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TRENDS OF INNOVATIVE DEVELOPMENT IN THE FIELD OF LOGISTICS AND TRANSPORT

The article is devoted to the problems of value perception in the field of logistics and supply chain management. The authors identified the problem of a possible conflict of interests of participants in logistics chains as a result of the development of innovative and "disruptive" technologies. However, studies of statistical data and axiological perception prove the effectiveness and the possibility of improving quality as a result of the introduction of innovative technologies.

Trends and trends of innovative development in the field of logistics and transport is the object of research for the development of innovative potential.

This article uses such research methods as generalization, comparison, systematization and statistical analysis.

The article highlights such modern trends as drones, self-driving vehicles (autonomous cars), 3D printing, "green" technology, the concept of the Internet of Things, 3D printing. It is noted that all modern trends in logistics are associated with the emergence of intensive development of digital technologies that are able to meet the needs of growing consumers. Examples of modern trends are considered. It is emphasized that modern digital technologies will lead to the transformation of supplies.

Keywords: logistics, drones, digitalization, «green» technology, Internet of Things, blockchain, innovation, trend, transport, transportation.

Кілт сөздер: логистика, дрондар, цифрландыру, «жасыл» технология, заттар интернеті, блокчейн, инновация, тренд, көлік, тасымалдау.

Ключевые слова: логистика, дроны, цифровизация, «зеленая» технология, Интернет Вещей, блокчейн, инновация, тренд, транспорт, перевозка.

JEL classification: 031 L91 032 L86

Introduction. In the course of recent research by the authors reveals innovative trends in the field of logistics, which allow for a more in-depth development of a new direction in research concerning the assessment of the degree of actual implementation of new technologies in the logistics chain[1].

At the moment, the logistics services market exceeds \$4 trillion, which encourages, in order to stimulate the development, development and implementation of innovations in this industry. When determining the level of administration, it is necessary to take into account innovative technologies, but also at the same time it is necessary to take into account and determine the actual pace of their application. The need for research is due to the saturation of the market with new technologies and developments, as well as tools for their application or the absence of such at all. In this paper, the authors analyze various trends in the development of logistics infrastructure in practice, the activity of their use and opportunities for implementation[2]. The assessment of the current level of development of a particular trend is given, as well as examples from foreign practice are considered. When writing the article, the authors used the following general scientific methods: empirical theoretical analysis, statistical and normative analysis, synthesis, analogy, generalization, as well as methods of scientific cognition. Methods of quantitative analysis and synthesis, methods of statistical groupings and dynamic series were used in data processing. These methods made it possible to ensure the reliability of the analysis and the validity of the conclusions.

Literature review. At the initial stage of the study, the authors conducted a systematic analysis of the literature, which helped to identify a number of typologies and classifications of modern logistics trends. Thus, according to the research of P. Grefen and V. Hoffman, the trends of modern logistics are inextricably linked with the trends in the development of the IT industry, which today make it possible to form the basis

for the integration of this sphere in the future [3]. In their research, the authors focus on three logistics mega-trends: the separation of physical (roads, bridges, transport) and information (business processes, models) infrastructure; rapid industrialization and accelerated process of professional growth; the need for customization, flexibility and evolution of logistics processes. M. Sachanek trends in the field of transport logistics have been compiled into a single list. This list presents analytics on the implementation of ICT applications, which made it possible to accumulate and broadcast information; the level of use of process simulation in the logistics center, as well as the practice of using data visualization on interactive maps [4].

M. Speranza in his work suggests slightly different trends, where emphasis is placed on the development of diverse and modern ways of the logistics sector, including motor transport [5].

In 2013, during the analytical work carried out by DHL experts, 14 main external factors were identified that directly affect trends in logistics. Of these, the main 6 can be distinguished - these are social mega-trends, and the rest represent challenges and obstacles in the development of sciences and society.

Main part. Discussions. At present, when the world is changing rapidly and humanity is on the verge of the Fourth Industrial Revolution, the processes familiar to us are already difficult to understand. The format of the economy, business and, consequently, the social sphere is changing. Of particular importance in such conditions is not so much the economy or business itself, as the philosophy of this knowledge. Logistics and supply chain management are no exception.

The accelerated pace of technological development of this sphere and innovations could not but touch upon the issues of a radical revision of logistics technologies and the shift of consumer interests towards faster, safer, less costly and environmentally friendly solutions.

In order to meet the ever-changing expectations of customers, logistics companies will soon be forced to adopt innovative and sometimes "disruptive" technologies that will change the industry forever [6]. The transition to digital supply chain management, using the potential of the Internet of Things (IoT) in Smart logistics, makes it possible to constantly track the goods during the delivery period. Big Data (Big Data) technologies have identified previously incredible ways to optimize supplies, create smart warehouses, which ultimately significantly increased management efficiency while reducing overhead costs.

Investments in the purchase of drones, self-driving vehicles (autonomous cars), 3D printing and new ways of delivering products will make transformational changes. And quantum computers and blockchain technologies will provide new opportunities for logistics and supply chain management [7].

According to the Global Logistics Report 2018, the following were noted when asked which technologies play an important role in the changes taking place in logistics: 52.79% noted blockchain, 51.3% - artificial intelligence, 44.61% - robotics, 42.01% - self-driving cars, 24.91% - drones [8].

Digitalization will make it possible to achieve integration in the supply chain management system, simplify many management operations, consolidate cargo in the multimodal transportation system, make the entire transportation process as transparent as possible, provide customers with alternative options and differentiated approaches to pricing, etc.

Thus, the future of logistics technology is determined by very promising changes that are radically different from past changes in this area. At the same time, such indicators as the speed and cost of deliveries, safety and environmental friendliness remain relevant values in the logistics system and supply chain management.

According to experts' forecasts, the delivery of goods by drones will increase by 30% annually (Figure 1) At the same time, the speed of rendering services in retail chains will increase [9].

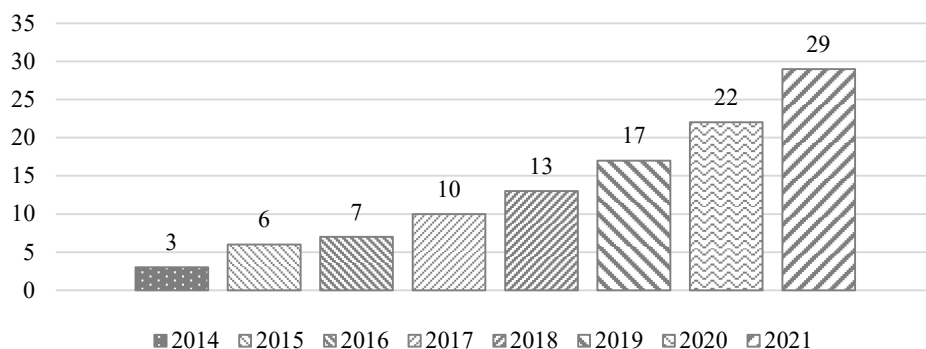


Figure 1. Forecast of increased delivery of goods by drones, million deliveries*

* <https://www.businessinsider.com>

This forecast is also based on the study of consumer perception, so according to a survey, more than 55% of respondents in the United States believe that the best quality for drone deliveries is an indicator of speed and reliability, about 40% believe that this type of delivery will cost less [9].

The increase in the use of innovative technologies in transport, the coefficient of safety and environmental friendliness in the cargo supply system increases many times. It can be said the development and use of autonomous vehicles guarantees a significant reduction in the dynamics of road traffic accidents in the world. Thanks to innovative transport technologies, the indicator of safety and environmental friendliness in the supply chain is significantly increased. This is due to the development of autonomous vehicles, thanks to which the number of road accidents can be reduced to an absolute minimum. According to the Index of Countries' Readiness to use Autonomous Transport (KPMG rating), the five countries included the Netherlands, Singapore, the USA, Sweden, and the United Kingdom. The Russian Federation took the 18th position in the TOP 20 countries ranking [10].

Autonomous machines have given impetus to the development of not only transportation, but also automated storage and handling of goods in terminals and warehouses.

According to data published by Business Insider, the autonomous car market will grow rapidly and in the coming years the cumulative average annual growth rate (CAGR) will be 27.5% (Figure 2).

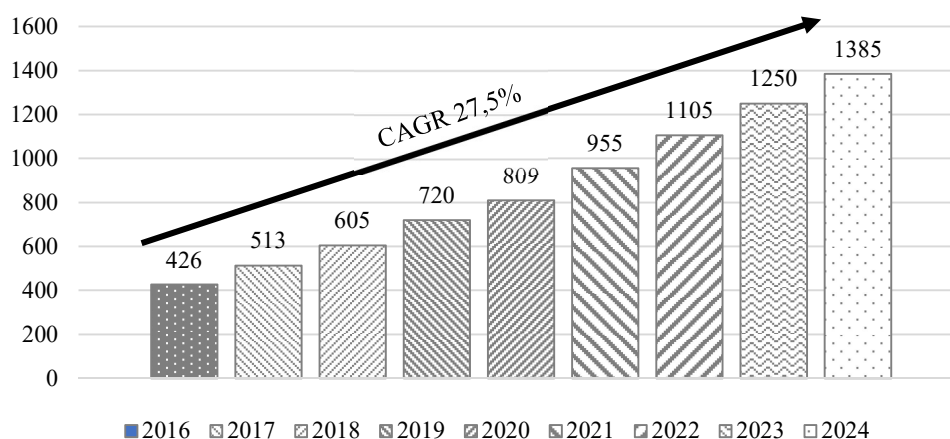


Figure 2. Forecast of growth rates of the autonomous car market, billion US dollars*

* <https://www.businessinsider.com>

Together with these trends, there will be a gradual replacement of traditional transport with self-driving cars.

Another current trend is the transition to "green" technologies in transport and logistics. So the use of electric transport in cargo transportation is no longer revolutionary news. So, starting from 2010 to 2030, the number of vehicles has exceeded the threshold of 2 million, significantly surpassing the hybrid vehicle industry (according to the Analytical Report on the electric car industry).

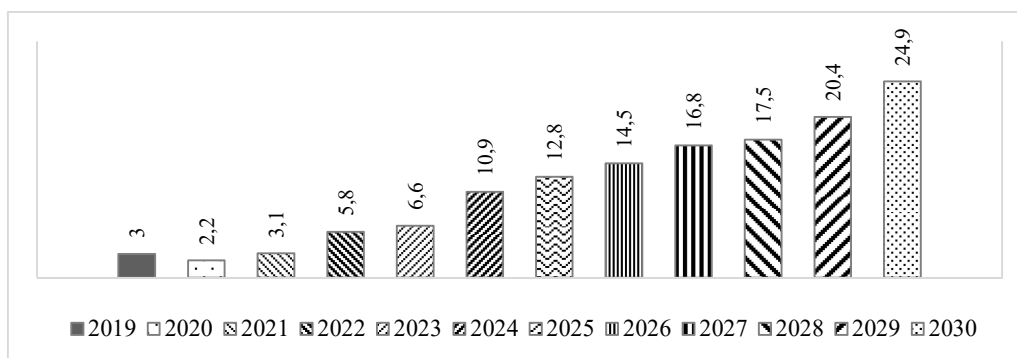


Figure 3. Worldwide electric vehicle sales for 2021 year (million)*

* Analytical report on the electric car industry.

Electric vehicle sales will continue to grow throughout the decade, and Canalis predicts that electric vehicles will account for 48% of all new vehicles sold in 2030. Analysts believe that governments will

establish and maintain policies that stimulate the production and sale of electric vehicles. Increasing the productivity and expanding the infrastructure of charging stations will attract even more buyers.

Canalys predicts that the number of electric vehicles sold will grow to 30 million in 2028, and by 2030 electric vehicles will account for almost half of all passenger cars sold in the world.

As a result, there will be reserves to reduce the cost of transportation and delivery time, since such transport is controlled by artificial intelligence. The advantage of electric transport is obvious, it is more environmentally friendly, the absence of any oils and liquids, and most importantly the absence of harmful emissions [11].

Conclusions. Thus, the development of technologies contributes to the sustainable development and inclusive growth of logistics and supply chain management, ensuring greater efficiency. Despite the danger and displacement of traditional technologies in the transportation system, innovative solutions provide more opportunities for the end user.

Drastic changes and "disruptive" technologies allow increasing emphasis on values such as speed and cost of delivery, safety and environmental friendliness. Therefore, from the point of view of the axiology of these terms, with the development of innovative technologies, key values will be achieved more efficiently and qualitatively.

To date, the priority values of logistics are speed, cost, safety and environmental friendliness of cargo deliveries. In this regard, the priority of these terms, with the development of innovative technologies, key values will be achieved more efficiently.

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ЛОГИСТИКА ЖӘНЕ КӨЛІК САЛАСЫНДАҒЫ ИННОВАЦИЯЛЫҚ ДАМУ ТРЕНДТЕРІ

Аңдатпа

Мақала логистика және жеткізілім тізбегін басқару саласындағы құндылықтарды қабылдау мәселелеріне арналған. Авторлар инновациялық және "диверсиялық" технологияларды дамыту нәтижесінде логистикалық тізбектерге қатысушылардың мүдделерінің ықтимал қақтығысы мәселесін атап өтті. Алайда статистикалық деректер мен аксиологиялық қабылдауды зерттеу инновациялық технологияларды енгізу нәтижесінде сапаны арттырудың тиімділігі мен мүмкіндігін дәлелдейді.

Мақаланың мақсаты логистика және көлік саласындағы инновациялық даму трендтері мен үрдістері инновациялық әлеуетті дамыту үшін зерттеу объектісі болып табылады. Зерттеуде жалпылау, салыстыру, жүйелеу және статистикалық талдау сияқты зерттеу әдістері қолданылады.

Мақалада дрондар, өзін-өзі басқаратын көлік (автономды машиналар), 3D басып шығару, "жасыл" технология, Заттар интернеті, 3D басып шығару сияқты заманауи трендтер көрсетілген. Логистиканың барлық заманауи тенденциялары өсіп келе жатқан тұтынушылардың қажеттіліктерін қанағаттандыра алатын сандық технологиялардың қарқынды дамуының пайда болуымен байланысты. Қазіргі тенденциялардың мысалдары қарастырылады. Қазіргі заманғы цифрлық технологиялар жеткізілімдердің өзгеруіне әкелетіні атап өтілді.

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ТРЕНДЫ ИННОВАЦИОННОГО РАЗВИТИЯ В СФЕРЕ ЛОГИСТИКИ И ТРАНСПОРТА

Аннотация

Статья посвящена проблемам восприятия ценностей в сфере логистики и управления цепями поставок. Авторы обозначили проблему вероятного конфликта интересов участников логистических цепей в результате развития инновационных и «подрывных» технологий. Однако исследования статистических данных и аксиологического восприятия доказывают эффективность и возможность повышения качества в результате внедрения инновационных технологий.

Целью данной статьи являются тренды и тенденции инновационного развития в сфере логистики и транспорта для развития инновационного потенциала. В данной статье используются такие методы исследования, как обобщение, сравнение, систематизация и статистический анализ.

В статье освещаются такие современные тренды, как дроны, самоуправляемый транспорт (автономные машины), 3D-печать, «зеленая» технология, концепция Интернет вещей, 3D-печать. Отмечается, что все современные тенденции логистики связаны с появлением интенсивного развития цифровых технологий, которые способны удовлетворить потребности растущих потребителей. Рассматриваются примеры современных тенденций. Подчеркивается, что современные цифровые технологии приведут к трансформации поставок.

