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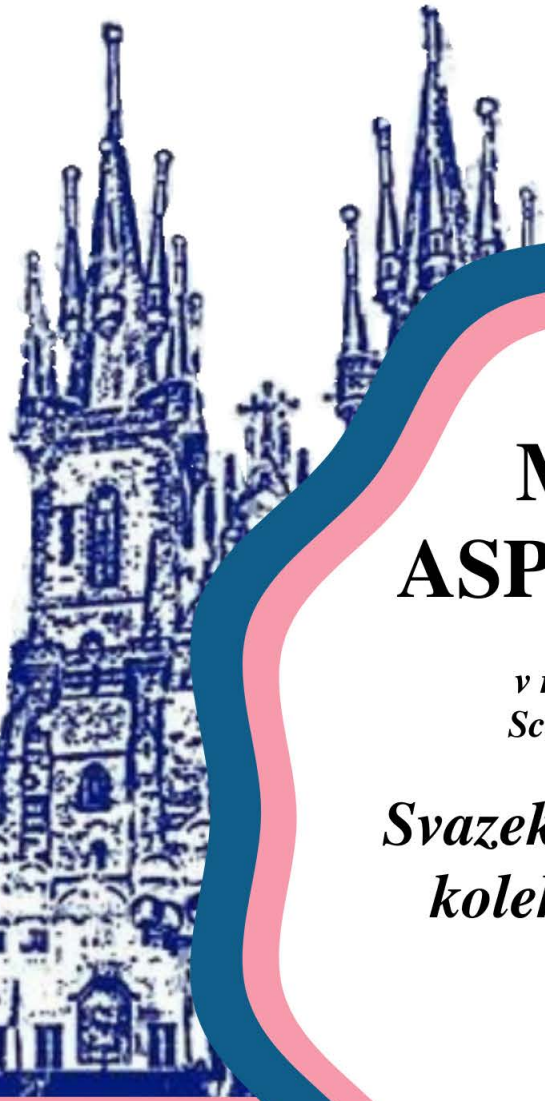

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Recenzenti:

Karel Nedbálek - doktor práv, profesor v oboru právo (Zlín, Česká republika)
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Dina Dashevska - geolog, geochemik Praha, Česká republika (Jeruzalém, Izrael)

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ODDÍL 7. KULTURA A UMĚNÍ

ODDÍL 8. TECHNICKÉ VĚDY

ODDÍL 9. ZEMĚDĚLSKÉ VĚDY

§8.2 PROBLEMS AND PROSPECTS OF OF LOGISTIC INFORMATION CORPORATE SYSTEMS ON EMERGING MARKETS IN CRISIS PHENOMENA **(Krasnyuk M.,** Kyiv National Economic University named after Vadym Hetman, **Goncharenko S.,** Kyiv National University of Technologies and Design, **Tuhaienko V.,** Kyiv National University of Technologies and Design, **Krasniuk S.,** Kyiv National University of Technologies and Design)

Introduction. Optimally organized logistics can provide not only an additional competitive advantage, but also be an important anti-crisis factor. In particular, strategic and tactical techniques of logistics, such as: integration of the value creation chain, evaluation of route efficiency, use of intelligent information technologies, optimization of communications, forecasting of demand, in-depth cost analysis, use of a scenario approach for modeling - will allow corporations to ensure additional efficiency (measured by time, funds, reputation, etc.). That is, effective logistics can be considered as a source of sustainable competitive advantage [1].

The use of not only software and technical complexes, but also powerful innovative algorithmic support, in the conditions of a globalized world and intelligent technologies for processing both structured and unstructured information, allows to significantly improve the quality and competitiveness of management solutions. The implementation of most classical logistics concepts would be impossible without the use of parallel computing, local and global computer networks, telecommunication systems and intelligent information and software [2].

One of the key roles in logistics systems at the micro, macro or meso level is played by appropriate information support. A general trend in the development of information technologies is the use of additional intelligent analytical methods of collecting, processing, storing and transmitting information [3].

The next argument for the relevance of the research in this article is the solution to the "Big Data" problem in the field of corporate logistics. The vast arrays of logistics data in OLTP and DataWatehouses accumulated in organizations contain many potentially useful hidden patterns that can and should be used for ongoing and strategic optimization. But simple methods of analysis, such as discovery visualisation, cannot help in this case [4].

They allow to answer only the question: "what happened", but it is necessary to get an answer to the question: "what should be done", "what will happen". This requires mechanisms for building predicative models that are able to find non-trivial regularities in large volumes of data, that is, the use of Data Mining technologies, and at the next stage of development, KDD technologies [5].

The application of Data Mining algorithms and technologies is actually the only possibility to obtain additional utility from accumulated data stores. Data Mining allows to extract knowledge from data and turn it into competitive advantages: qualitative forecasting, more precisely identifying target audiences, predicting the development of events, managing risks, identifying "bottlenecks", identifying potential customer needs and offering new logistics products and services based on them, optimizing product placement, thereby minimizing duplicate and redundant intra-corporate movements, etc [6].

Taking into account the above, the research and analysis of the causal and effect stages of the development of logistics information systems, the analysis of current problems and the generation of directions for the innovative development of LIS within the framework of globalized corporate information systems, the development of principles and concepts of the creation and effective functioning of LIS in the conditions of crisis macroeconomic phenomena are the urgent tasks of this research.

Logistics as a scientific discipline and management practice can become a reliable assistant in improving the activities of enterprises by increasing their integral competitiveness.

The modern development of logistics enterprises should be aimed at improving management analysis and strategic modeling and planning based on such in-depth intellectual analysis. Innovative models of LIS develop mutually with processes of reengineering of business processes and information flows. Logistics enterprises should move to a complete reorganization of logistics procedures, reducing the number of functional cycles and volumes of related activities, in particular due to the implementation of effective intelligent logistics information systems, taking into account the principle of "perforating material flow", which becomes an object of management with qualitative and quantitative indicators that are controlled by OLAP, BI and KDD methods.

As a next step, on emerging markets it is necessary to create a knowledge-oriented cloud system for logistics centers, which in the current crisis conditions will help enterprises to quickly establish and qualitatively maintain new hybrid cross-border logistics connections in the conditions of macro-crisis phenomena in traditional sales markets [7].

However, the material flow management system currently existing on emerging markets is insufficiently transformed and adapted. A number of features should be taken into account when developing logistics models aimed at use in the general economic space of the EU.

Taking into account the above, it can be concluded that in the analyzed scientific studies, the issue of innovative development of LIS within the framework of globalized corporate information systems, development of principles, concepts and technologies for the creation and effective functioning of innovative LIS in conditions of crisis macroeconomic phenomena of the domestic globalized economy is practically not investigated.

The strategic direction of improvement and transformation of LIS on emerging markets should take place with consideration the

problems identified in this study and in the following relevant directions:

1) the absence of a state policy on logistics problems, which is manifested both in the absence of an appropriate regulatory framework (corresponding to the European one), and in the absence of certified specialists and their training centers.

2) the systemic economic crisis, the incomplete solution to the ownership issue, the reduction of production volumes, inflation - which significantly slow down any innovations.

3) There is practically no or incomplete comprehensive total detailed accounting of logistics costs throughout the logistics chain in the holding/corporation, in which their constant growth in the transport and warehousing business is overshadowed by the efficiency achieved outside this sphere.

4) Logistics management involves radical changes in the structure of an enterprise, transition to more flexible organizational structures, creation of specialized transport and warehouse services, i.e. reengineering of business processes and reengineering of information systems of the corporation.

5) An introduction of the concept of a total logistics management is still hampered by shortcomings in a professional training of personnel.

6) Reorientation from the service market to the consumer market and, as a result, reaching the limit of effectiveness of the traditional management system of the service and production spheres. For the further competitiveness of domestic goods/services, it became absolutely necessary to use all ways of increasing efficiency and optimizing the use of corporate resources (time, funds, materials, reputation).

7) The development of innovative computer technologies and algorithms, which allows to carry out analytical intelligent processing of huge arrays of information and to exchange built laws and data models in real time with minimal time spent on their use throughout the corporate management system [8, 9].

Presentation of the basic material. The integration, coordination and synchronization of the corporation's commodity and financial flows depends on the completeness, relevance, verification and efficiency of the operation of logistic information flows. For this purpose, enterprises create a LIS as a system of relationships between people, equipment and relevant management procedures in order to provide an appropriate information base for planning, organization and control of logistics at the enterprise. The main function of LIS is to ensure the adoption of effective logistics decisions.

Supporting the functionality of international logistics chains on the territory of emerging markets, the LIS concept proposed below is a complex system of collective use with a single information space.

The existing functional complex of classic LIS tasks:

- Organization of mixed cargo transportation;
- Organization of interaction of companies responsible for various types of transport and directions of transportation;
- Search for new customers, suppliers, carriers and other participants in the delivery of goods;
- Management of industry databases and data warehouses;
- Maintenance of the tariff directory, formation of invoice models and issuance of invoices according to templates;
- Formation of standard delivery process control schemes;
- Providing clients with information on the condition of the cargo and control of the transportation process by each individual mode of transport involved.

However, the developing intelligent LIS should have a wide range of functionality for controlling the main warehouse operations - loading and unloading operations, cargo acceptance, marking and bar coding, registration of arrival and departure, repackaging, assembly and fraud detection operations.

The transport functionality of the intelligent LIS must provide the main functions of transport logistics - receiving and forming orders, managing planned and actual routes, drawing up

the optimal traffic schedule, the time of stay and completion of each stage of transportation, planned and actual expenses along the route, calculation of transportation expenses at each stage, cargo tracking in transit.

An important element of new systems is the availability of financial components that provide/guarantee the supporting financial component of long-term business processes. The modular concept of the system allows for phased implementation of the system at specific enterprises in accordance with current external influences.

Therefore, taking into account the above, the LIS of a logistics enterprise should consist of the following subsystems:

– data collection subsystem, which receives raw data from many external and internal sources (Data Warehouse), for example, from suppliers, customers, contact audiences, from the sales and supply department, etc.;

– subsystem of data synthesis and analysis, where the analytical processing of data (OLAP) necessary for managing the logistics processes of an enterprise takes place (filtering, analysis, evaluation, etc.);

– a subsystem that generates reports for making optimal logistics decisions (which includes customer databases, analytical models that formulate relevant conclusions). Processing and analysis of data at the enterprise should be carried out using appropriate means of economic and mathematical modeling [10].

Such a system should consist of orderly interdependent elements and possess some set of synergetic qualities. Most often, LIS is also divided into functional and supporting subsystems.

The functional subsystem consists of a set of tasks to be solved, grouped according to the common goal.

The support subsystem includes the following elements: 1) technical support, that is, a set of technical means that ensure the processing and transmission of information flows; 2) information

support, which contains various directories, classifiers, codifiers, means of formalized description of data; 3) mathematical support, that is, a set of methods for solving functional tasks.

The main goal of forming an effective multi-module LIS of a logistics enterprise is to improve the efficiency of the enterprise's logistics processes and optimize its logistics costs. The following can be considered the main characteristics of a modern LIS for a domestic logistics enterprise: synchronization and coordination between financial, informational, logistical and material flows; coherence, sequence and complexity of actions of different time periods, different levels of management; reality of tasks, correct use of information, optimal decision-making in logistics.

At present, all LIS are, as a rule, automated control systems. To build a logistics information system, it is always necessary to pay great attention to the principles of building a LIS.

The principles of LIS construction include:

1) The principle of reliability and accuracy provides for the absence of errors in the formation of a database of accumulated information.

2) The principle of continuity means the systematic collection, accumulation and processing of information.

3) The principle of efficiency and timeliness arises due to the requirement of quick market research and the search for necessary information due to the constant dynamism of the external environment of an enterprise.

4) The principle of rationality and completeness of information collection involves searching for only necessary information related to the company's activities and collecting it in full to form a comprehensive analysis and search for solutions.

5) The principle of economy is determined by the value of information and determines the optimization of costs for obtaining and processing information.

6) The principle of simplicity implies that information should be presented in such a way that the recipient can understand it.

7) The principle of clarity of the information flow - information should not be very complex (absence of information overload) and should comply with the principle of simplicity.

8) The principle of relevance arises from the fact that information is necessary to allow its recipient to solve a problem or make a decision.

9) The principles of adequacy arose due to the need to match the content of information with material and other flow processes.

The ability not only to localize LIS but also to the parallel operation of information systems and technologies makes it possible to approach the management of material flows from a systemic perspective, ensuring the processing and exchange of large volumes of information between various participants in the logistics process. When implementing logistics functions at an enterprise, the main areas of design and information work within the framework of LIS are:

- technical means for performing the software task are determined;
- requirements for quality characteristics are drawn up and the necessary volume of financial and labor resources is determined;
- the basic methods of forming program tasks are determined;
- organizational forms of implementation of program tasks are selected;
- network models of stages and works are created;
- systems of assessment criterias and motivations for actions are being developed;
- control, accounting and assessment of work progress are organized.

The logistics system at an enterprise is effective only when conditions are created for its integration into current production and commercial processes. This problem is solved by creating an information base corresponding to this type of production, its

volume and other characteristics of the production structure of enterprises. This includes the monitoring audit of resources (availability of actual and planned orders, content of production main and intermediate warehouses) and terms (delivery, processing, waiting, downtime, meeting deadlines).

Thus, the information subsystem for making a separate management decision regarding LIS should consist of four interconnected blocks, namely:

1) the unit of input information that is accumulated in the form of a database based on retrospective and forecast information for a certain date and is relatively unchanged over time;

2) the unit of operational information that comes directly from the production sites of the enterprise and constantly changes as the production process progresses;

3) the unit for the formation of a management decision, in which, on the basis of analytical models, input and operational information is processed and justified by the expediency of the adoption of this management decision and its parameters (in particular, the terms of adoption);

4) the unit of management decision-making, which contains the relevant fragment of the organizational structure of enterprise management, i.e. divisions, officials involved in making a management decision, and relationships between them.

5) the unit of source information, which represents the resulting information provided to the manager (in accordance with his powers, job rights and functional duties) about the state or activity of this or that object in the form of information about the availability of personnel at an enterprise by category personnel and structural divisions as of a certain date, which includes regulatory and planning, actual and special information.

The set of information flow processes at an enterprise forms an information system, which consists of: 1) information infrastructure (information and technologies); 2) information

support (means of receiving, processing, storing and transmitting information) . Moreover, at present, it is difficult and inappropriate for LIS in the conditions of a transformational economy to clearly separate them.

Based on the set goal, the main tasks of intelligent LIS at an enterprise were formed, which from a functional point of view represent a four-level hierarchical system.

Information infrastructure and information support do not have a clear distinction, since information and information technologies cannot exist separately without information support. In the absence of information support, information becomes more accessible to everyone and ceases to be a unique and expensive resource.

It is worth paying attention, in the context of the design and development of LIS, the statement that the development of logistics systems is determined by a system of economic, information-organizational, technical-technological and social measures, the implementation of which allows to comprehensively improve the organization and management of an economic object with the aim of saving resources with simultaneous compliance safety and ecological and economic efficiency [11].

Modern IT solutions in the field of CRM allow enterprises to collect a complete history of relationships with customers and always have up-to-date information about the sales process, about solving customer service problems, and about the effectiveness of marketing activities.

It is quite clear that the availability of such information can be of great benefit in understanding the company's position on the market and determining development strategies through the effective use of OLAP→KDD. Failure to use analytical methods in this situation deprives the company of many significant opportunities to gain a competitive advantage.

Thanks to the functioning of the enterprise management system, the organization's goal of a certain level is achieved. To improve the management structure, a preliminary deep study of the

existing information flows is necessary, the determination of the contradictions formed between the content of the management functions and its organizational forms, between the organizational structure and the quantitative composition of the bodies and in their management, the establishment of a unified system in the work of managers, and the regulation of the functional duties of employees.

As we can see, in the existing concepts of logistics management within the framework of classic CIS (SCM, CRM, ERPII), the main attention was paid to material flows of goods, raw materials, and funds. Laws/regularites and knowledge were not given even a secondary role. Under the information provision of the process of movement of goods from the supplier to the consumer, only operative and some analytical information was assumed. The main trend in the improvement of modern corporate logistics management processes is the recognition of the priority of the analytical, knowledge-oriented component for DSS.

Main conclusions. The need for the transformation of classic LIS in developed countries is not least stimulated by the need for a quick reaction of manufacturers to market conditions, the desire to quickly adapt to changing situations, and in emerging markets - the need to quickly adapt to dynamic macro- and microeconomic threats and crises.

Supporting the functionality of international logistics chains on the territory of emerging markets, the proposed intelligent LIS is a complex system of collective use with a single information space.

The vast arrays of OLTP and Data Warehouse logistics data accumulated in organizations contain many potentially useful hidden patterns that can and should be used for ongoing and strategic optimization.

But simple methods of analysis, such as intelligence visualization, cannot help in this case. They allow to answer only the question: "what happened", and it is necessary to get an answer to the question: "what should be done", "what will happen". This

requires mechanisms for building predicative models that are able to find non-trivial regularities in large volumes of data, that is, the use of Data Mining technologies, and at the next stage of development, KDD technologies.

The modern development of logistics enterprises should be aimed at improving management analysis and strategic modeling and planning based on such in-depth intellectual analysis. Innovative models of LIS develop mutually with processes of reengineering of business processes and information flows.

Logistics enterprises should move to a complete reorganization of logistics procedures, reducing the number of functional cycles and volumes of related activities, in particular due to the implementation of effective intelligent logistics information systems, taking into account the principle of "end-to-end/perforating material flow", which becomes an object of management with qualitative and quantitative indicators that are controlled by OLAP, BI and KDD methods. As a next step, on emerging markets, it is necessary to create an intelligent cloud system for the logistics centers that are being created [12], which in the current crisis conditions will help enterprises to quickly establish and qualitatively maintain new hybrid cross-border logistics connections in the conditions of macro-crisis phenomena in traditional sales markets.

Prospects of use of research results. Currently, in the practice of domestic private and state corporations, globalized intelligent information technologies of logistics management (which were studied above) are practically not created and, therefore, not implemented. In fact, all active LIS currently:

- function intra-corporately and do not support information gateways with other subjects of the domestic logistics services market, especially with foreign logistics centers;
- do not provide comprehensive support for the entire range of logistics activities along the logistics chain;

- the technologies and policies underlying them are not based on recognized transnational norms.

- do not support the detection of hidden patterns by Data Mining algorithms and do not provide for the creation and group use of the LIS knowledge base by all participants and potential customers of the logistics chain.

Therefore, on the basis of the above research, the causal and effects stages of the transformation of logistics information systems, the detection of systemic problems of such transformation and ways to solve them, the creation of the concept of innovative development of LIS within the framework of globalized transcorporate information systems - the prospects of the developed concept of designing, creating and effective functioning of LIS are clearly proven in the conditions of existing crisis macroeconomic phenomena.

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