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*DEVELOPMENT OF A SYSTEM OF KEY PERFORMANCE INDICATORS IN THE MANAGEMENT SYSTEM OF AVIATION TRAINING COMPLEX* .....

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## INNOVATIVE TECHNOLOGIES IN SUPPLY CHAINS

**Anastasiia Serzhuk "Innovative technologies in supply chains".** The article reveals the essential and substantive basis of supply chains, the main tasks. The main elements of the interaction of the material flow on the path of its movement have been studied. The relevance and necessity of using new information technologies in logistics and, in particular, in supply chain management is determined. Digital technologies are the basis of modernity, it is one of the promising areas of development of the world economy. The use of these technologies in logistics processes in the conditions of Industry 4.0 led to the emergence of the concept of "smart logistics". Thanks to smart technologies, the time of many processes in both marketing and logistics is reduced. You can reduce the speed of product delivery and its quality. The development of the digital economy in Ukraine is aimed at creating motivation, forming needs for the use of digital technologies to increase production volumes, increase competitiveness and national development in accordance with the "Concept of the Development of the Digital Economy and Society of Ukraine for 2018-2020" [1]. This concept notes the growing demand for the use of digital processes in various industries. The concept of "smart logistics" is equated with "intelligent logistics" or "intelligent logistics", which involves the optimization of information logistics flows that contribute to the automation of processes. That is, with the help of smart-logistics tools (information systems), efficiency increases in those processes where they are used. The movement of material flow in logistics chains requires the storage of certain stocks in warehouses. Accordingly, warehousing also needs to improve the efficiency of its activities, as well as the transportation system. The purpose of this article is to define the concept of smart logistics, its meaning and key elements. Key information technologies used in supply chain management are analyzed in the work, and the stages of their application are highlighted. The introduction of smart technologies in logistics determines clearer processes and priorities for the use of digital innovations in the company's activities.

**Keywords:** logistics, logistic process, supply chains, innovations, material resources, smart technologies..

**Анастасія Сержук. «Інноваційні технології в ланцюгах постачання»** У статті розкрито сутнісно-змістовну основу ланцюгів постачання, основні завдання. Досліджено основні елементи взаємодії матеріального потоку на шляху його руху. Визначена актуальність та необхідність використання нових інформаційних технологій в логістиці та зокрема, в управлінні ланцюгами постачання. Цифрові технології є основою сучасності, це один із перспективних напрямів розвитку світової економіки. Використання даних технологій в логістичних процесах в умовах Індустрії 4.0 призвело до появи поняття «сма́рт-логістика». Завдяки сма́рт-технологіям скорочується час здійснення багатьох процесів як в маркетингу, так і в логістиці. Можна скоротити швидкість доставки продукції та її якість. Розвиток цифрової економіки в Україні спрямований на створення

мотивації, формування потреб використання цифрових технологій для зростання обсягів виробництва, підвищення конкурентоздатності та національного розвитку згідно «Концепції розвитку цифрової економіки та суспільства України на 2018-2020 роки» [1]. В даній концепції відзначається зростаючий попит на застосування цифрових процесів в різних галузях промисловості. Поняття «сма́рт-логісти́ки» ототожнюють з «розумною логістикою» чи «інтелектуальною логістикою», що передбачає оптимізації інформаційних логістичних потоків, які сприяють автоматизації процесів. Тобто, за допомогою інструментів сма́рт-логістики (інформаційних систем) підвищується ефективність в тих процесах, де їх застосовують. Рух матеріального потоку в логістичних ланцюгах передбачає необхідність зберігання певних запасів на складах. Відповідно, складське господарство також потребує підвищення ефективності діяльності, як і система транспортування. Метою даної статті є визначити поняття сма́рт-логістики, його значення та ключові елементи. В роботі проаналізовані ключові інформаційні технології, що застосовуються в управлінні ланцюгами постачання, виділені етапи їх застосування. Запровадження сма́рт-технологій в логістиці визначають більш чіткі процеси та пріоритетність напрямів використання цифрових інновацій в діяльності підприємства.

**Ключові слова:** логістика, логістичні процес, ланцюги постачання, інновації, матеріальні ресурси, сма́рт-технології..

**Introduction.** Under the influence of external and internal operating conditions of the enterprise, the process of material flow management requires the use of modern mechanisms for the coordination of all actions. Now there is a tendency to reduce mass production, more universal equipment is used, production systems are becoming more flexible. That is why the application of logistics in the material sphere is becoming more and more relevant, the purpose of which is to optimize material flows at the enterprise, which, in turn, create material benefits. Logistics is becoming increasingly automated, smart technologies are being used, thanks to which logistics operations are becoming more reliable and flexible.

**Analysis of recent research and publications.** The problems of applying innovative technologies in supply chains were mainly dealt with by leading global companies, for example, DHL, Amazon. Among scientists, new trends in the application of modern technologies in logistics were studied by H. Haas, E. Larson, O.S. Kostyuk, O.B. Mnyh, M.A. Aucklander, O.O. Shulika et al.

However, many aspects remain unresolved regarding the use of innovative technologies in logistics systems.

**Formulation of the problem.** In modern conditions, the formation of supply chains takes place under the influence of global trends and innovations. The effectiveness of its logistics activity depends on the formed supply chains of domestic enterprises, which determines the relevance of the research topic.

The global pandemic and the introduction of martial law led to the fact that enterprises need to conduct more detailed data analysis for more efficient work in difficult conditions and more accurate short-term forecasting, processing a large amount of information. In this regard, the use of smart technologies in logistics activities is becoming more and more popular.

**Research methods.** To achieve the goal, scientific publications on logistics and intra-production logistics, in particular, were researched. The following scientific methods were used in the writing process: abstract-logical, comparison, grouping, generalization.

**Presentation of the main results.** In order to determine exactly how smart technologies relate to supply chains, it is

necessary to clarify the concept of a supply chain and its components. We can say that logistics deals with the management of supply chains. In turn, supply chain management involves planning, creating and controlling the flow of information and materials in the supply chain in order to meet customer needs with maximum efficiency.

The supply chain involves the movement of goods from the producer to the final consumer. For this, it is necessary to ensure:

- transportation of material resources,
- planning systems,

- storage systems,
- data collection and analysis of warehouse operations.

The overall efficiency of logistics in Ukraine can be seen in Table 1, where the Logistics Efficiency Index (LPI) is displayed. The LPI is an interactive benchmarking tool created to help countries identify the challenges and opportunities they face in their performance and what they can do to improve their performance. This rating is carried out once every 2 years.

Table 1 – Ukraine's logistics efficiency rating for 2014-2023

Indicators/Year	2014	2016	2018	2023
LPI Rank	61	80	66	79
Customs Rank (Score)	69 (2,69)	116 (2,3)	89 (2,49)	90 (2,4)
Infrastructure Rank (Score)	71 (2,65)	84 (2,49)	119 (2,22)	89 (2,4)
International shipments Rank (Score)	67 (2,95)	95 (2,59)	68 (2,83)	75 (2,8)
Logistics competence Rank (Score)	72 (2,84)	95 (2,55)	61 (2,84)	94 (2,6)

Source: created by the author [3]

As can be seen from the table, Ukraine took 61st place in 2014 and 79th in 2023 among 139 countries ranked by the World Bank. These are quite good results considering the hostilities currently taking place in the country. In total, the rating

includes five research areas. The rating is displayed in a rank or in a score. The higher the score, the stronger the position of the country in this category. The general assessment of Ukraine can be seen in Figure 1.



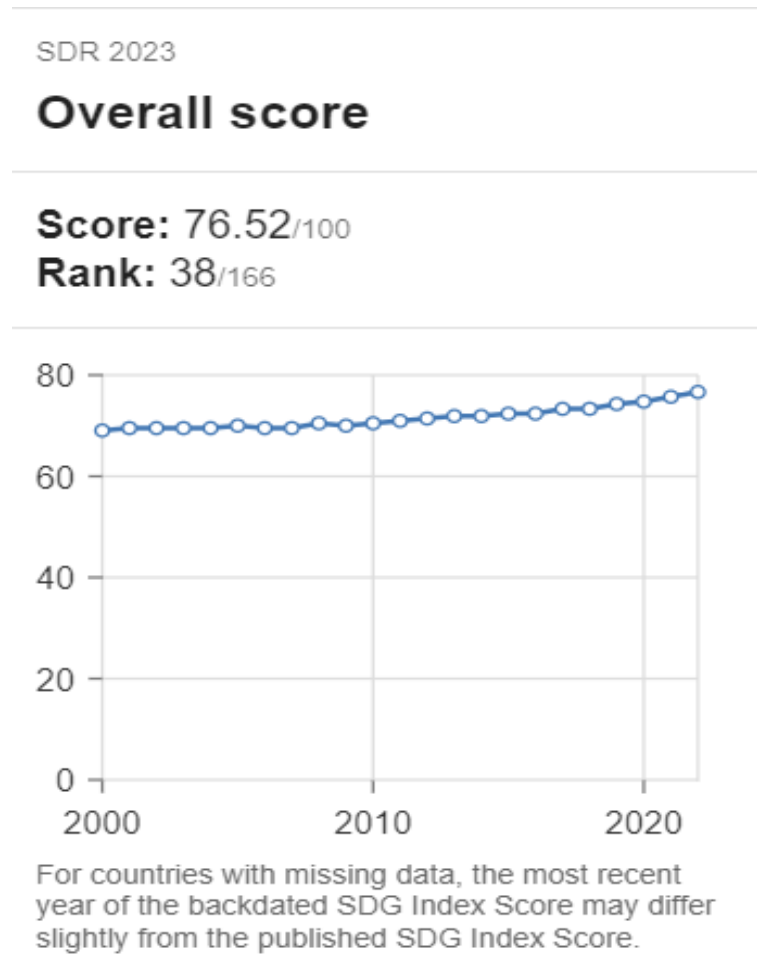


Figure 1 – Overall score of Ukraine for 2023

Source: [3]

Increasing the efficiency of logistics processes depends to a large extent on the use of the latest technologies. Therefore, the issue of introducing smart technologies into the logistics activities of domestic companies is quite relevant and of practical importance.

The functions of smart logistics are based on smart approaches in managing flows of material resources with the use of modern information and communication technologies. With the help of smart logistics, you can manage the risk elements of logistics costs.

Certain principles should be followed to apply smart technologies in supply chains:

- logistics functions should be adapted to the conditions of using smart technologies;
- in the basis of the management of material flows, one should take into account

the purpose, sequence of actions, flexibility and adaptability to unforeseen actions, observe time limits;

- it is necessary to monitor and evaluate processes using analytical systems;
- to determine the criteria for evaluating the efficiency of logistics processes and the results of using smart technologies;
- to optimize costs due to the use of smart technologies in supply chains.

We propose to highlight the main innovations used in supply chains and their impact. Ecommerce - increases sales volumes. Transforms traditional supply chains.

Internet of things - allows to minimize human intervention in logistics processes.

Unmanned vehicle - allows remote control of vehicles, increases the safety of deliveries and will reduce delivery costs in the future.

The concept of transparency of logistics processes – with the help of special technologies, provides transparent access to information about the processes taking place in supply chains.

Blockchain in transportation – increases transparency and security in supply chains by storing all data, helping to increase efficiency and reduce costs.

Smart contracts are a form of blockchain technology that creates a secure, automated

digital transaction platform to streamline supply chain processes.

Flexibility and nearshoring - makes it possible to effectively manage cross-border deliveries in one system. This is a model of cooperation between a customer and an organization from neighboring countries.

Table 2 shows selected digital technologies and their application in various processes of the logistics chain.

Table 2 – The use of digital technologies at various stages of the movement of the material flow

№	Digital technologies	Transportation of MR	Planning system	Storage system	Data collection and analytics
1	eCommerce			+	+
2	Internet of things		+		+
3	Unmanned vehicle	+			
4	The concept of transparency of logistics processes		+		+
5	Blockchain in transportation	+			+
6	Smart contracts	+			+
7	Flexibility and nearshoring	+	+		

Source: created by the author

Digital technologies in logistics make it possible to correctly distribute responsibilities between participants, promptly provide everyone with accurate and transparent information. That is, logistics flow management is based on a smart approach using information and communication technologies. Thus, the material flow moves together with the information flow, which allows for efficient management of the supply chain.

**Conclusions.** In modern conditions, when competition on the market is increasing, companies are trying to find new ways to improve the efficiency of their

activities. In order to adapt to the consumer market, enterprises apply innovations. This also applies to the logistics sphere. Smart logistics is formed under the influence of Industry 4.0. It is possible to adapt the use of smart technologies to changes in the external environment, expand sales markets, control costs, meet global quality standards, quickly respond to changes, and implement projects. The combination of logistics processes with material and information flows is ensured precisely by the introduction of smart technologies.

The use of smart technologies and their impact on supply chains are promising areas

of research, as new technologies are constantly changing and adapting to market conditions.

### References

1. Kontseptsiya rozvytku tsyfrovoyi ekonomiky ta suspil'stva Ukrayiny na 2018-2020 roky. Uryadovyy portal Verkhovnoyi Rady Ukrayiny. [The concept of development of the digital economy and society of Ukraine for 2018 - 2020]. URL: <https://zakon.rada.gov.ua/laws/show/67-2018-%D1%80#Text>
2. Kolodizyeva T.O. Vyznachennya lantsyuhiv postavok ta yikhnya rol' u pidvyshchenni efektyvnosti lohistychnoyi diyal'nosti pidpryyemstv. Problemy ekonomiky, №2, 2015, c. 133-139.
3. The world bank URL: <https://lpi.worldbank.org/international/global>
4. Logistics Trend Radar. Version 2018/19. URL: <https://www.logistics.dhl/global-en/home/insights-andinnovation/thought-leadership/trend-reports/logisticstrend-radar.html>.
5. Yangke Ding, Mingzhou Jin, Sen Li, Dingzhong Feng. Smart logistics based on the internet of things technology: an overview. URL: <https://www.tandfonline.com/doi/abs/10.1080/13675567.2020.1757053>
6. Pfohl H.-C. The Impact of Industry 4.0 on the Supply Chain / H.-C. Pfohl, B. Yahsi, T. Kurnaz // Innovations and Strategies for Logistics and Supply Chains. Technologies, Business Models and Risk Management ; [Kersten, W., Blecker, T., Ringle, C.M.], Hamburg International Conference of Logistics (2015). – 31–58. – URL: <https://hicl.org/publications/2015/20/1.pdf>.
7. Internet of Things in Logistics. A Collaborative Report by DHL and Cisco on Implications and Use Cases for the Logistics Industry. – URL: [http://www.dhl.com/content/dam/Local\\_Images/g0/New\\_aboutus/innovation/DHLTrendReport\\_Internet\\_of\\_things.pdf](http://www.dhl.com/content/dam/Local_Images/g0/New_aboutus/innovation/DHLTrendReport_Internet_of_things.pdf).
8. Krykavskyy E.V. (2004). Lohistyka. Osnovyteoriyi [Logistics. Basictheory]. Lviv. «Intelekt-Zakhid» [in Ukrainian].