

*Усов О. Д., Резнік Н. П.
Національний авіаційний університет*

Now we are living in an era of the latest technologies and innovations that improve the performance of a particular industry. Technological innovation plays an important role in many sectors of the economy, and logistics is no exception. Innovations in the field of logistics are aimed at faster and cheaper delivery of goods or services to the customer.

The efficiency of logistics activities of national enterprises is directly dependent on the formed them logistics chains. Research of theoretical approaches to the definition of the concept of "chain supply" identified key aspects on which to focus the attention of scientists. Information technology for supply chain visibility (SCV) allows you to receive data online. For example, information about the current location of the car, weather or road condition - that is, about everything that affects the delivery time. Next, the program SCV analyzes the data obtained and offers adjustments to the routes. With the help of such technologies, the company's logisticians can choose the optimal solutions for fast delivery. In 2019, studies showed that logistics companies that use fully integrated supply chains are 20% more efficient than their competitors. "The main goal is that the client could see the entire cycle of the implementation of his order - from production to delivery [1]. Of course, this is far from a novelty for Europe. However, in Ukraine, technologies such as SCV appeared relatively recently and are now more used by large courier companies or European carriers. There are services that allow you to track where your package is. We strive that in this way the client can track where his order is."- said Logistics Director of Inter pipe on innovations in the supply chains of products from factory floors to end-users in Europe [2].

We can't talk about supply chain management without mentioning Internet of Things (IoT) technology, which is the most important asset for supply tracking. Connecting IoT devices in different areas allows warehouses to track the movement of

equipment, vehicles and goods through cloud services. At the same time, IoT-based container management is also simplified through real-time monitoring, fuel efficiency, preventive maintenance, and intensification of container operations instead of jet ones [3].

Another great example of the company's impact on the industry is Flexport, a specialized cloud software for freight forwarding and a data analysis platform that incorporates the strategic operational model of global freight forwarding and combines the best of all supply chain technologies.

When we are talking about current directions of logistics scientific research, it is impossible to forget about robotization of warehousing operations. Automation and robotics of warehouses are actively developing in all countries [4]. This is one of the logistics trends set by Amazon and which is currently being implemented in the areas of loading and unloading and ordering of the largest online retailers. Wages of warehouse staff account for a significant share of total operating costs. In addition, such work requires high speed and often significant physical exertion. However, technicians are still needed to keep the system operational. But this is no manual control involved in the storage and reloading of goods.

Over the last few years, the logistics industry has begun to integrate artificial intelligence (AI) solutions into its operations, including intelligent transportation, route planning and demand planning, and this is just the beginning. AI is now available one of the most powerful areas research in science and one of the most discussed topics in society. Recently, AI has also become one of the most important technological trends in the world [5]. The reason is rapid technology development, globalization and accelerating scientific and technological progress. New (innovative) digital technologies are literally undermining traditional approaches to production and business automation. Carriers, suppliers and consumers are going to benefit from these trends in logistics technology in the near future. Along with AI, augmented reality and augmented intelligence will probably be used no less actively. Artificial intelligence narrow Spectrum (ANI) is the first level of artificial consciousness that specializes in decision-making in only one area: for example, can beat the world a chess champion, but can do only this and nothing more. This type of AI is planned to be used in logistics.

The next one direction of logistics research is not as new and innovative as previous, but it has a special place in the list of innovations in logistics over the last decade. Blockchain is a modern technology, and many scientific papers related to its work have been written by the authors who are also the creators of this programs and work with it. Blockchain being digitally protected register, may perform the functions of banks, including the safe storage and transfer of assets. Experts believe that this technology will save banks about 20 billion USD due to the lack of intermediaries in transactions. There are three "generations" of Blockchain - 1.0, 2.0 and 3.0 – Blockchain bitcoin, blockchain "smart" contracts and so on called "Blockchain of everything" - a system in which information is stored publicly and securely about any object [6].

In today's world with the rapid development of technology, companies are faced with the need to use such functional means that allow you to earn extra income by reducing costs. That is, they need to implement such innovations which will provide high-grade activity of the enterprise, its interaction with clients, thus will demand not so much cash as energy resources and will not only high quality but also high degree of protection, as the level of cybercrime is constantly growing.

The topic of the blockchain for world research is no new because of the popularity of cryptocurrency caused great interest in the technology itself. Thus, most participants in the global logistics market prefer transparency and reliability of supply chains. Blockchain technology meets all requirements, makes the process easier and more accessible to test and affect performance and the stability of the economy as a whole. In the logistics industry, the blockchain can facilitate the exchange of confidential data for different carriers or shippers; and companies could create trade finance and supply chain solutions [7]. There are already experimental projects that successfully use the blockchain in logistics.

Unfortunately, cryptocurrencies have not gained such popularity in the Ukrainian market implementation of these technologies is quite slow and difficult for domestic enterprises.

At new era of technologies, when all the work and things concerned to work become automatic, I cannot forget to write about autonomous vehicles. Although autonomous vehicles are whether driverless trucks or drones - are closely linked to the near future of

logistics, we are likely to see it only in the testing phase in 2020. However, one of the most discussed trends in logistics technology in recent times. Autopilot for drivers has a number of advantages and disadvantages, but the fact that autopilots are introduced in everything world for both private and business use purposes, for example, trucking - already a reality the present. #Today the whole world is on the threshold of major changes due to the rapid development of robotics, information technology and artificial intelligence, and Ukraine cannot stay away from these processes. A striking example of this kind of change is implementation both in the United States and in countries of the European Union autopilots for drivers of cars [8].

The legal framework for the widespread use of autopilot cars is already being improved in the leading countries of Europe, namely the United Kingdom, France, Germany, Sweden and others. For example, the Minister Britain's Jesse Norman told reporters: "Britain is a world leader from research and development in the field of transport [9]. Because now the unprecedented development of technology has begun driving a car is very important to our laws kept pace with the times, and Britain remained alone from the world leaders in this field » The UK Automated and Electric Vehicles Act defines an automated vehicle as a motor vehicle, who is able to "manage himself". This actually means that the vehicle is capable of operating in an automated mode when it is not controlled by a person and not requires human monitoring throughout or part of the route [10].

But not everyone, even from the world's leading countries, has bills on the legalization of automatic vehicles, so this can also be a problem in the research and development of the above scientific and technical field.

List of sources

1. Ministry of Strategic Industries of Ukraine / Innovations in the field of logistics / 20/08/2020
<https://sfii.gov.ua/innovacii-v-galuzi-logistiki/>
2. Т. О. Колодізева / Kharkiv national university of economics names of the forger's seed / Supply chain management / 2016
<http://surl.li/btdoy>
3. Timoshyn Y., #Hokhkalenko S. / Intended use and major trends of the joint implementation of big data and IoT / National Technical University of Ukraine "Kyiv Polytechnic Institute" / 2016
<http://www.inter-nauka.com/issues/2016/3/945/>
4. Kaveh Azadeh, René de Koster, Rotterdam School of Management, Erasmus University, The Netherlands; Debjit Roy, Indian Institute of Management, Ahmedabad, India / Robotized Warehouse Systems: Developments and Research Opportunities /
<https://core.ac.uk/download/pdf/154412962.pdf>
5. Геннадій Андрощук / Development trends artificial technologies intelligence: economic and legal aspect / Research Institute intellectual property of the NAPRN of Ukraine / 2019
<http://surl.li/btfvl>
6. Мокляк М.В., Хаустова Е.О. / Blockchain technology in the logistics system of the enterprise / Poltava National Technical University named after Yuri Kondratyuk / 2018
http://pev.kpu.zp.ua/journals/2018/1_06_uk/14.pdf
7. Koibichuk Vitaliia, Rozhkova Maryna / Research for application of blockchain technologies in the world's enterprises activity: methodical approach / Sumy State University / 2020
http://pev.kpu.zp.ua/journals/2020/4_21_ukr/22.pdf
8. Фасій Б.В., Байгальюк Д.Р. / Autopilot vehicles: civil responsibility issues / National University "Odesa Law Academy"
http://www.lsej.org.ua/3_2019/23.pdf
9. Давидов Д. / The problem of responsibility of the autopilot in the event of an accident cannot be resolved? / Teknoblog / 2018
<https://teknoblog.ru/2018/07/26/91394>
10. Hunt Quentin / Self-driving cars and the law – more problems than answers / 2019
<https://www.bestcriminaldefencebarrister.co.uk/>
11. #Резнік Н.П. Логістика: навчальний посібник / Н.П. Резнік / Національний університет біоресурсів і природокористування України. – Київ, 2021. – 146 с.