass production, and sometimes cheaper, besides, production time and labor costs reduce sharply [22].

One of the most important tasks of modern electronic logistics is to replace the traditional mechanism of relations between enterprises and the Ministry of Defense of Ukraine.

The transition to electronic systems undermines the corruption component. Using e-logistics while maintaining traditional distribution channels requires a well-thought-out strategy. Special attention should be paid to such types of information services that are provided by consulting firms of electronic logistics, outsourcing, etc.

In the process of risk analysis for the e-logistics system, its components are studied, vulnerabilities of the system are identified, the possibility of realization of each specific threat and the expected size of the corresponding losses are assessed, possible protection methods are selected and their cost is calculated. Until recently, domestic enterprises used "1C: Accounting". But since 2000, the German SAP program has been increasingly installed at large and medium-sized enterprises.

The functional areas of the SAP program consist of the following modules:

– PP module provides an opportunity to plan and manage such types of production as discrete and that one with a continuous cycle;

– MM module allows managing material flows;

– AM and AA modules provide income, accounting, write-off, depreciation, and the movement of fixed assets in the enterprise structure;

– FI module is responsible for finances;

– RM module provides maintenance and further repair of equipment;

– CO module provides control through which the administrative-accounting is realized. It allows analyzing, under what conditions there are profits and losses, and also analyzes places and reasons for the arrival and expense of funds;

– SD module manages sales system processes, allowing invoicing, replenishing, and shipping;

– HR module allows managing staff, taking into account personnel, recruiting staff, and calculating salaries.

Thus, summarizing, the authors believe that the algorithm scheme for the implementation of such information innovation in logistics can be shown in Fig. 3.

This kind of system creates a common field for work within the company, becoming a single control center for all key tasks. Its special feature is that all operations take place in real-time. The processed information is immediately sent to the updated server.

This scheme demonstrates the content of the mechanism for improving the effectiveness of the latest software, which will greatly facilitate all procedural issues and allow a prompt receipt of information.

Conclusions

Thus, the logistics of the Armed Forces is a set of closely related procedures, as well as the activity of logistics bodies and subdivisions, aimed at optimal and efficient organization of the supply of resources, goods, and services, as well as efficient use of the transport network and vehicles to perform tasks of various types during peace, crisis, and war. It consists of coordinating, planning, organizing, stimulating, and controlling the use of various means of supply, as well as the implementation of a wide range of specialized and household services. The purpose of the logistics support of the Armed Forces is to meet the needs of troops for means which are necessary to live and conduct military and extra-military operations, and to ensure the ability of human resources, as well as weapons and military equipment to conduct hostilities.

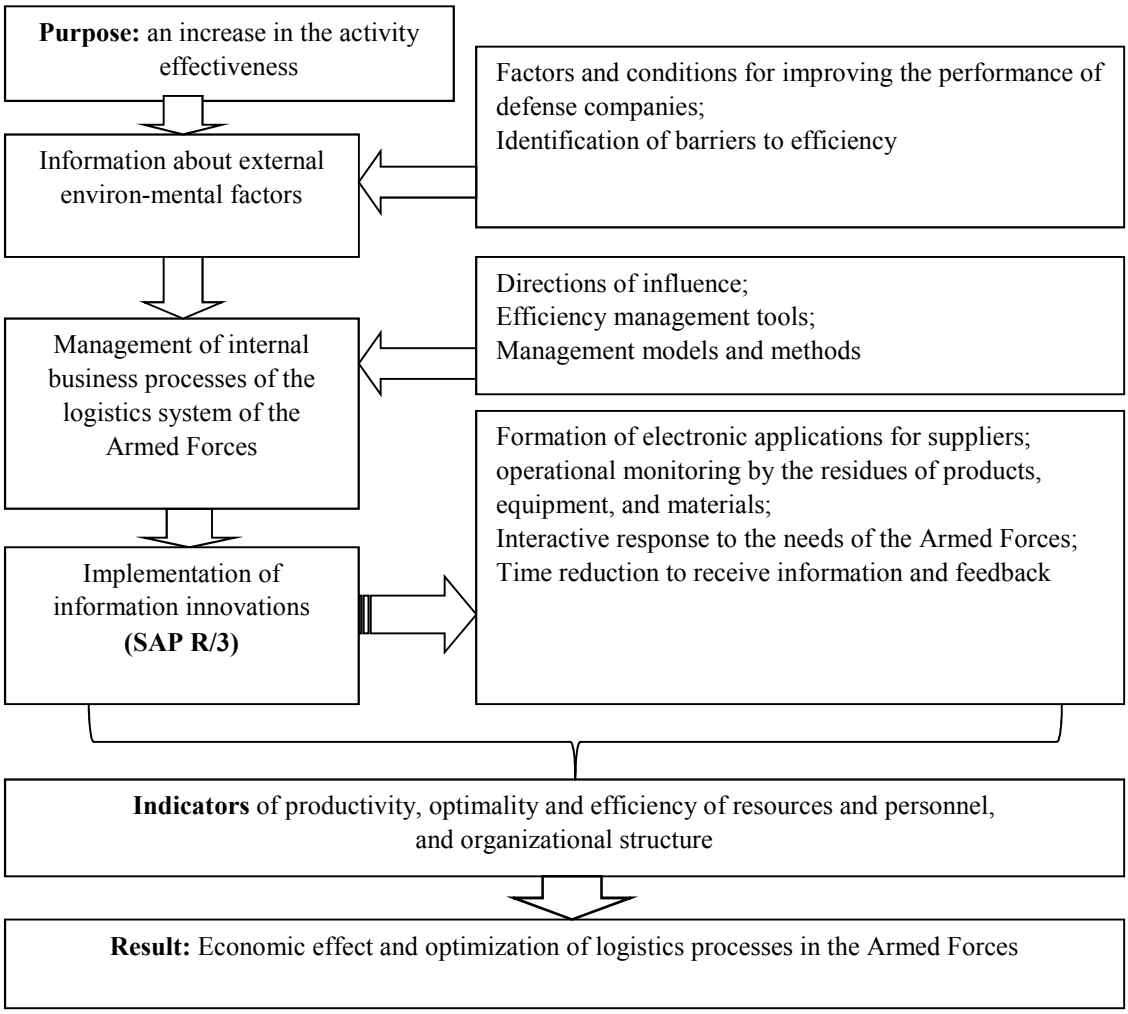

Fig. 3. Algorithm for the implementation of SAP R/3 in the logistics activity of the Armed Forces

Undoubtedly an important factor in the development of logistics systems today is the active implementation of automated management decisions that lead to the formation of electronic logistics, which is important in the face of rapid changes in the unit's location and active hostilities.

It should be noted that e-logistics globalization is developing inconsistently; its benefits are unevenly distributed between countries and regions of the world economy, resulting in a deepening asymmetry of the regional and structural distribution of resources of the global e-logistics market.

The spread of e-logistics requires the development of new models, strategies, and the formation of additional services. However, it is necessary to know how the development of information systems affects the situation in the Armed Forces of Ukraine. The most noticeable are the following signs of this influence – electronic systems involve all outsourcing companies in global competition, regardless of their location.

To better organize logistics processes in the Armed Forces of Ukraine, it is proposed to create the service of monitoring the support component of the defense industry.

Prospects for further research

Based on the study, it can be argued that the SAP R/3 program, proposed by the authors for further implementation, as well as for the optimization of logistics business processes in the Armed Forces, will increase logistics efficiency, greatly facilitate all procedural issues and allow a prompt receipt of information.

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ОПТИМІЗАЦІЯ ЛОГІСТИЧНИХ БІЗНЕС-ПРОЦЕСІВ У ЗБРОЙНИХ СИЛАХ УКРАЇНИ

Проаналізовано проблемні питання оптимізації логістичних бізнес-процесів у Збройних силах України. Обґрунтовано необхідність упровадження автоматизованої системи управління в систему логістики на базі Accelerated SAP (ASAP), що поєднує технологічну й управлінську частини у вигляді трьох основних компонентів: 1) синхронізація бізнес-пріоритетів клієнта (залежно від індустрії) з конкретними рішеннями SAP через галузеві карти бізнес-цінностей (value maps) інструмента Solution Explorer; 2) карти управління проєктами (маршрутні карти) з основними етапами та діями на них; 3) проєктування, розроблення, тестування і експлуатація за допомогою менеджера рішень SAP Solution Manager. Виявлено, що в результаті упровадження програми SAP R/3 можливо підвищити результативність логістики, пришвидшити виконання оперативних завдань, а також збільшити швидкість отримання і опрацювання інформації.

Ключові слова: логістика; військова логістика; логістичні бізнес-процеси; логістичні витрати; служба системи моніторингу; електронна логістика; інформаційні логістичні системи; програмне забезпечення SAP R/3.