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TRANSPARENCY OF THE PROCESS APPROACH TO THE FORMATION OF INFORMATION AND LOGISTIC SUPPORT OF ENTERPRISES IN THE CONDITIONS OF THE SPATIAL CIRCULAR ECONOMY

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Arefiev S. O., Lelechenko A. P., Arefieva O. V., Petrovska S. V. Transparency of the Process Approach to the Formation of Information and Logistic Support of Enterprises in the Conditions of the Spatial Circular Economy

The article identifies the prerequisites for the formation of information and logistic support for oil transport enterprises while leveling threats to their stable functioning, analyzes the updated requirements and prospects for regulating macro- and microeconomic factors. The authors consider their mutual complementation based on the flow nature and the possibility (need) to be updated within certain time limits and functional spaces. It is proved that enterprises can more effectively determine the spatial stages of interaction with partners, reduce the time of information and logistic content in decision-making and implement new functional strategies that reflect the current phase of the life cycle. It is proposed to combine the approaches to the formation of support used in an adaptive combination, since changes in the conditions of the enterprise's activity require significant modifications of the original system of processes. This will help to avoid duplication, overlap and inability to link processes, which contributes to the maximum sharing and reuse of processes. The current trends in the functioning of oil transport enterprises as a supporting component of the country's economic development are studied and the relevant market is analyzed. The study of the infrastructure of oil transport companies is conducted, and it is noted that the main goal is to increase the volume of oil products transportation through main oil pipelines to ensure domestic consumption and transit to European markets. An additional strategic goal is to diversify sources and routes of oil supply to enhance Ukraine's energy security. Another important task is to maintain high standards of service quality and uninterrupted transportation, which requires careful maintenance and improvement of the infrastructure. Approaches to improving the early diagnosis systems of oil transport enterprises through macro- and micro-chains are developed, and key stages are identified for each of them, which become the basis for the formation of normative and logistic support. It is proved that transportation and return to the micro-chain are conditioned by the specifics of the scale and volume characteristic of this area of activity. Each link of the production process corresponds to a specific function aimed at ensuring optimal efficiency within the micro-supply chain.

Keywords: *process approach, structural approach, information and logistic support, business processes, economic cycles, sustainable development, oil transport enterprises, strategies, spatial circular economy.*
Fig.: *3.* ***Tabl.:*** *1.* ***Bibl.:*** *32.*

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Ареф'єв С. О., Лелеченко А. П., Ареф'єва О. В., Петровська С. В. Транспарентність процесного підходу до формування інформаційно-логістичного забезпечення підприємств в умовах просторово-циркулярної економіки

У статті виявлено передумови формування інформаційно-логістичного забезпечення нафтотранспортних підприємств для нівелювання загроз стабільному функціонуванню, проведено аналіз оновлених вимог і перспектив регулювання на макро- та мікроекономічні чинники. Їхнє взаємне доповнення ґрунтується на потоковій природі та можливості (необхідності) оновлюватись у визначених часових межах і функціональних просторах. Доведено необхідність для підприємств ефективніше визначати просторову етапність взаємодії з партнерами, зменшити час інформаційно-логістичного наповнення при прийнятті рішень та впроваджувати нових функціональні стратегії, які відображають актуальну фазу життєвого циклу. Запропоновано поєднати підходи до формування забезпечення, які використовуються в адаптивній комбінації, через те, що зміна умов діяльності підприємства потребує значних модифікацій оригінальної системи процесів. Це дозволить уникати дублювання, пере-

криття та нездатності зв'язати процеси, що сприятиме максимальному спільному доступу до процесів та їх повторному використанню. Вивчено сучасні тенденції функціонування нафтотранспортних підприємств як забезпечувальної складової розвитку економіки країни та здійснено аналіз відповідного ринку. Проведено дослідження інфраструктури нафтотранспортних підприємств; зазначено, що головною метою є збільшення обсягів транспортування нафтопродуктів магістральними нафтопроводами для забезпечення внутрішнього споживання та транзиту до європейських ринків. Додатковою стратегічною ціллю є диверсифікація джерел і маршрутів постачання нафти для підвищення енергетичної безпеки України. Важливим завданням є також дотримання високих стандартів якості послуг і безперебійне транспортування, що вимагає ретельного технічного обслуговування й удосконалення інфраструктури. Розвинуто підходи до вдосконалення систем раннього діагностування нафтотранспортних підприємств через макро- та мікроланцюги; для кожного з них визначено ключові етапи, які стають основою при формуванні інформаційно-логістичного забезпечення. Доведено, що транспортування та повернення в мікроланцюг обумовлені специфікою масштабів та обсягів, характерних для даної сфери діяльності. Кожна ланка виробничого процесу відповідає конкретній функції, спрямованій на забезпечення оптимальної ефективності в рамках мікроланцюга поставок.

Ключові слова: *процесний підхід, структурний підхід, інформаційно-логістичне забезпечення, бізнес-процеси, економічні цикли, сталий розвиток, нафтотранспортні підприємства, стратегії, просторово-циркулярна економіка.*

Рис.: *3.* ***Табл.:*** *1.* ***Бібл.:*** *32.*

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The external environment of enterprises in the current economic environment is characterized by a high level of complexity, volatility and uncertainty. Under such conditions, the main task of an enterprise should be to respond quickly to changes and implement appropriate measures in the organization and conduct of its activities.

The appropriate operational response to a rapidly changing and increasingly unstable business environment is determined by the organizational structure and the formation of information and logistic support of enterprises in the business management system. Since most enterprises are organized on a functional basis and on the basis of hierarchical levels, this creates significant difficulties in carrying out effective activities. Functional units are relatively isolated, which does not directly affect them, which requires the implementation of transparency and systematic understanding of the processes of the entire enterprise, its organization to improve the efficiency of functioning in certain business areas.

A number of practitioners and researchers are engaged in the application of the process approach to management. This approach involves the introduction of a new form of organizational structure in the activities of the enterprise, including the functioning associated with the rethinking of the quality of production processes and their results. The process approach focuses on the formation of business processes and their changes that link the activities of all departments of the enterprise, rather than on the management of individual resources and, accordingly, cost centers. The term "business process" is central to various scientific interpretations of the process approach. In particular, the so-called "business process" is the object of modeling commercial and production activities that should be in line with the current dynamic and changing market environment.

A significant contribution to the study of the issue in terms of the feasibility of applying the process approach in the activities of an enterprise has been made by the authors: Arefieva O., Deryhin O., Kozenkov D., Aloshyna T., Haiduk I., Kulakovska T., Prokhorova V., Zaitseva A., Skliar Ye., Ksenofontova A.

In order to provide stakeholders with quality information, attention was paid to the publications of Kaut O., Shportko A., Bihun O., Kubatko O., Makovoz O., Zaitseva A., Shkurenko O., Kuzior A., Arefiev S., Poberezhna Z.

Also, the improvement of the activities and prospects for the renewal of oil transportation enterprises are revealed in the scientific works of Horal L., Prokopiv M., Raicheva L., Maslak O., Mariya M., Grishko N., Yakovenko Y., Savielova A., Prokhorova V., Bozhanova O., Putro A., Yukhman Y., Azizova K.

The conditions and benefits of the spatial circular economy have been reflected in the research of such scholars as: Arefieva O., Poberezhna Z., Derhaliuk M., Tulchynska S., Horal L., Hurochlina V., Lepeiko T., Mazorenko O., Podra O., Samsonenko M., Trushkina N., Shvets A., Shkurenko O., Kuzior A., Ihumentsev O.

The scientific and practical value of the carried out research is quite useful in the current economic conditions, in particular, given the current state of the economy and its sectors in Ukraine and the problems of their renewal and development, there is a need to combine the essential features of transparency of the process approach, characteristics of information and logistic support and requirements of the spatial circular economy. This will help to harmonize the advantages and disadvantages of the process approach, identify priorities and focus on improving the enterprise's system processes, the combination of which will ensure increased efficiency and competitiveness by maximizing customer satisfaction. Therefore, the problem of developing a process approach and reforming economic foundations in Ukraine is also an extremely relevant issue in the context of a spatial circular economy.

The article is *aimed* at studying the problems and prospects of transparency of the process approach of enterprises in the context of the spatial circular economy and developing the foundations for the formation of information and logistic support for improving the economic efficiency of activity.

The structural formation of information and logistic support of oil transportation enterprises in the context of the spatial circular economy within the field of renewable economic cycles allows maintaining the transparency of the process approach, and also becomes a key stage of strategic development aimed at adapting to changes in the industry and maximizing efficiency in different phases of the economic environment.

The use of the spatial circular economy creates mutually complementary levers for choosing business models that are focused on optimizing the resources used, reducing the need for them in business activities, and possibly using a closed cycle. The implementation of the process approach in this context involves diagnosing certain processes by stages of the production and commercial process from the standpoint of reducing the primary demand for primary resources in the relevant industry. It also creates "conditions for the accumulation of innovative potential capable of mastering the latest technologies, creating new products, developing new markets, increasing the real product for consumption, providing favorable conditions for the development of society and international scientific and technical cooperation. The convergence of development allows combining the most appropriate processes into a single approach to forming the appropriate support to optimize the elements through a functional and resource approach" [1].

An important aspect of improving the implementation of information and logistic support for the automation and optimization of business processes of oil transport enterprises, which allows enterprises to more effectively determine the spatial phasing of interaction with partners, reduce the time of information and logistic content flow in decision-making and the introduction of new functional strategies that reflect the current phase of the life cycle.

It is that "during the transition to the next cycle, changes consistently cover all elements of the economic structure. Their starting point and impetus are the contradiction between the growing volume of society's needs and the low efficiency of the economy, which is unable to meet them. This causes changes in the technological and, as a result, regenerative, sectoral, territorial, institutional structures, in the system of property relations" [12, p. 12], as well as the corresponding stage of the market segment and product.

In this context, the importance of the system of information and logistic support of the management process at the enterprise on the basis of the process approach lies in its role as a key element for achieving efficiency and competitiveness in the modern business environment, the ability to adapt in time to the updated conditions of functioning. This system plays an important role in the implementation of the process approach conception, which recognizes an enterprise as a system of interacting business processes rather than separate functional units. Information support allows automating, controlling and optimizing these processes, contributing to more efficient operation of the enterprise. A process-based information management system provides a reliable flow of information in real time, enabling management to make informed decisions. Logistic support contributes to the spatial and temporal balancing of business processes, which enhances the adaptability of the organizational, economic and technical components. Their mutual complementation is based on the flow nature and the ability (need) to be updated within certain time frames and functional spaces.

If we consider macroeconomic trends as a determining component of the external environment, it is reasonable to rely on the fact that "a common property of all economic cycles, which manifest themselves as fluctuations, is that a set of individual economic indicators move together. In addition, when studying monthly or quarterly data of a significant number of economic indicators, cyclical fluctuations can be easily identified, since the corresponding fluctuations are usually larger, longer and permeate almost the entire economic system of the country" [11, p. 839].

It affects all aspects of management, from resource planning to quality control, creating a single information ecosystem. Its essence is also manifested in simplifying internal communication, implementing strategic changes and increasing the degree of adaptability of the enterprise to changes in the external environment. In a spatially circular economy, the system is a necessary tool to support modern management at an enterprise, which allows it to achieve optimal efficiency and successfully compete in the market.

The system of information and logistic support of management at an enterprise on the basis of the process approach is a key element of modern business management. The process approach involves consideration of an enterprise as a system of interacting and interdependent business processes, rather than separate functional units.

Thus, "the system of information support of the management process at the enterprise on the basis of the process approach should include creation of an internal system for analyzing and summarizing information about each business process; formation of information channels, i. e. ensuring that information users can solve and justify tasks arising during the implementation of the enterprise's business processes; organization of favorable conditions for its effective use" [28], based on creating a balance of process integrity and choosing business scenarios for their coordination.

In our opinion, a process-based information and logistic system is aimed at implementing technologies and programs in both components that help to effectively manage and improve key business processes. This includes automation, analysis and monitoring of processes to ensure their optimization and alignment with the strategic goals of the enterprise. It also allows for real-time data acquisition and processing, enabling rapid adaptation and the timely, informed decision-making. The system also ensures the integration of various functional areas, improving internal interaction and communication at the enterprise. Implementation of the information and logistic system based on the process approach helps to increase the efficiency of management activities, rationalize business processes and support the strategic goals of the enterprise in a constantly changing and competitive environment.

An additional advantage of information and logistic support is that "it is the "greening" of logistic activities that will become an important factor of competitiveness in the future, since most consumers will prioritize companies that carry out cargo transportation by "green" transport and use technologies that conserve natural resources" [20, p. 155], which will accelerate the mutual complementation of sectoral and functional features when implementing a spatial circular approach to development.

Both approaches to the formation of provision are used in an adaptive combination due to the fact that changes in the conditions of the enterprise's activity require significant modifications of the original system of processes. This will help to avoid duplication, overlap and inability to link processes, which contributes to the maximum sharing and reuse of processes, identifying contradictions when aggregating them to a higher level through the development of new processes or their adjustment.

"The basis of the circular economy is the formation of new business models that focus on reducing the amount of resources used, introducing reuse or a closed production cycle (planning the need for production in materials) and recycling in production, which allows to ensure environmental protection and reduces the primary need of industrial enterprises for external resources" [8, p. 53].

The formation of a process approach should be understood as a strategic process in management aimed at organizing and optimizing the activities of an enterprise or organization through the identification, modeling and optimization of its core and additional business processes. This approach involves reviewing and improving the supply chain system as a single commercial and production process with certain logical relationships and sequence (*Tbl. 1, Fig. 1*). The essence of the clarity of the formed process approach is that the judge is not the one who wrote the process, but the one who uses it. Therefore, the process must meet three conditions: the process is easy to understand, the process is complete, and the process is easy to modify.

These stages are based on applicable process modeling methods, which can be divided into two possible dynamic processes: top-down and bottom-up, and correspond to deductive (from the general to the particular) and inductive (from the particular to the general) ways of thinking, respectively. First, it is necessary to create the most complete list of processes, and then break them down into detailed sub-processes with a certain hierarchical structure.

Table 1

The main stages of the formation of the process approach

Stage	Stage name	Stage description
1	Defining business processes	Analyzing and identifying the key processes that determine the functioning of the organization. This may include aspects such as production, marketing, customer service, resource management, etc.
2	Modeling business processes	Developing visual models that show the sequence of events and the relationships between different stages of the process. This contributes to a better understanding of the organization's work
3	Implementation and automation	Implementation of internal changes in the organization based on the study and optimization of processes. Use of information technology to automate and improve operations
4	Management and monitoring	Defining key performance indicators (KPIs) and continuously monitoring the results to ensure continuous improvement and compliance with the set goals
5	Staff training and development	Involving staff in the new organizational culture and providing them with the necessary knowledge and skills to work effectively in a process-based environment

The focus of oil transportation companies on identifying and optimizing key business processes in line with market needs and conditions includes a thorough analysis of the chain of production, transportation and distribution of oil products to improve productivity and reduce costs.

The formation of the process approach of oil transport enterprises should be based on their structuring and consists in creating a comprehensive and flexible management system capable of responding optimally to the challenges and changes in the modern energy sector. The main goal is to optimize internal processes to achieve high efficiency, adapt to changes in the production and market environment, and ensure sustainable development. Structuring the process approach is aimed at identifying and optimizing key business processes, taking into account their interaction and impact on the overall success of the enterprise. This includes studying and analyzing all stages of activity, from production to transportation and marketing of oil.

In this area, the importance of the circular economy is becoming more relevant, which "has become an irreversible phenomenon in today's conditions, as it is designed to solve urgent problems related to environmental protection, exhaustion of natural resources and, at the same time, ensuring economic development through the implementation of materials reuse technologies, innovations, circular business models, renewable resources, etc." [25].

Structuring the process approach of oil transportation enterprises is a comprehensive process of organizing and optimizing internal management aimed at achieving high efficiency and adapting to changing market conditions, which allows enterprises to operate more efficiently in the oil transportation sector. One of the key components is the identification and analysis of key business processes, such as production, transportation, storage and marketing of oil and oil products. A thorough study of these stages allows us to identify opportunities for optimization and further improvement of information and logistic support for the creation of real applications from adapted processes.

The macro supply chain includes: planning, procurement, production, warehousing, transportation, return and other links, each of which corresponds to a business model that can generally be directly attributed to industry segmentation. It includes various stages that are perceived as successive links in the process from initial planning to the completion of the cycle. These stages include planning, procurement, production, warehousing, transportation, return and other important aspects. Each link in the macro supply chain plays a different role in the business model, reflecting the relationships and interactions in the context of a particular industry. These stages may vary depending on the specifics of the industry and the business processes of the enterprise. It is crucial to consider that each link in the macro chain has its own impact on efficiency and productivity. Industry segmentation, which is reflected in the business model, defines the specifics of each link and determines how they interact to achieve the strategic goals of the enterprise.

In today's environment, the Ukrainian oil transportation system (hereinafter referred to as the "OTS") faces an important task of ensuring the efficiency of its operations in a dynamic environment.

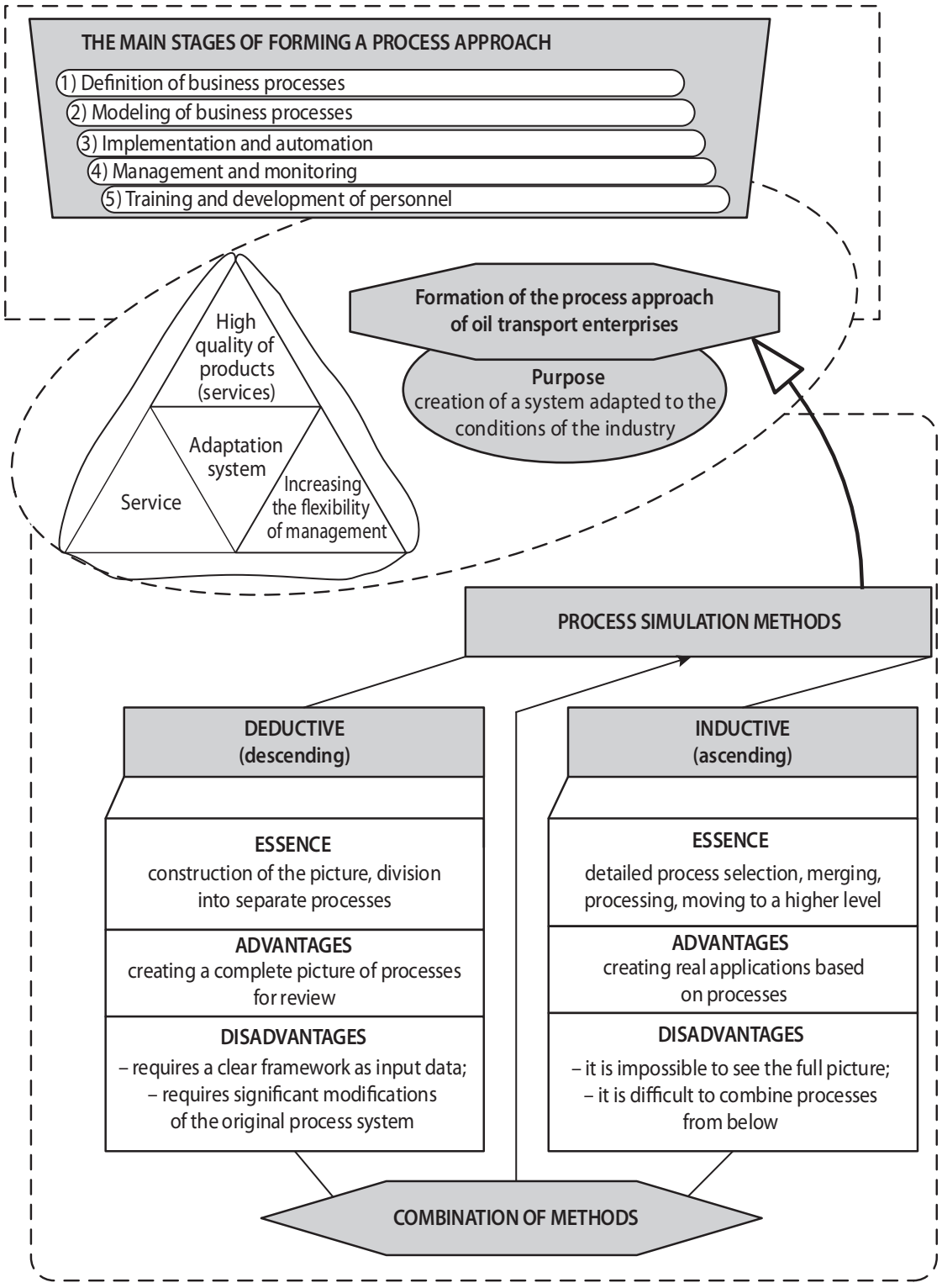

Fig. 1. Model of structural formation of the process approach to the development of oil transportation enterprises

Oil transportation in Ukraine is one of the key business areas, which includes not only the functions of transporting oil to Ukrainian refineries and its transit to the countries of Central and Eastern Europe, but also refining and trading of oil and oil products [22]. Noting the great strategic importance of this area, it is important to consider it in the context of constant changes in markets and technological innovations to maximize its productivity. Optimizing the functioning of the oil transportation system requires not only improving existing technologies and infrastructure, but also implementing innovative solutions to ensure reliability, safety and sustainable development.

The operator of the oil transportation system of Ukraine is Ukrtransnafta JSC, a national operator providing oil transportation services by pipeline, 100% of which is owned by Naftogaz of Ukraine [24]. Other functions include trading of oil products and liquefied gas, wholesale and retail sales of light oil products and petrochemicals. In addition, the company carries out the transportation of liquefied gases and light hydrocarbon raw materials, processes hydrocarbon raw materials, and provides maintenance and repair services for special gas tank cars [18].

The balance and normal functioning of this sector is critical to the stability of the economy. Military actions can cause serious challenges to the infrastructure and supply chain, which directly affects the efficiency and safety of oil transportation companies. Increasing risks affect the financial performance of companies and lead to higher costs for security and maintenance of existing infrastructure facilities. At the same time, these factors have a negative impact on the investment climate, making it difficult to raise capital and financial support for the recovery and development of the oil transportation sector. However, despite the impact of external factors, Ukrtransnafta JSC was ranked among the top 100 most profitable companies in Ukraine in 2022 [4] (*Fig. 2*). As of November 2023, Ukrtransnafta JSC "provided transit of 30–35 thousand tonnes of Russian oil per day for refineries in Slovakia, the Czech Republic and Hungary, providing transportation via the southern branch of the Druzhba railway" [23, p. 14].

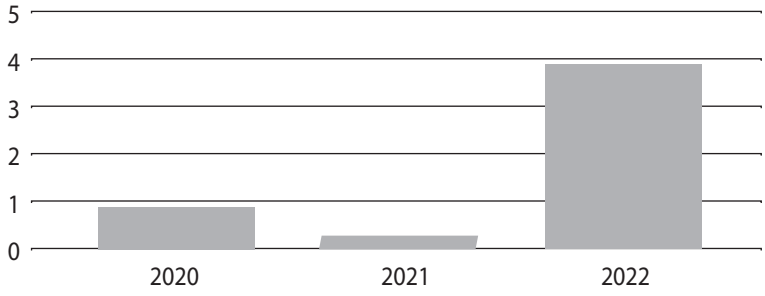

Fig. 2. Dynamics of changes in the net financial result of JSC Ukrtransnafta in 2020–2022, UAH billion [3]

Accordingly, in order to ensure stability and optimization of processes in the oil transportation system of Ukraine, it is important to ensure the strategic development of Ukrtransnafta JSC, which is aimed at: "increasing the volume of oil transportation through main oil pipelines; diversification of sources and routes of oil supply to Ukraine and its transit through the territory of Ukraine to strengthen the energy security of the State; ensuring reliable and uninterrupted transportation of oil to oil refineries of Ukraine and in transit to European consumers; implementation of investment projects; ensuring reliable transportation of oil products, their storage and transshipment; ensuring compliance with quality standards of transportation services".

Thus, the development of Ukraine's oil transportation system is focused on the implementation of strategic goals aimed at ensuring stability, reliability and efficiency of its operations (*Fig. 3*). The main goal is to increase the volume of oil products transported by main oil pipelines to ensure domestic consumption and transit to European markets. An additional strategic goal is to diversify sources and routes of oil supply to enhance Ukraine's energy security. Another important task is to maintain high standards of service quality and uninterrupted transportation, which requires careful maintenance and improvement of the infrastructure.

Given that "the implementation of strategic directions for the development of Ukraine's logistics infrastructure in the context of creating a new economic model of a closed cycle requires the creation of a national logistics strategy aimed at harmonizing the interests of economic process participants in the socioeconomic environment, its main directions should be aimed at improving the parameters of incoming resources through improved relations with business entities; improving internal flows, i. e. results and coherence of actions.

In particular, the implementation of investment projects and the introduction of the latest technological innovations are becoming key factors in enhancing the system's resilience to negative environmental impacts and implementing appropriate resource restructuring. All of these strategic directions are aimed at ensuring the system's management flexibility and adaptability in the face of instability, while ensuring its sustainability and competitiveness in the international market. In addition, renewable economic cycles can stimulate innovation activity, in particular in the field of renewable energy sources, resource conservation technologies, and other environmentally friendly solutions in a spatially circular economy.

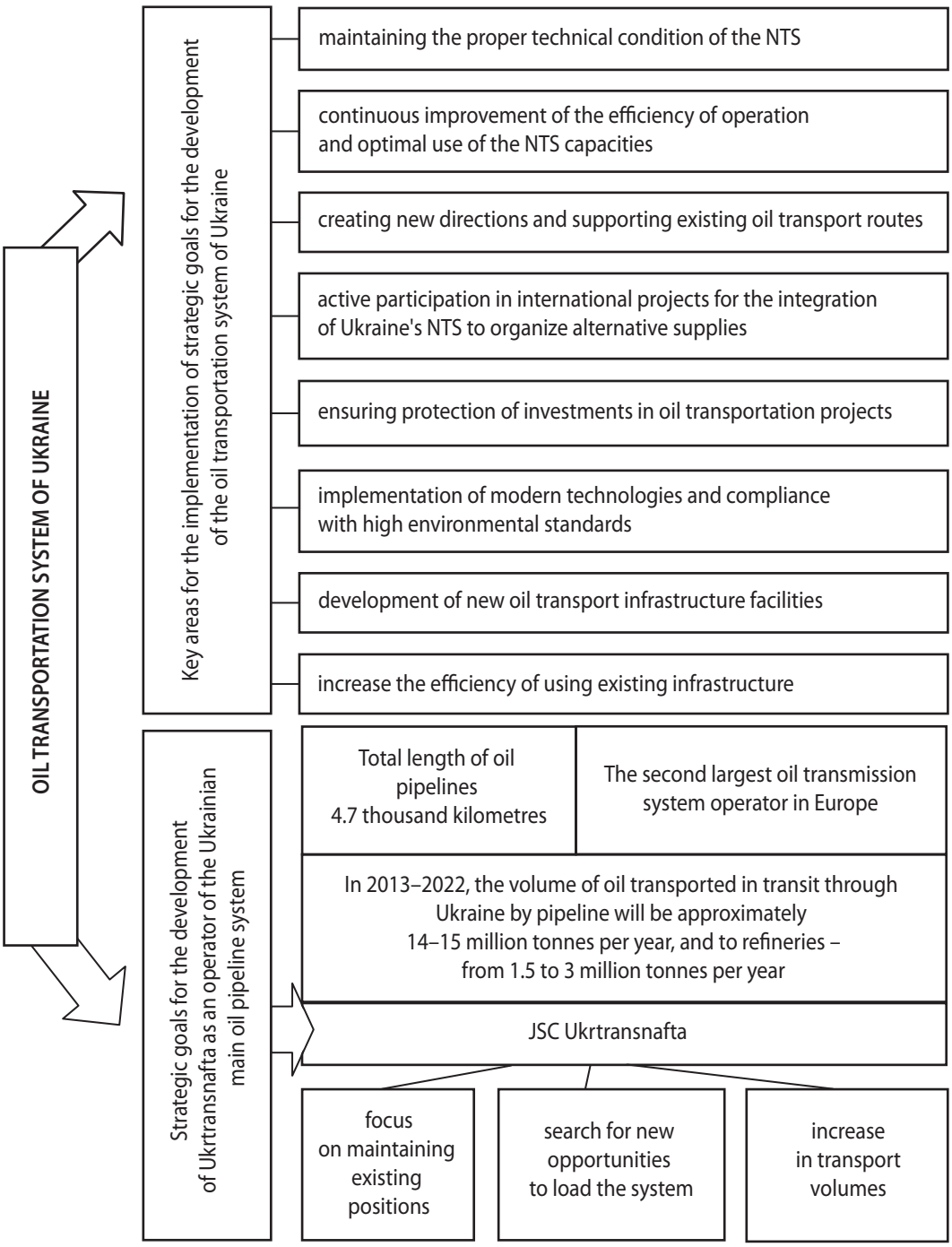

Fig. 3. Strategic goals of the development of the oil transportation system of Ukraine in an unstable environment

Source: compiled by the authors according to [16; 22].

To reach a qualitatively new level of resource efficiency in a circular economy, technological innovations and changes in the behavior of business entities, large-scale investments and government incentives will be needed. Logistic support as a modern important tool contributes to the achievement of the goals of innovation cooperation development through the implementation of the principles of efficiency, systematicity, flow, process and optimization [26, p. 159].

The micro supply chain, in turn, defines the stages that are part of a narrow range of supply chain activities and solve specific tasks to optimize performance. The key stages of this chain include planning, procurement, production, warehousing, transportation, return and other links. Planning at the micro-chain level focuses on specific aspects of production and supply aimed at meeting demand within a limited scope of operations. Purchasing focuses on securing the neces-

sary resources for production, while production and warehousing focus on the production and storage of goods within a limited area. Transport and return in the micro-chain are driven by the specific scale and volume of the activity. Each link in the production process corresponds to a specific function aimed at ensuring optimal efficiency within the micro supply chain.

In addition, "incorporating the principles of responsible production, energy efficiency and waste management is becoming an important component of an innovative business ideology that takes into account environmental requirements and promotes sustainable development. In addition, a focus on inclusivity and diversity in the work environment helps to create a creative environment where different perspectives and experiences come together to generate innovative ideas" [17].

Thus, the transparency of the process approach in the field of recovering economic cycles has its own peculiarities that determine their specificity and impact on the economy as a whole. In this context, policy decisions and regulation are important, as they can significantly affect the stimulation of the use of renewable resources, ecosystem management, and circular processes.

The characteristic features of the formation of information and logistic support for enterprises in the conditions of a spatial circular economy in the implementation of renewable cycles should include: dependence on sources, since renewable cycles are often associated with the use of natural resources and the results of circular technologies. Such cycles may be driven by the renewal of natural resources, minerals, and others; the aggressiveness of environmental factors, including climate change, natural disasters, and ecosystem diversity, may affect the renewable economic cycles in various sectors of the national economy and create preconditions for either accelerating or slowing down the duration and intensity of the cycles.

These features determine the dynamics and direction of the economic recovery cycles, and emphasize the importance of rational use of resources and effective ecosystem management for achieving sustainable development.

CONCLUSIONS

Thus, the goal of structuring the process approach is to create an organizational structure that will contribute to the achievement of the strategic goals of the enterprise and ensure its successful functioning in a complex and changing energy environment.

In our opinion, the basis of process-oriented information and logistic support is the introduction of technologies and software in both areas that help to effectively manage and improve key business processes. This includes automation, analysis and monitoring of processes to ensure their optimization and alignment with the strategic goals of the enterprise. The system also allows collecting and processing data in real time, which ensures fast personalization and timely, informed decision-making. The system also ensures the integration of various functional areas, improving communication and interaction within the enterprise. Implementation of a process-oriented information and logistic system helps to increase management efficiency, optimize business processes and support the strategic goals of the enterprise in a constantly changing competitive environment.

In general, the structural formation of the process approach for the sustainability of economic cycles contributes to the creation of an adaptive and competitive information and logistic system that can function effectively in the changing conditions of the spatial circular economy and the specifics of the relevant industry and oil transportation enterprises. ■

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