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# MODERN DEVELOPMENT PRINCIPLES OF TRANSPORT-LOGISTICS ENTERPRISES IN ECONOMIC CLUSTERS

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## СУЧАСНІ ЗАСАДИ РОЗВИТКУ ТРАНСПОРТНО-ЛОГІСТИЧНИХ ПІДПРИЄМСТВ В ЕКОНОМІЧНИХ КЛАСТЕРАХ

***Specifically, the development of these processes, through a wide range of strategies and measures, is crucial for continuously optimizing and adjusting the activities of transport and logistics enterprises. Accepting the outlined thesis as an axiom has led to the conclusion that the environment of optimization and adjustment of activities for transport and logistics enterprises in economic clusters enables them to acquire capabilities for: effective interaction and collaboration; pooling resources; optimal supply chains (or those ensuring the stability and reliability of product supply); fostering joint innovative projects; exploring cutting-edge technologies in the field of transport and logistics; gaining competitive advantages in the market through collaborative efforts and knowledge exchange.. On the one hand, these capabilities determine the outcome — which is the effective development of these enterprises in economic clusters. On the other hand, achieving such a result is impossible if the basic principles of its formation are not adhered to. We interpret these principles as various aspects that consider contemporary challenges and trends in economics, technology, and management. The content of the research demonstrates that the contemporary principles contributing to the effective development of transport and logistics enterprises in economic clusters are as follows: the creation of regionally integrated logistics systems; a transition to technological innovation in transport and logistics enterprises and the logistics processes they shape; continual optimization of transport processes; the establishment of a favorable innovative transport and logistics environment; ongoing training and development of personnel; and constant interaction with authorities and the community. It is stated that within the complex principles for the development of transport***

*and logistics enterprises in economic clusters, technical and organizational directions are identified, along with the quality of their interaction with other enterprises, including those that do not belong to the cluster. The prospects for further research in this direction involve exploring optimal models and strategies for integrated logistics systems of transportation and logistics enterprises in economic clusters. This research aims to optimize supply chains and ensure supply stability at the regional level.*

*Дослідження спрямоване на визначення та системну характеристику сучасних засад розвитку транспортно-логістичних підприємств в економічних кластерах. У межах дослідження звернено увагу на той факт, що для забезпечення позитивного впливу кластерів на сферу транспорту та логістики, важливою є якість процесів обміну товарами, послугами, цінностями й грошима, зокрема, такий їх розвиток, який, через широкий спектр стратегій та заходів, дозволить постійно оптимізувати та коригувати діяльність транспортно-логістичних підприємств.*

*Прийняття окресленої тези як аксіоми дозволило дійти висновку, що середовище оптимізації та коригування діяльності транспортно-логістичних підприємств в економічних кластерах формує набуття ними можливостей до: ефективної взаємодії та співпраці; об'єднання ресурсів; оптимальні ланцюжки постачання (або такі, що гарантують стійкість та надійність постачання продукції), сприяння спільним інноваційним проєктам, дослідженням новітніх технологій у сфері транспорту та логістики, набуття конкурентних переваг на ринку завдяки спільній діяльності та обміну знаннями. З одного боку, очевидним є те, що ці здатності визначають результат, яким є ефективний розвиток цих підприємств в економічних кластерах. З іншого боку, досягнення такого результату неможливе, якщо недодержані базові засади його формування, інтерпретовані нами як різноманітні аспекти, які враховують сучасні виклики та тенденції в економіці, технологіях та управлінні. За змістом дослідження доведено, що сучасні засади, що сприяють ефективному розвитку транспортно-логістичних підприємств в економічних кластерах є наступними: створення інтегрованих (на рівні регіону) логістичних систем; перехід на технологічну інноваційність транспортно-логістичних підприємств та сформованих ними логістичних процесів; постійна оптимізація транспортних процесів; створення сприятливого інноваційного транспортно-логістичного середовища; постійне навчання та розвиток кадрів; взаємодія з владою та громадськістю. Констатовано, що в комплексі засади розвитку транспортно-логістичних підприємств в економічних кластерах визначають технічні, організаційні напрямки та якість їх взаємодії з іншими підприємствами (у тому числі з тими, що не належать до кластера).*

*Key words: transport and logistics enterprises; cluster; logistics systems; transport and logistics sector.*

*Ключові слова: транспортно-логістичні підприємства; кластер; логістичні системи; сфера транспорту та логістики.*

## TARGET SETTING

The relevance of defining contemporary principles for the development of transport and logistics enterprises in economic clusters and examining investment practices and experience in this context is extremely important in contemporary conditions. Let's note that, first and foremost, the transport and logistics sector serve as a key element of economic infrastructure, ensuring the efficient movement of goods and services not only within a group of companies, organizations, or institutions that are geographically close and collaborate in a specific field, sharing common resources, innovations, and knowledge to enhance their competitiveness but also within the region where a particular cluster operates. Therefore, it should be noted that the modern principles of development for transport and logistics enterprises within economic clusters should be formulated in such a way as to create a favorable environment not only for their development but also for the development of the economic regions in which they operate. This necessitates an exploration of the definition of the contemporary principles of this process.

## ANALYSIS OF RESEARCH AND PUBLICATIONS

In the scientific works of both domestic and foreign experts, there is a considerable amount of propositions that address specific issues in the development of economic clusters (including the works of Mashtaler O., Hutsul T., Masligan O., Cheban Y., Tsymbalistova O.) or transport and logistics enterprises (including the works of Kurbatska L. M., Kadyrus I. G., Savenko O. A., Nechiporenko K. V., Kopitko V. I., Kopitko O. V.). In this regard, the analysis of their content reveals an apparent lack of complexity and a certain fragmentary nature, which does not allow for a clear definition of the modern principles of development for transport and logistics enterprises in clusters, which are the foundation for ensuring a positive impact on regions. Therefore, there is a need for a comprehensive and systematic approach to the analysis and development of principles for the development of transport and logistics enterprises within the context of economic clusters.

## THE WORDING OF THE PURPOSES OF ARTICLE (PROBLEM)

The article aims to identify and provide a systematic characterization of modern principles for the development of transport and logistics enterprises within economic clusters.

## THE PAPER'S MAIN BODY WITH FULL REASONING OF ACADEMIC RESULTS

Transport and logistics enterprises in economic clusters constitute a group of businesses that collaboratively work and interact within a specific geographical region to achieve common goals and enhance competitiveness. To ensure a positive impact of economic clusters on the transportation and logistics sector, it is crucial to qualitatively facilitate the processes of exchanging goods, services, values, and money. Specifically, the development in this regard should involve a wide range of strategies and measures that allow for the continuous optimization and adjustment of the activities of transport and logistics enterprises [3]. The environment of optimization and adjustment of activities for transport and logistics enterprises within economic clusters fosters their acquisition of capabilities in: effective interaction and collaboration; pooling of resources; optimal supply chains (ensuring the stability and reliability of product supply); promotion of joint innovative projects; exploration of cutting-edge technologies in the field of transportation and logistics; and gaining competitive advantages in the market through collaborative activities and knowledge exchange. On one hand, these capabilities determine the outcome — which is the effective development of these enterprises within economic clusters. However, achieving such a result is impossible without adhering to the fundamental principles of its formation [2; 4—5], interpreted by us as various aspects that consider modern challenges and trends in economics, technology, and management.

The modern principles that contribute to the effective development of transport and logistics enterprises in

economic clusters (see Figure 1) include the following: the creation of integrated logistics systems at the regional level (or a focus on the process of creating and managing shared infrastructure, processes, and logistics services at the regional level); transition to technological innovation in transport and logistics enterprises and the logistic processes they have formed (or a focus on a systematic and phased process of implementing advanced technologies and innovations to improve efficiency, competitiveness, and service quality); continuous optimization of transportation processes (or a focus on achieving maximum efficiency and resource savings); creation of a favorable innovative transport and logistics environment (or a focus on stimulating and supporting innovations in the field of transportation and logistics); continuous training and development of personnel (or a focus on supporting and enhancing the professional skills and competencies of employees in these fields); ongoing interaction with government and the public (or a focus on systematic and mutually beneficial exchange of information, collaboration, and interaction between transport and logistics enterprises and governmental institutions, as well as with the public and other stakeholders).

It should be noted that within the complex principles for the development of transport and logistics enterprises in economic clusters, technical and organizational directions are defined, along with the quality of their interaction with other enterprises, including those outside the cluster. This is ensured through the identification and adjustment of the systemic characteristics of these principles (i.e., their characteristics as a system and their ability to function and interact with other elements).

The process of creating integrated logistics systems at the regional level involves the integration and coordination of logistic processes across different companies and sectors within the cluster, within the framework of shared infrastructure, processes, and logistics services specific to a particular region. This provides opportunities for understanding and addressing the needs of various

supply chains within the region and the shared utilization of infrastructure and resources to support efficient logistic processes. In this regard, the primary stages of defining and adjusting the systemic characteristics of this process are as follows [2; 4]:

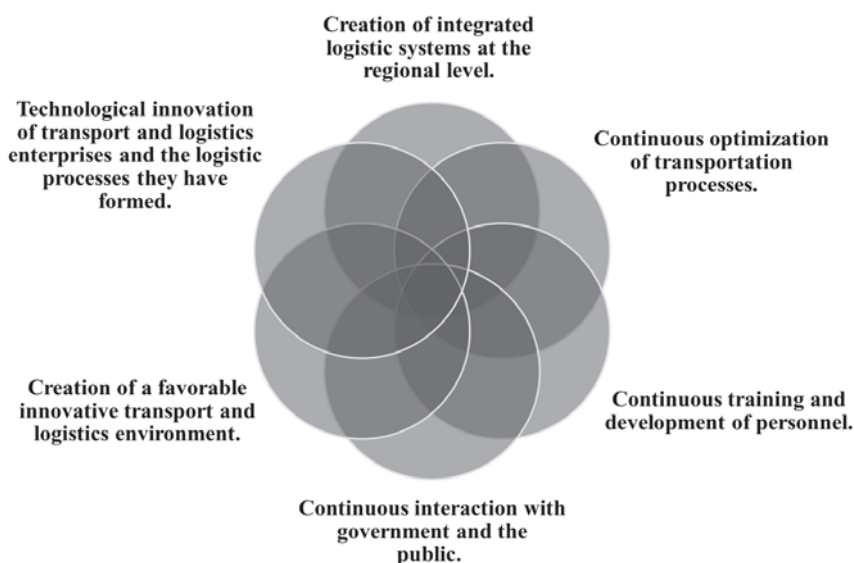
1) Assessment of logistic needs across various sectors and companies in the region.

2) Development of strategies and plans for creating integrated logistics systems.

3) Establishment of shared warehousing facilities, terminals, and infrastructure to consolidate transportation flows.

4) Implementation of technologies for effective cargo tracking and management.

5) Implementation of universally accepted logistics standards to standardize processes.



**Figure 1. Key principles of development for transport and logistics enterprises in economic clusters**

Source: formed based on [2; 4—5].

6) Integration of information systems among different participants in the logistics chain.

7) Facilitating the transition from homogeneous transport systems to intermodal ones that integrate different modes of transportation.

8) Establishing intermodal terminals and centers for seamless transitions between different modes of transportation.

9) Developing collaborative relationships among different companies and industry players.

10) Joint management and planning of the supply chain to ensure mutually beneficial cooperation.

11) Implementing monitoring and analysis systems for continuous assessment of the efficiency of logistic processes.

12) Adjusting strategies and plans based on the obtained data.

The process of transitioning to technological innovation in transport and logistics enterprises and the logistic processes they have formed involves the implementation of modern Information and Communication Technologies (ICT) to automate and enhance the management of logistic processes. This provides opportunities for the development and application of cutting-edge technologies in transportation systems (such as electric vehicles, autonomous transportation, etc.), the establishment of logistics management systems (WMS, TMS), the adoption of electronic document workflow, and the transition of enterprises to the use of analytics and Big Data, among other things. In this regard, the primary stages of defining and adjusting the systemic characteristics of this process are as follows [2; 5]:

1) Assessment of the technical level and innovation potential of the enterprise.

2) Identification of strengths and weaknesses, opportunities, and threats in the context of technological innovation.

3) Development of a strategy outlining the directions of technological innovations and their impact on logistic processes.

4) Formulation of an implementation plan for innovations and the necessary resources for their realization.

5) Application of information technologies for the automation and optimization of logistic processes.

6) Implementation of electronic document workflow and electronic reporting to facilitate information exchange in the supply chain.

7) Collection and analysis of large volumes of data to gain insights and improve decision-making.

8) Utilization of analytical tools for demand forecasting, inventory optimization, and selection of optimal routes.

9) Utilization of drones for the delivery of small cargo in hard-to-reach areas.

10) Use of Internet of Things technologies for tracking and monitoring the movement and storage conditions of goods in warehouses.

11) Implementation of automated sorting and processing systems for goods.

12) Adoption of environmentally friendly technologies and fuels for transportation vehicles.

13) Utilization of sustainable packaging and other environmentally friendly practices.

14) Implementation of educational programs and training for staff to acquire proficiency in new technologies.

15) Establishment of an innovative corporate culture and support for employee initiatives in the field of innovation.

The complexity of implementing the defined process makes it dynamic and adaptive, capable of accommodating rapid technological changes and market demands. This adaptability is crucial to ensure competitiveness and sustainability in the transport and logistics business within the economic cluster.

The process of continuous optimization of transportation processes is aimed at improving the functioning of transport and logistics systems and optimizing the utilization of resources such as time, vehicles, fuel, labor, and others. This process provides opportunities for systematic assessment and improvement of routes and transportation processes to reduce costs and enhance efficiency. It also allows for the implementation of "green logistics management" concepts to minimize the negative impact on the environment. In this regard, the primary stages of defining and adjusting the systemic characteristics of this process are as follows [1—2; 5]:

1) Determining optimal delivery routes to reduce time and fuel costs.

2) Automated planning and allocation of resources to optimize overall logistics expenses.

3) Utilizing global positioning systems for tracking the location of vehicles.

4) Monitoring and telematics systems for collecting data on movement efficiency, speed, and other parameters.

5) Automated inventory management systems.

6) Efficient storage and unloading of goods to reduce processing time and costs.

7) Utilizing a combination of different transportation modes to optimize the logistics chain.

8) Systematic analysis and evaluation of transportation processes.

9) Implementation of changes and improvements in transportation processes (based on the results of their analysis).

10) Utilization of analytical tools for demand forecasting and planning.

11) Application of artificial intelligence and machine learning for decision automation and process optimization.

12) Development of strategies for optimal utilization and allocation of transportation resources.

13) Implementation of efficient routing and navigation technologies.

The complexity of implementing the defined process enables transport and logistics enterprises in economic clusters to consistently maintain a high level of efficiency in logistic processes and adapt to changes in market conditions and technologies.

The process of creating a favorable innovative transportation and logistics environment aims to support the development and implementation of advanced practices and technologies in transportation and logistics. In this regard, the primary stages of defining and adjusting the

systemic characteristics of this process are as follows [1; 3; 5]:

- 1) Assessment of the current state of the transportation and logistics sector, identifying problems and opportunities.
- 2) Setting specific goals for the development of innovations in transportation and logistics.
- 3) Collaboration with transportation companies, logistics enterprises, and other industry players.
- 4) Collaborating with government institutions to create a favorable regulatory environment.
- 5) Facilitating the creation of clusters where companies and researchers can join forces for collaborative problem-solving and innovation.
- 6) Providing access to shared laboratories, innovation centers, and other resources.
- 7) Securing financial support from government organizations for research and development.
- 8) Attracting investments from companies interested in innovation.
- 9) Supporting scientific research and the development of new technologies.
- 10) Implementing and testing new technological solutions in real-world conditions.
- 11) Applying the Internet of Things, artificial intelligence, and other innovative technologies in logistics and transportation.
- 12) Developing digital platforms to facilitate efficient information exchange among various supply chain participants.
- 13) Establishing informational portals to promote innovative data exchange.

The complexity of implementing the defined process enables transportation and logistics enterprises in economic clusters to consistently adopt advanced practices and technologies in their transportation and logistics environment. This contributes to the creation of horizontally and vertically integrated and harmonious logistic processes.

The process of continuous learning and development of personnel in logistics and transportation is aimed at supporting and enhancing the professional skills and competencies of employees in these fields. This process provides opportunities for designing educational and developmental programs for professionals in the transportation and logistics sectors, collaborating with educational institutions to ensure a high level of professional training. The main stages of determining and adjusting the systemic characteristics of this process are as follows:

- 1) Analysis of contemporary technological and organizational changes in the field.
- 2) Identification of key skills and competencies.
- 3) Development of programs aimed at enhancing specific skills and knowledge.
- 4) Considering the labor market requirements and innovative trends.
- 5) Organizing regular training and seminars for employees.
- 6) Engaging experts and practitioners to conduct sessions.
- 7) Utilizing electronic platforms for learning and self-paced material absorption.

8) Development of online courses and interactive learning tools.

9) Organizing internships and practical training to acquire hands-on skills.

10) Collaboration with companies to provide real-world experience opportunities.

11) Implementation of a mentoring system for new employees.

12) Facilitating knowledge exchange between experienced and junior employees.

13) Dissemination of knowledge and experience through participation in conferences and industry events.

14) Engagement in scientific discussions, initiatives, and providing access to resources for self-learning.

15) Encouraging employee initiative in planning their personal and professional development.

16) Implementation of internal development programs to retain talented employees.

17) Conducting regular assessments and reports on the effectiveness of development programs.

18) Analyzing results and adjusting the learning processes.

The comprehensive implementation of the defined process enables transportation and logistics enterprises within economic clusters to adapt their human resources to the demands of the modern market. It ensures a consistent improvement in the qualifications of employees in the logistics and transportation sectors.

The process of continuous interaction with government authorities and the public in the context of logistics and transportation is aimed at systematic and mutually beneficial exchange of information, collaboration, and interaction between transportation and logistics enterprises, governmental institutions, as well as with the public and other stakeholders. This process is crucial for the development of the industry, addressing issues, and facilitating interaction among all participants. It provides opportunities for: engaging in dialogue with government structures to address regulatory matters and create a conducive environment for industry development; involving the public and stakeholders in discussions on the development strategies of transportation and logistics clusters. At the same time, the key stages of determining and adjusting the systemic characteristics of this process are as follows [1; 5]:

1) Meetings, consultations, and discussions on industry development issues.

2) Involvement in the development of strategies and policies.

3) Representation of the interests of logistics and transportation companies before governmental structures.

4) Participation in the processes of shaping laws and regulations.

5) Development and implementation of joint projects with the government that contribute to the development of the industry.

6) Exploring new opportunities for collaboration and innovation.

7) Continuous exchange of information regarding the state of the industry, plans, and innovations.

8) Public information campaigns highlighting the achievements and challenges of the industry.

9) Engaging in public discussions and considering public opinion.

10) Taking public sentiments into account when making significant decisions.

11) Implementing projects and programs that contribute to the improvement and development of regions.

12) Embracing socially responsible business practices.

13) Implementation of environmentally friendly projects and initiatives.

14) Collaboration with the government to address environmental issues.

15) Forming partnerships with governmental bodies for joint initiatives.

16) Developing and implementing strategies that consider the interests of all stakeholders.

The comprehensiveness of implementing the defined process contributes to improving the working environment for transportation and logistics enterprises, fostering industry development, accommodating diverse interests, and promoting sustainable development overall.

## CONCLUSIONS FROM THIS STUDY AND PROSPECTS FOR FURTHER EXPLORATION IN THIS AREA

Within the scope of the research, attention is drawn to the fact that to ensure a positive impact of clusters on the transportation and logistics sector, it is crucial to qualitatively support processes of exchanging goods, services, values, and money. Specifically, such development, through a wide range of strategies and measures, will allow for the continuous optimization and adjustment of the activities of transportation and logistics enterprises. Acceptance of the stated thesis as an axiom has led to the following conclusions:

1. The environment of optimization and adjustment of activities for transportation and logistics enterprises in economic clusters fosters their capabilities in effective interaction and collaboration; pooling resources; establishing optimal supply chains (ensuring the stability and reliability of product supply); promoting joint innovative projects; exploring cutting-edge technologies in the transportation and logistics sector; gaining competitive advantages in the market through collaborative efforts and knowledge exchange. On one hand, these capabilities determine the result — which is the effective development of these enterprises in economic clusters. On the other hand, achieving such a result is impossible if the fundamental principles of its formation are not adhered to, interpreted by us as various aspects that consider modern challenges and trends in economics, technology, and management.

2. Modern principles that contribute to the effective development of transportation and logistics enterprises in economic clusters include the following: the creation of regionally integrated logistics systems; a shift towards technological innovation in transportation and logistics enterprises and the processes they form; continuous optimization of transportation processes; the establishment of a favorable innovative transportation and logistics environment; ongoing training and development of personnel; constant interaction with government authorities and the public.

3. As part of the development principles for transportation and logistics enterprises in economic clusters, they define the technical and organizational directions and the quality of their interaction with other enterprises (including those not belonging to the cluster).

The prospects for further research in this direction involve exploring optimal models and strategies for integrated logistics systems of transportation and logistics enterprises in economic clusters. This research aims to optimize supply chains and ensure supply stability at the regional level.

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