European Journal of Economics, Finance and Business Development
ISSN (E): 2938-3633
Volume 2, Issue 8, August - 2024

ENHANCEMENT OF CONSTRUCTION OF AN AUTOMATED LOGISTICS GAS CHEMICAL COMPLEX ON THE EXAMPLE OF PJSC SIBUR

Juraeva Diyora Bakhodir qizi,
Cargo Service Development Manager,
YANDEX LOG OZB LLC

Yarashova Vasila Kamalovna
Doctor of Economics, Professor,
Tashkent State University of Economics,
Department of Green Economy

Abstract

The present paper describes a proposed study that will examine the methods of improving the performance of industrial-logistics complexes within an organization. The purpose of this research is to develop applied measures to create an automated industrial and logistics park at SIBUR PJSC Corporation. To achieve supply chain effectiveness and internal business models, it is proposed to use a systematic method to improve the operation of industrial and logistics complexes based on solving multi-criteria problems. The data for this study comes from the implementation of PJSC SIBUR's logistics activities from 2018 to 2021. The findings of this study are envisioned to contribute to the improvement of business models, the current logistics activities at SIBUR PJSC and the adaptation of other organizations to automated and innovative industrial and logistics comp. The proposal consists of several sections: The introduction to the study, literature review, methodology, reporting of expected results, and conclusions.

Introduction

Improving the operation of industrial and logistics complexes in terms of the systematic introduction of innovative and progressive methods in business management is a critical prerequisite for consolidating intra-industry competitiveness at the current stage of development of the domestic economy.

Although using automation and innovative tools to improve the performance of industrial and logistics complexes has many benefits, most domestic organizations continue to operate under old business management concepts and principles.

The issue of boosting the performance of industrial and logistics complexes to current economic realities is, thus, of the highest priority and importance in the course of conducting scientific and practical research. The functional skills performed as part of the work of the industrial and logistics complexes, for instance, inventory management in the sphere of

circulation, predictive estimation of transportation needs, organization and placement of storage facilities, and identification of material flow rate evidence this.

Problem statement

The purpose of the implementation of scientific and practical research is the development of applied measures that will enable the formation of an automated industrial and logistics park at PJSC SIBUR.

As part of achieving the above goal, it is necessary to determine the difficulties that the corporation faces in the course of logistics activities, propose a methodological approach that allows improving the work of the industrial logistics park, present a set of applied measures for the formation of an innovative industrial logistics park in the corporation and evaluate their effectiveness.

Delimitations of the study

The implementation of scientific and practical exploration implies the use of methodical methodological approach to ameliorate the operation of the company's artificial logistics park through a series of digital results integrated into the gas- chemical ecosystem, which will enhance the effectiveness of the logistics chain.

Professional value

The findings of scientific and practical exploration could be significant and precious for the heads of departments for transport logistics, trade activities, industrial development and foreign economic business communications. In this case, managers can apply the results of scientific and practical research in order to improve the company's internal business model, which will enable the company to adapt to best to the automated gas chemical logistics complex.

Literature Review

This section of the proposal reviews a cycle of theoretical and academic research on tools and applied nature for enhancing the effectiveness and overall production effectiveness of logistics complexes.

To enhance the performance of industrial and logistics complexes, Mathauer and Hofmann [Mathauer and Hofmann, 2019, p. 419] presented a comparative examination of production and information technologies. Thus, they concluded that any manufacturing technologies would be influenced by the applied technical improvements due to the digitalization of the logistics park. In conjunction with this, production technologies may become high-tech since either flexible conveyor platforms or robots will become key products produced in the industrial and logistics complexes.

Additionally, the authors examined the significance of numerous options for access to innovative technologies designed for the logistics complex: make, buy or ally. The results obtained empirically confirmed the value of the theoretical approach, justified by Grawe [Grawe, 2019] and the potential of logistics complexes to be innovative. On the one hand, this potential is dynamically changing, and on the other hand, it implies the logistical integration

of the company, the reconfiguration of the resource base and existing professional competencies in the operation of the logistics complex.

Meanwhile, Wagner [Wagner, 2018] claims the point of view that technologies are the foundation for automation and the introduction of innovation tools into the operation of industrial logistics complexes, while the success of automation will depend on the degree of improvements (either progressive or radical). An empirical investigation conducted by the author showed that, as a rule, the operation of logistics complexes is concentrated on the implementation of additional expenditures in connection with the organization's desire to improve daily consumer services. In other words, the logistics complexes of organizations have practically no money left to automate and implement innovative tools, and as a result, even a decline in the efficiency of their work has been recorded.

In the research projects Deeper J.M., Goldsby T.J., Knemeyer A.M. and Wallenburg C.M. [Deeper et al., 2018] and Wallenburg C.M. [Wallenburg, 2019] reached a similar conclusion that there might be numerous options for upgrading industrial logistics complexes, but there are still a lot of factors depending on the initiative of the organizations themselves to implement and then use these enhancements which serve as positive tools in boosting consumer loyalty and the effectiveness of the logistics complex respectively.

However, internal and external organizational system factors that influence the effectiveness of tools for improving the operations of logistics complexes are highlighted in the article by Soosey and Hyland [Soosey and Hyland, 2020], Thus, it is worth considering, as internal factors, the financial potential of the organization, the behavior patterns of the organization's employees and stakeholders, the level of quality of the final product, the duration of the manufacturing business function, and the question if the organization is leader among the industry competitors. Nevertheless, intra-industry competition has become a fundamentally extra-organizational factor, which to some extent encourages industrial organizations to improve the working conditions in their own logistics complexes.

The two interrelated publications of Marchet G., Melacini M., Perotti S., Sassi C. and Tappia E. [Marchet et al., 2018a], [Marchet et al., 2018b] presented a classification of participants in logistics complexes and supply chain depending on the scale of the business, the type of ownership in the authorized capital, the total volume of provided logistics services, including areas where participants in the logistics complexes of large entrepreneurial organizations that ship goods. In other words, it depends on the efficiency of the logistics complex that focus on cargo volume, innovations and overall processes in the logistics complex. At the same time, the empirical investigation of the authors allows to conclude that industrial companies need to set up business partnership with organizations that supply innovative technologies and enterprises that ship goods.

In the process of transformation of the logistics industry there might occur problems which, according to Kolesnikov et al. [Kolesnikov et al., 2020] correlate with the interaction between employees and the information system to support the operation of the logistics complex. Taking into account the fact that the authors, from the point of view of clarifying the automation of the logistics complex, assume that the organization is implementing a full-fledged information system. Thus, there is a big demand for the completeness of the information base, the effectiveness of the information support system and confidentiality. It lets the authors propose

solution to potential problems by forming a cyber-physical information system for the operation based on digital and financial technologies: IoT, multi-agent systems and blockchain technology. The cyber-physical information system will function using the conceptual ideas of building intelligent technologies, as well as active information systems.

In spite of the intensity of the digital methods of work of the logistics complex, Abduljabbar R., Dia H., Liyanage S., Bagloee S.A. [Abduljabbar et al., 2019] claim that the numerous difficulties that arise during the operation of the logistics complex allow to find solution to multiobjective problems that determine the use of special optimization algorithms in practice. As an example, the authors state raster optimization algorithms, as well as an applied fuzzy logic model that optimize the shipping routes. The authors conduct a comparative analysis of the applied fuzzy logic model and the concept of logistic regression, stating that the unclear logic method is more effective in improving the performance of logistics complexes.

Apart from economic and mathematical methods, Khan et al. [Khan et al., 2019] studied in their article green methods for improving the operation of logistics complexes. The authors claim that the use of such methods increases the effectiveness of the logistics complex according to four indicators: environmental, economic, operational and social. In conjunction with this, thanks to green methods for improving the operation of logistics complexes, financial and economic performance may not rise at all since the methods considered by the authors are an extremely new way to improving industrial logistics complexes. As a rule, projects for applying green methods into the operation of logistics complexes requires significant investments, leading to constant costs in the cost structure, which are mainly aimed at performing cross-cutting functions in the logistics complex. Nevertheless, in conjunction with all mentioned above, there is a negative impact on short-term financial and economic performance.

Simultaneously, Khan's empirical study [Khan et al., 2019] found a positive correlation between green methods for improving the operation of the logistics complex and financial and economic performance. Thus, currently green methods for improving the operation of the logistics complex can be regarded as the basis for achieving environmental sustainability of facilities located on industrial sites.

Methods

This part of the proposal deals with the algorithm for using the system method as part of the automation of the industrial logistics complex of SIBUR. The use of the system method aims at the solution to a multi-criteria problem, which implies the automation of the functional capacity of the industrial logistics complex by achieving flexible management of the container site.

The system method implies the achievement of the effectiveness of the logistics complex according two goals: the optimal reduction in the ground run of the container site facilities; optimal increase in productivity (generating) of container site facilities. The content of the system method is based on the concept of multi-objective optimization of the operation of the industrial logistics complex, with regard to the achievement of the abovementioned goals.

The achievement of the first objective depends on certain factors for the operation of the industrial logistics complex such as the time period that ends with the last stage of the practical

implementation of the industrial cycle in the logistics complex; the time difference between the period of arrival of containers to the place of the industrial cycle in the logistics complex, as well as the nearest facilities of the logistics complex; the time period, which ends at the stage of the crane's availability for loading containers which arrive at the logistics complex in the industrial cycle. According to the first criterion, in order to achieve this goal, the key factor to improve the work of the industrial logistics complex will be the need for constant practical implementation of the industrial cycle. According to the third criterion, in order to achieve this goal, the priority in improving the work of the industrial logistics complex will be the optimization of the crane operation in the transport and logistics complex within the framework of minimizing the queue of containers for loading.

The achievement of the first objective depends on certain factors for the operation of an industrial logistics complex such as the time period of the ground mileage of container site facilities, the time period of the ground mileage of a loaded container site facility, the potential for parallel operations in the industrial cycle of the logistics complex. According to the first criterion, in order to achieve this goal, the priority in improving the work of the industrial logistics complex will be the optimization of the operation of container site facilities, taking into account possible internal conflicts. According to the second criterion, in order to achieve this goal, the priority in improving the work of the industrial logistics complex will be the optimization of the work of the loaded object of the container site, taking into account potential internal conflicts. According to the third criterion, in order to achieve this goal, the priority in improving the operation of the industrial logistics complex will be the optimization of the operation of the container site facility, taking into account the practical implementation of parallel operations in the industrial cycle of the logistics complex.

The capacity for parallel operations in the industrial cycle of the logistics complex can be determined by three possible scenarios. The first potential scenario: the capacity for parallel operations may shrink to zero amount, provided that the container site facility performs the corresponding work in another site where the previous industrial cycle of the logistics complex was not completed. The second possible scenario: the capacity for parallel operations can reach the value of 0.5 units, provided that, although the container site object performs the corresponding work in another place where the previous industrial cycle of the logistics complex was not completed, it can partially perform a similar operation in another place of the logistics complex within the allocated time period. The third potential scenario: the capacity for parallel operations may reach a single value in cases that are not marked in the first and second scenarios.

Results Anticipated

The following part of the proposal deals with the outcomes which are likely to be obtained thanks to the mentioned system method. Once the conceptual ideas of automation of the industrial logistics complex are identified, we suppose that we will be able to prove the hypothesis that the formation of the industrial logistics complex of PJSC SIBUR according to the system method of improving the operation of the industrial and logistics complex will be effective. It will ensure a positive change in the trend and positive values of real and discounted profitability, a significant dominance of the value of the internal rate of return over the interest

rates for alternative products of financial investments in the modern market segment, the minimum value of the time period of payback of financial investments in the project of the formation of an industrial logistics complex according to the system method.

Conclusion

In conclusion, it should be noted that the improvement in the work of the industrial logistics complex can be achieved by using numerous methods. The review of academic research enabled us to identify some of the tools and methods of innovative, digital improvement in the industrial logistics complex. Above all, it is necessary to consider these methods, since the modern functioning of PJSC SIBUR outcomes is due to the high digital activity of the industrial organization under study.

In parallel, we propose the use of a system method in the operation of an industrial logistics complex. The idea is based on the application of an algorithm for resolving a multi-criteria problem. By the help of the system method in the practice of an industrial organization, two key goals that affect the existing business model will be achieved: an optimal reduction in the ground mileage of container site facilities; an optimal rise in the productivity (production) of container site facilities. The achievement of the intended objectives can be ensured by solving a multi-criteria task assignment in the framework of which six criteria were developed.

Subsequently, the conceptual idea of the system method will be integrated into the algorithm of improving the operation of the industrial logistics complex via a set of digital solutions that have already been undertaken by PJSC SIBUR. We assume that the proposed approach, besides improving the operation of the industrial logistics complex, will enhance efficiency of the supply chain management system as a whole.

References

1. Abduljabbar, R., Dia, H., Liyanage, S., & Bagloee, S. A. (2019). Applications of artificial intelligence in transport: An overview. Sustainability, 11(1), 189.
2. Deepen, J. M., Goldsby, T. J., Knemeyer, A. M., & Wallenburg, C. M. (2018). Beyond expectations: an examination of logistics outsourcing goal achievement and goal exceedance. Journal of business logistics, 29(2), 75-105.
3. Grawe, S. J. (2019). Logistics innovation: a literature-based conceptual framework. The International Journal of Logistics Management, 20(3), 360-377.
4. Khan, S. A. R., Jian, C., Zhang, Y., Golpîra, H., Kumar, A., & Sharif, A. (2019). Environmental, social and economic growth indicators spur logistics performance: from the perspective of South Asian Association for Regional Cooperation countries. Journal of Cleaner Production, 214, 1011-1023.
5. Kolesnikov, M. V., Lyabakh, N. N., Mamaev, E. A., & Bakalov, M. V. (2020, September). Efficient and secure logistics transportation system. In IOP Conference Series: Materials Science and Engineering (Vol. 918, No. 1, p. 012031). IOP Publishing.
6. Marchet, G., Melacini, M., Sassi, C., & Tappia, E. (2018a). Assessing efficiency and innovation in the 3PL industry: an empirical analysis. International Journal of Logistics Research and Applications, 20(1), 53-72.

7. Marchet, G., Melacini, M., Perotti, S., Sassi, C., & Tappia, E. (2018b). Value creation models in the 3PL industry: what 3PL providers do to cope with shipper requirements. International Journal of Physical Distribution & Logistics Management, 47(6), 472-494.
8. Mathauer, M., & Hofmann, E. (2019). Technology adoption by logistics service providers. International Journal of Physical Distribution & Logistics Management.
9. Soosay, C. A., & Hyland, P. W. (2020). Driving innovation in logistics: case studies in distribution centres. Creativity and Innovation Management, 13(1), 41-51.
10. Wagner S.M. (2018) Innovation management in the German transportation industry. Journal of Business Logistics, 2(45), 357-382.
11. Wallenburg, C. M. (2019). Innovation in logistics outsourcing relationships: proactive improvement by logistics service providers as a driver of customer loyalty. Journal of supply chain management, 45(2), 75-93.