

Electronic scientific and practical journal
**INTELLECTUALIZATION OF LOGISTICS
AND SUPPLY CHAIN MANAGEMENT**

#22 (2023)
December '23



WWW.SMART-SCM.ORG

ISSN 2708-3195

DOI.ORG/10.46783/SMART-SCM/2023-22

ISSN 2708-3195



Electronic scientific and practical publication in economic sciences

Electronic scientifically and practical journal “Intellectualization of logistics and Supply Chain Management” included in the list of scientific publications of Ukraine in the field of economic sciences (category "B"): **Order of the Ministry of Education and Culture of Ukraine dated October 10, 2022 No. 894 (Appendix 2)**

Field of science: Economic.

Specialties: 051 – Economics; 073 – Management

ISSN 2708-3195

DOI: <https://doi.org/10.46783/smart-scm/2023-22>

The electronic magazine is included in the international scientometric databases:
Index Copernicus, Google Scholar

Released 6 times a year

№ 22 (2023)

December 2023

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In 2020, the International Center for Periodicals (ISSN International Center, Paris) included the Electronic Scientific and Practical Edition "Intellectualization of logistics and Supply Chain Management" in the international register of periodicals and provided it with a numerical code of international identification: ISSN 2708-3195 (Online).

Recommended for dissemination on the Internet by the Academic Council of the Department of Logistics NAU (No. 7 of February 26, 2020). Released 6 times a year. Editions references are required. The view of the editorial board does not always coincide with that of the authors.

Electronic scientifically and practical journal "Intellectualization of logistics and Supply Chain Management" included in the list of scientific publications of Ukraine in the field of economic sciences (category "B"): **Order of the Ministry of Education and Culture of Ukraine dated October 10, 2022 No. 894 (Appendix 2)**

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DOI: <https://doi.org/10.46783/smart-scm/2023-22>

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тел.: (063) 593-30-41

<https://smart-scm.org>

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

INTRODUCTION

We are happy to invite you to get acquainted with the first issue of the new scientific and practical publication "Intellectualization of Logistics and Supply Chain Management".

We strongly believe that the launch of this magazine indicates the objective need to rethink a wide range of issues related to the development of theory and practice in logistics and supply chain management, awareness of the need to unite the scientific community and logistics practitioners, dissemination of modern knowledge and best practices for innovative development of the logistics services market.

The first issue of the magazine is published at a difficult time. The global coronavirus pandemic and the deep economic crisis have significantly worsened business activity in the world. Currently, global supply chains are collapsing, international trade is declining, and competition between global and regional logistics operators is intensifying. The most common thesis is that the world will never be the same again. Industry experts predict the emergence of new, more flexible and adaptive supply chain management strategies and approaches to logistics business process management. The trend towards collaborations, cooperation and unification of services is emerging, comprehensive proposals for clients are being developed. There is increasing talk about the need to build bimodal supply chains, which involves the development of different decision-making scenarios: the traditional approach - cost-effective efficiency, low risk, high predictability; a new approach "second mode" - rapid recognition of opportunities, adaptability, willingness to solve unexpected problems and look for new opportunities.

Radical transformations of the global and national markets for logistics services require appropriate scientific support. Logistics science has a special role to play in this process. Initiating the emergence of a new journal, we decided to focus on its coverage of problematic aspects of the formation and development of logistics systems at the micro, mezo and macro levels, supply chain management, digitization of logistics, methods and tools for optimizing processes in logistics and supply chains, sociopsychology relations and network interaction of enterprises using cloud technologies, artificial intelligence, e-learning, neural business process management systems, etc.

Therefore, we invite scientists, researchers and business representatives, as well as our colleagues from abroad, to cooperate and present the results of scientific research, to discuss and debate on them, to work together to develop the scientific theory of logistics and promote mutual intellectual enrichment.

We hope that the new scientific publication will become a theoretical guide for young researchers and representatives of other fields.

HRYHORAK Mariia
Chief Editor



UDC 656.583

DOI: <https://doi.org/10.46783/smart-scm/2023-22-1>

JEL Classification: M14, O11, Q10.

Received: 09 November 2023

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PROSPECTS OF THE SUSTAINABLE DEVELOPMENT CONCEPT, THE IMPORTANCE OF ITS HIGH-QUALITY IMPLEMENTATION IN THE LOGISTICS SPHERE

Vladyslav Marchenko, Dmytro Bugayko, Danylo Bugayko. *«Prospects of the sustainable development concept, the importance of its high-quality implementation in the logistics sphere».* The issues of environmental pollution, depletion of natural resources and climate change gained a global scale. They are beginning to concern more and more people, pushing humanity to search for new ideas that can solve them qualitatively, or at least slow down their pace. The negative consequences that we can clearly see today in all corners of the world are a direct result of the long-term ignorance of these problems in the past. To continue our development as if human activity does not cause any harm to the environment and the earth's resources are infinite is simply impossible. Understanding of this obvious fact led to the formation and step-by-step improvement of the modern concept of sustainable development. It is especially important for logistics and management. Today, the logistics industry in one way or another covers all areas of human activity. It is simply impossible to imagine our life without reliable logistics, the whole modern economy relies on it, its overall quality, flexibility and speed. The logistics sphere connects a huge number of different enterprises, companies, transport vehicles and clients into a single system. No one would deny its significant impact on the environment and the climate change process. At present, one of the priority goals is to minimise the negative impact of logistics on the environment.

Keywords: ecology, optimization, development, prospects, efficiency, transport, decarbonization, technologies, green logistics.

Владислав Марченко, Дмитро Бугайко, Данило Бугайко. «Перспективи концепції сталого розвитку, важливість її високоякісної імплементації в логістичну сферу». Питання забруднення навколишнього середовища, вичерпання природних ресурсів та зміни клімату набули глобального масштабу. Вони починають турбувати дедалі більшу кількість людей, плекають людство до пошуку нових ідей, що здатні їх якісно вирішити, або ж принаймні сповільнити їх темпи. Негативні наслідки, які ми чітко бачимо сьогодні у всіх куточках світу є прямим результатом, багаторічного ігнорування даних проблем в минулому. Продовжувати наш розвиток таким чином ніби людська діяльність не завдає жодної шкоди навколишньому середовищу, а земні ресурси є нескінченними вже просто неможливо. Розуміння цього очевидного факту і призвело до формування та покрокового вдосконалення сучасної концепції сталого розвитку. Вона є особливо важливою для логістики та менеджменту. Сьогодні логістична галузь, так чи інакше охоплює всі сфери людської діяльності. Уявити наше життя без надійної логістики вже банально неможливо, вся сучасна економіка всеціло опирається на неї, її загальну якість, гнучкість та швидкість. Логістична сфера об'єднує колосальну кількість різних підприємств, компаній, транспортних засобів та клієнтів в єдину систему. Ніхто не стане заперечувати її значний вплив на навколишнє середовище та процес зміни клімату. В наш час, однією з пріоритетних цілей, залишається мінімізація негативного впливу логістики на довкілля.

Ключові слова: екологія, оптимізація, розвиток, перспективи, ефективність, транспорт, декарбонізація, технології, зелена логістика

Introduction. It is important to realise that the global consequences caused by the above-mentioned problems are becoming more serious and beginning to concern more and more people with each new year. For this reason, researches in the field of the sustainable development concept are characterised by novelty and high relevance today. Their growing priority stimulates the search for possible ways to implement this concept in the logistics sector, which is undoubtedly of great importance to all mankind. The number of all possible high-quality ideas and projects continues to grow. The concept of sustainable development can be presented as a new philosophy or ideology of civilisation development.

In today's market, it is able to achieve great success and popularity, as it is initially based on the idea of compromise and maintaining an optimal balance between social, economic and environmental components. The concept of sustainable development relies on scientific achievements, modern innovations, green technologies, reforms, advanced technical

solutions and high-quality environmental awareness of citizens. Its implementation in various spheres of our life will give us the opportunity to significantly improve the situation with the above-mentioned issues.

The purpose of the article is to study the theoretical foundations of achieving sustainable development in logistics. This article will reveal the essence of this concept, explain its global importance, reasons for its creation, prospects in the logistics sphere, and problems that limit its development, both in Ukraine and in the world.

Presentation of the main results. The logistics sphere is continuously evolving. Each year brings it new projects, interesting startups, promising solutions and ideas. Without doubting its importance, it is no longer possible to ignore its serious impact on the environment. For a long time, most people did not pay attention to the gradual process of its pollution and banally ignored the excessive and sometimes simply uncontrolled use of raw materials.

Nowadays, as the situation continues to deteriorate and escalate at a rapid pace, the

obviousness of the mistake made in the past has become clear to absolutely everyone. World pollution kills more people annually than wars, disasters, hunger [1].

Global climate change is a serious concern for both society and business. That is why today this issue is so often on the agenda of a huge number of countries around the world. Environmental protection — an extremely important topic of global scale [2].

This can be seen especially well on the example of the XX century. In the business sphere, ecological issues were not popular and the idea of environmental care did not become widespread. This policy allowed companies to think only about their own earnings and neglect the environmental aspect of their activities.

The adoption of controversial, outdated solutions, which were not yet based on the concepts of optimality, economy and rationality, only worsened the situation. Thus, the consequences caused by the earlier mentioned short-sightedness are already being felt by citizens of different countries of the world, including Ukraine.

Today, various experts agree that such decisions were a serious mistake of the past. Most importantly, in order to correct the

situation, humanity needs to make a huge collective effort and start acting together right now.

Awareness of the global nature of these issues has begun to set a new pace in the current trends towards finding effective solutions. Attitudes towards these issues have begun to change seriously at all levels. Climate change is one of the biggest challenges of our times [3].

Gradual attempts to take control of these problems have regularly led to the emergence of an increasing number of agreements, initiatives, projects and proposals of environmental orientation. They are now supported by both the authorities and ordinary citizens.

Their ultimate goals can be narrowly focused or global in scope, representing both a national spectrum and an international one.

Good recent examples are: Montreal Protocol; United Nations Framework Convention on Climate Change; Kyoto Protocol; Paris Agreement, etc. The possible global level of countries' participation in them can be understood thanks to the official UNFCCC data, based on the last example in Fig. 1.



Figure 1 – Countries by their participation in the Paris agreement as of April 2021

Source: <https://www.statista.com/chart/9656/the-state-of-the-paris-agreement/>

Each accepted agreement is of significant importance, as it clearly regulates the further vector of development of various spheres of our life, including business activities of companies and enterprises. In recent years, the trend for an eco-friendly lifestyle is only gaining momentum [4].

For this reason, it is not surprising that the concept of sustainable development has gained particular popularity in our time. In this powerful concept, people are placed at the centre of the decision-making and complex problem-solving process. Sustainable development is development

that meets the needs of the present without compromising the ability of future generations to meet their own needs [5].

As the Earth's resources are finite, it aims to ensure that present and future generations can not only live with an adequate living standard, in a healthy environment, but also be able to fulfil their ambitions and needs in an optimally rational and efficient manner. Such a modern distribution policy will enable our descendants to use the available

resources in a similar way. Sustainable development is based on three fundamental pillars: social, economic and environmental [6].

To achieve success, it is important to take into account each of them, set specific objectives and appropriate goals. In 2015, the General Assembly adopted the 2030 Agenda for Sustainable Development. All 17 Sustainable Development Goals can be seen in Fig 2.



Figure 2 – Sustainable Development Goals
Source: <https://en.unesco.org/sustainabledevelopmentgoals>

They are the ones that will put the world on the path to resilience and sustainability. They are absolutely universal and therefore can be implemented by all countries, without exception. 17 SDGs have been defined, with 169 associated targets, to be reached by 2030 [7].

Sustainable development is a new philosophy of doing business, which has huge prospects in the logistics field. Sustainable solutions in logistics can take many different forms and can be presented in many different ways. Such common examples are usually related to: improving warehouse logistics; developing reverse logistics; reducing energy consumption; recycling waste; infrastructure development; product and process engineering; optimising supply chains; developing multimodal transport; improving communication with stakeholders and customers; implementing modern standards;

replacing inefficient transport with environmentally friendly vehicles.

According to this concept, the global success of a logistics company lies not only in good economic indicators, but also in its ability to find new ways of development, minimise negative impact on the environment, control and correct existing weaknesses, create and follow long-term plans. The concept of sustainable development has had a huge impact on improving the direction of green logistics and green technologies.

The field of green logistics is new and has a fairly wide scope. There are a large number of definitions for it, some narrowly focused, others the opposite. Green logistics is a new scientific direction that involves the use of advanced supply chain technologies and modern equipment to minimize pollution and increase the efficiency of using logistics resources [8].

Nowadays, the green logistics direction is actively gaining new interpretations and continues its development. Various promising projects, trends, initiatives, and technological solutions that arise in this area on a daily basis contribute to this improvement. The increasing popularity of green logistics can even be seen in the sharp increase in the number of authors who became interested in it in recent years and wrote relevant publications.

There is a huge number of ways to realise the course of «green» development of a logistics company. Such examples are: qualitative saving of resources; use of clean

energy sources; the most rational use of operating assets; recycling of waste; establishing the principles of reverse logistics; decarbonisation of technological processes, etc.

In order to succeed, the manager must ensure the most efficient use of financial, informational and operational resources available in the company and make their interaction as fast, reliable and safe as possible. Having analysed market trends, logistics companies' plans and strategies, it can be stated that in most cases the focus is placed today on the goals presented in Fig. 3.

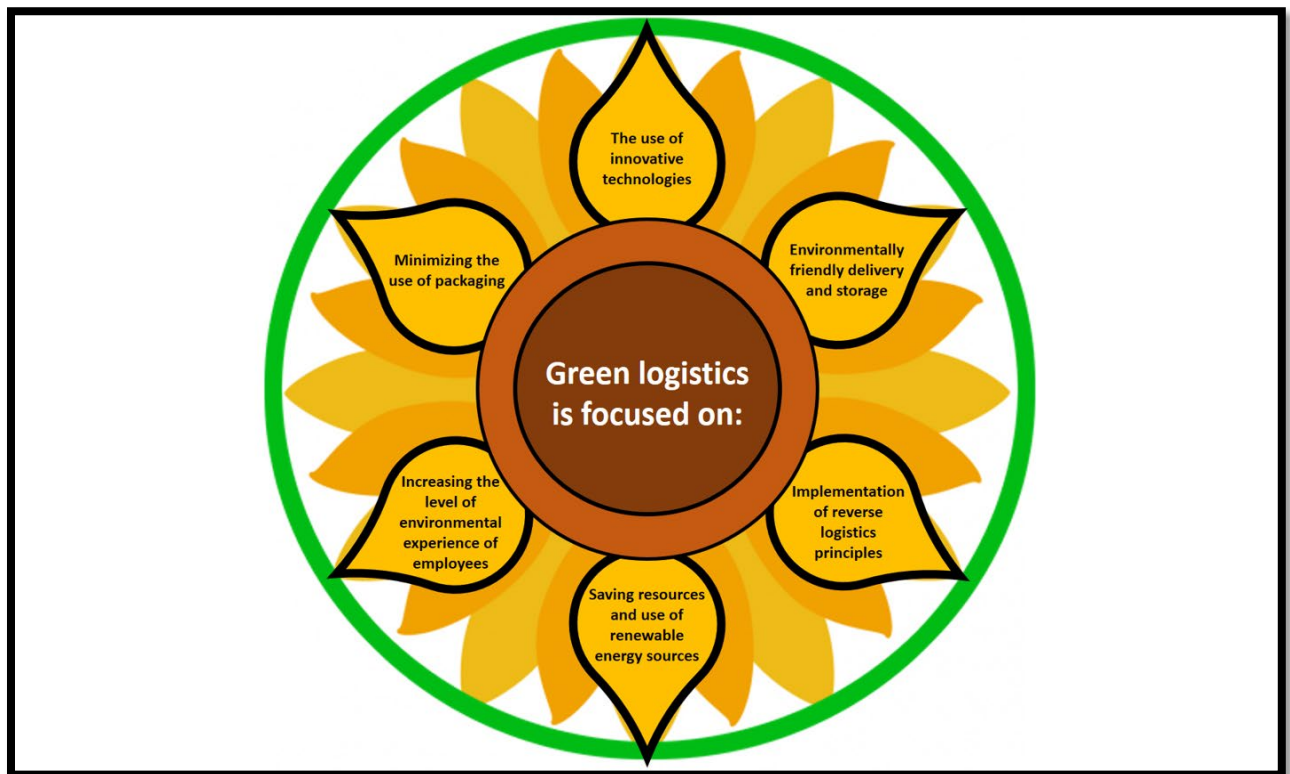


Figure 3 – Focus of logistics companies on important goals of green logistics
Source: Developed by Vladyslav Marchenko

Now more and more people are beginning to realise this, despite the fact that not so long ago this direction was simply ignored by countries. Unfortunately, Ukraine is not an exception. Such a negative, long-term policy of the country, in not noticing the

above-mentioned global problems, has become the reason for its serious lag in many important areas and problems. Key problems that slow down green logistics development in Ukraine are presented in Table 1.

Table 1. Problems that slow down green logistics development in Ukraine

No	Examples of problems
1	Weakly developed legal basis in this direction.
2	Outdated, ineffective methods of accounting.
3	Lack of innovative systems for monitoring various business processes of enterprises and companies.
4	Insufficient number of highly qualified specialists and experienced experts in this field.
5	Poorly optimized educational programs necessary for preparing a reliable and experienced working staff with relevant knowledge and practical skills.
6	Inadequate monitoring, both in the area of key market needs and its new popular trends.
7	Strong complexity and low adaptability of management structures of various companies and enterprises.
8	Outdated transport, technical and technological infrastructure that does not meet modern standards and quality norms.
9	Complexity of the process of controlling the impact of business activities on the environment.
10	Lack of mass social culture for environmental protection.
11	Difficulty in organizing reverse logistics processes.
12	Low financial capabilities of the population and the country as a whole.
13	Lack of practice of serious support of environmental initiatives and projects by the state.
14	A slow and complex process of reformation.

Source: Developed by Vladyslav Marchenko

For Ukraine, the concept of «green logistics» is new. At present, there are a large number of opportunities for the implementation of its practices. Ukrainian companies can already adopt foreign

experience in green business strategies from other well-known international companies. Such logistics companies with effective green business strategies can be presented in Fig. 4.



Figure 4 – Logistics companies that have effective green business strategies

Source: Developed by Vladyslav Marchenko

All of them have come a long way, through trial and error, and in the end not only succeeded in applying «green» technologies in their business activities, but also built marketing strategies around them. This not only allowed them to positively showcase their business in the market among their competitors, but also provided other additional benefits.

To fully disclose the chosen topic, it is equally important to reveal the root causes of the need to follow the «green» course of development and improvement of the logistics sector in this direction. There are a huge number of serious problems on which this can be explained, but the most obvious and easy-to-understand examples for everyone are global climate change and

environmental pollution. We must not forget that our world does not stand still, it is always in motion, in constant search, setting new goals. The Industrial Revolution radically changed all previously established rules. The global transition from manual labor to machine labor has opened a new era of business development and launched a process of incredible changes in our lives. Everyone saw powerful growth rates, an unprecedented level of power. A particularly large number of breakthrough solutions of that time arose in industry: metallurgical, textile, coal, oil, chemical and many others. New machines, new power sources, and new ways of organizing work made existing industries more productive and efficient [9].

It is impossible simply to describe the significance for us of all the various achievements of that time. A particularly significant breakthrough was achieved in the transport industry. The emergence of new modes of transport, especially railway, had a significant impact on the development of logistics and formed a new agenda in the process of delivering all types of products. Innovations have made it possible to create more modern transport networks with arterial roads, full-fledged canals and waterways. In this way was achieved: an increase in system capacity, a reduction in delivery waiting time and a reduction in the costs required for transporting goods.

The step-by-step implementation of such strong solutions by business led to significant economic growth, but, unfortunately, this period of history was not only marked by positive things. He had a colossal number of other serious problems, one of which, as mentioned earlier in the work, was the beginning of a policy of massive use of various natural resources in many areas of business at that time. This included raw materials such as coal, oil and gas. Over time, the number of examples of their widespread use only grew.

It is very important that at that time the energy sector of the countries was rather poorly regulated, which, unfortunately, made it possible not to rely on the concepts of maximum rationality, economy or environmental protection. This led to the fact that a large number of operations at that time polluted the environment quite heavily. The effect of burning fossil fuels has been particularly negative. When fossil fuels are burned, they emit greenhouse gases like carbon dioxide that trap heat in the earth's atmosphere and contribute to climate change [10].

The second, no less important reason was deforestation, which was becoming increasingly widespread in the world. Even now, it can still be found in many countries, as shown in Fig. 5.



Figure 5 – A modern example of deforestation

Source: <https://www.greenpeace.org/usa/palm-oil-commitments-broken-global-brands-linked-massive-deforestation/>

Forests are very important. Their role as natural regulators of oxygen levels in the atmosphere has been largely ignored. They were simply treated as revenue resources. As the environmental situation in the world

continued to deteriorate, the world began to realise the need for fundamental changes and the search for effective, completely new solutions to improve the situation. Having fully felt the negative consequences of a past

mistake, humanity became more seriously concerned with environmental protection and resolutely focused on counteracting climate change.

To overcome this problem, it is necessary to ensure high-quality implementation of various environmental treaties (both international and national). Nowadays, one of the key players in solving this problem is the European Union. Realising all the global consequences that rapid climate change and environmental pollution may lead to in the future, its countries have decided to respond to the situation. Such agreements, documents or programmes may have a wide time frame for implementation. And because the problem is so complex, some of them are aimed not just at years, but at decades.

In our time, the modern global economy is directly dependent on reliable, safe, fast and efficient logistics. Logistics is responsible for a giant number of processes and involves a great number of vehicles. But since most of them are models with internal combustion

engines, it is clear that the negative impact on the environment and climate from them is really huge.

Such global challenges indicate the need for logistics to move towards a new and promising «green» vector of development, which will be based on modern technological solutions, rules and standards. The development of green logistics will allow us to reduce the use of natural resources, lower delivery costs and improve warehouse efficiency. And of course, the key benefit of such a decision will be the minimisation of the negative impact on the environment and the process of climate change. Green logistics should become a key element that will allow humanity to achieve an optimal balance between such important concepts as ecology, economy and society in the future. There are many popular examples of green course policy implementation in logistics, which we can see in Table 2.

Table 2. Popular examples of green course policy implementation in logistics

№	Examples of the green course policy in logistics
1	Development of the most environmentally friendly transport systems of routes that will be the most resource efficient.
2	Business transition to renewable energy sources, mass electrification of vehicles, replacement of obsolete models and the reduction of the role of road transport in favour of other, more environmentally friendly options such as railways.
3	Digitization of activities, with the aim of improving control, speeding up processes, providing electronic reporting and full-fledged «paperless» mode.
4	Creation of powerful networks of optimally located warehouses, which will minimize the number of irrational transportations.
5	Support of partnership relations with market representatives, who are also concerned with issues of environmental preservation and increasing the level of energy efficiency.
6	Establishment of reverse logistics, which will allow re-processing of various products or their safe disposal, if necessary.

Source: Developed by Vladyslav Marchenko

The most clear and simple examples of the price we are paying for the industrial revolution and the further comprehensive development of mankind are the severe

decrease in the reserves of many important raw materials and the rapid acceleration of climate change.

To solve this problem, humanity must act in co-operation, collectively, developing for each country a personalised long-term action plan with individual timelines for implementation. Practice shows that one of the most promising options for minimising the negative anthropogenic impact on climate change is the implementation of a modern policy of "green" development of countries. Mass introduction of "green" technologies in various spheres of our life, especially in business spheres, may become a long-awaited key to solving this issue.

Green technologies are formed on the basis of different sciences, and therefore their interpretation can vary greatly depending on a large number of variables. The field of «green technology» encompasses a continuously evolving group of methods and materials, from techniques for generating energy to non-toxic cleaning products [11]. They have a great importance, especially now. Green Technology is the usage of science on the environment to preserve the resources and the environment and to control negative impact from human activities [12].

As a rule, they are related to solar energy, wind energy, geothermal energy,

hydropower, or bioenergy. These can be different solar panels, electric cars, LED lights, water purification systems, powerful hydroelectric power plants, wind turbines, etc. The major goal of green technology is to help control climate change, protect the natural environment, reduce our dependence on Non-Renewable resources such as fossil fuel, and heal the damage done to the environment [13].

In recent years, green technologies are developing very fast, becoming more mainstream and popular. This makes it possible to gradually replace outdated technological solutions with more modern and efficient versions. Nowadays, above all, green technologies are implemented in order to: 1. Effective protection of the environment from the negative impact of various activities; 2. The most rational use of natural and production resources; 3. Recycling of products or ensuring safe disposal of waste; 4. Gradual restoration of the positive environmental condition from the serious damage already caused to it in the past. The positive impact of green technologies on many processes can be seen well in Table 3.

Table 3. Positive impact of green technologies on different processes

№	Positive impact of green technologies
1	Contribute to the improvement of technological solutions.
2	Contribute to the adaptation of business to new quality standards.
3	Contribute to the popularization of the use of renewable energy sources.
4	Contribute to the improvement of the investment climate.
5	Contribute to the transition of ordinary citizens and businesses to electric vehicles.
6	Contribute to clear control and in-depth analysis of negative impacts on the environment.
7	Contribute to the growth of business efficiency.
8	Contribute to the emergence of new services.
9	Contribute to increasing the level of competitiveness of enterprises and companies.
10	Contribute to the simplification of operational relationships and reduction of downtimes.
11	Contribute to the formation of «eco-friendly» consciousness of citizens.
12	Contribute to the solution of many problems of entrepreneurial activity.
13	Contribute to the creation of norms that can minimise the impact on the environment.

Source: Developed by Vladyslav Marchenko

It is not surprising at all that international logistics companies have decided to analyse

and study them on a global scale, in search of new benefits and opportunities. It is now clear

that the correct implementation of green policy can not only bring huge benefits to the environment and minimise the negative anthropogenic impact on climate change, but at the same time provide additional benefits to the companies that have implemented it.

They will be presented in the form of a new field for successful development, financial savings, optimisation of complex operations, effective marketing, increased safety and reliability. Another important factor is that people are beginning to pay more attention to the ideas of environmental protection and climate neutrality, and therefore the relevance of this direction will grow significantly.

The pandemic was also an important additional factor. It helped European

countries to fully understand the incredible importance of simplifying all possible bureaucratic processes in favour of operational flexibility, IT development and digitalisation.

Unpreparedness for such a powerful challenge has become a demonstrative lesson and a serious precedent for guiding the development of the European continent not only towards the effective achievement of climate neutrality, but also towards global digitalisation.

Examples of opportunities given by the realisation of green initiatives can be seen in Table 4.

Table 4. Opportunities given by the realisation of green initiatives

№	Opportunities
1	Allows to speed up integration with the EU in a wide list of important areas.
2	Allows to clearly establish a strategic course towards full membership in the EU.
3	Allows to make the export and import policy more flexible and efficient.
4	Allows to increase the level of international cooperation with the EU and satisfy its demand in various areas by providing modern, competitive services and products.
5	Allows to establish long-term business relations in the field of clean fuel applications.
6	Allows to bring relations with international environmental organizations to a new level.
7	Allows to popularize the concept of ecologically clean enterprises and companies.
8	Allows you to gradually replace paper documentation with electronic, and ensure the global development of digitalization.
9	Allows to optimize and facilitate various customs operations.
10	Allows to modernize the state procurement system.
11	Allows to improve control over both illegal import and illegal export of goods and products.

Source: Developed by Vladyslav Marchenko

Based on today's global challenges and all that has been said above, it can be stated that logistics companies simply do not have the right to lose precious time, but, on the

contrary, must actively prepare for large-scale changes. Different variants of companies' development in the ecological direction can be found in Table 5.

Table 5. Variants of companies' development in the ecological direction

No	Variants of logistics companies development in the ecological direction
1	Creation of new eco-services and offers.
2	Limitation of such emissions into the atmosphere as carbon monoxide, nitrogen oxides, various volatile organic compounds, or other harmful substances.
3	Popularization and mass application of modern, efficient green technologies, both in ordinary supply chains and powerful distribution channels.
4	Establishing business relations with market representatives aimed at supporting the development of the green course.
5	Complete rejection of transport packaging (in cases where it is possible), or transition to its ecological analogues.
6	The use of different types of transport containers that can be recycled many times for reuse or, as a final option, be safely disposed of.
7	Development of the most efficient and rational system of routes for the delivery of goods and all possible products, with the aim of saving resources.
8	Popularization of the green development policy among the staff and ordinary citizens.
9	Creation of automated and maximally energy-efficient warehouses.
10	Following green trends when setting up modern offices.
11	Transition to renewable energy sources.
12	Electrification of vehicles and replacement of outdated models with modern analogues.
13	Development and active improvement of a new system for monitoring and controlling the level of negative impact of business on the environment and the process of climate change.

Source: Developed by Vladyslav Marchenko

Taking all of the above into account, it becomes clear why sustainable development is so perspective for logistics companies in our time. The article is a logical continuation of a number of publications of authors on the subject of sustainable development of logistics and transport [14-15].

Conclusions. As a result of the research conducted in this article, all the set goals have been achieved. In this paper, attention has been focused on global issues such as environmental pollution, depletion of earth's resources and climate change. It explained their seriousness and global character, analysed the root causes that led to their escalation. It was emphasised that the long-term human policy of ignoring them has only worsened the situation. Special emphasis was placed on the fact that the negative consequences of mistakes made in the past can now be felt by citizens of all countries of the world. Nowadays, in order to solve these problems or at least slow down their pace, it is necessary to make extremely colossal and complex efforts, to look for new effective solutions and directions. In this paper, the concept of sustainable development as one of the most modern and promising variants has

been qualitatively researched and analysed. Its meaning, importance and significance were revealed. The key attention was paid to the implementation of this concept in the logistics industry, as the entire modern economy is completely relying on it. It was explained in detail and qualitatively why modern business should move towards a green course, and especially develop the green logistics direction. In this article, popular examples of green course policy implementation in logistics were presented and key problems that slow down green logistics development in Ukraine were listed. It was explained that in order to ensure a smooth transition, Ukrainian companies can gradually adopt significant foreign experience. Great attention was given to revealing the importance of green technologies, their role, prospects and implementation opportunities. In this paper, the positive impact of green technologies on different processes was demonstrated, variants of companies' development in the ecological direction were indicated, and opportunities given by the realisation of green initiatives were presented. As a final result, it was emphasised that, taking into

account all of the above, it is absolutely obvious why the concept of sustainable development is so important in our time.

References

1. ABC News. (2017). World pollution kills more people annually than wars, disasters, hunger. URL: <https://www.abc.net.au/news/2017-10-20/world-pollution-deadlier-than-wars-disasters-hunger/9069776>
2. Proskuriv. (2019). URL: <https://proskuriv.khm.gov.ua/2019/09/27/екологія-пріоритет-який-ігнорувати-н/>
3. European Environment Agency. Climate change is one of the biggest challenges of our times. URL: <https://www.eea.europa.eu/themes/climate/climate-change-is-one-of>
4. NV. (2021). URL: <https://biz.nv.ua/ukr/markets/ekologiya-ta-korporativna-socialna-vidpovidalnist-yak-pochati-biznes-z-ekologichnoyu-strategiyeyu-50174443.html>
5. International Institute for Sustainable Development. Sustainable Development. URL: <https://www.iisd.org/mission-and-goals/sustainable-development>
6. Greenly. (2023). What are the Three Pillars of Sustainable Development?. URL: <https://www.greenly.earth/blog-en/3-pillars-of-sustainable-development>
7. European Commission. Sustainable Development Goals. URL: https://international-partnerships.ec.europa.eu/policies/sustainable-development-goals_en
8. StudyCorgi. (2022). The Concept of the Green Logistics. URL: <https://studycorgi.com/the-concept-of-the-green-logistics/>
9. Swan Valley Anglican Community School. The Industrial Revolution. URL: <https://svacs.libguides.com/c.php?g=939203>
10. Environmental and Energy Study Institute. (2021). Climate, Environmental, and Health Impacts of Fossil Fuels. URL: <https://www.eesi.org/papers/view/fact-sheet-climate-environmental-and-health-impacts-of-fossil-fuels-2021>
11. Green Technology. What is Green Technology?. URL: <https://www.green-technology.org/about/>
12. Ingenta Connect. Green Technology Concept and Implementation. URL: <https://www.ingentaconnect.com/contentone/asp/asl/2017/00000023/00000009/art00102>
13. ResearchGate. (2020). Green Technology and its Implications Worldwide. URL: https://www.researchgate.net/publication/350443477_Green_Technology_and_its_Implications_Worldwide
14. V. Marchenko, Dm. Bugayko, Yu. Yerkovska, D. Bugayko, Development of transport logistics in conditions of globalization: concept, key features and advantages. III International scientific and practical Internet conference "Business analytics: models, tools and technologies". K: NAU. C 71-75.
15. Vladyslav Marchenko, Dmytro Bugayko, Danylo Bugayko, Sustainable development of a logistics company based on the implementation of a «green» business strategy. Intellectualization of Logistics and Supply Chain Management: The electronic scientifically and practical journal v.19 (2023).

UDC 658.71: 159.947.2

DOI: <https://doi.org/10.46783/smart-scm/2023-22-2>

JEL Classification: M15, Q12.

Received: 10 November 2023

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PROSPECTS OF DEVELOPMENT OF UKRAINIAN AIR TRANSPORT REGULATION

Dmytro Bugayko, Anastasiia Tkachenko, Danilo Grabovskiy *"Prospects of development of Ukrainian air transport regulation". The world transport system is unthinkable without aviation. Currently, there is a positive trend in the field of air transportation, and the role of aviation on a global scale cannot be overestimated. Today our state is in a state of war, but we can claim that Ukraine has significant potential for the development of the aviation market. Before the war, the passenger air transportation market had the highest growth rates among all modes of transport in Ukraine. Such prospects are due, first of all, to significant unmet demand for air transportation, as well as a favorable geographical location for the development of transit transportation. At the same time, the development of instruments for regulating the industry at the national level is of particular importance. This article is devoted to finding ways to improve the legislative and regulatory framework of air transport.*

Keywords: air transport, regulatory framework, aviation safety, aviation security, national level.

Дмитро Бугайко, Анастасія Ткачєнк, Данило Грабовський. *"Перспективи розвитку регулювання авіаційного транспорту України". Світова транспортна система неможлива без авіації. В даний час спостерігається позитивна тенденція у сфері авіаперевезень, і роль авіації у світовому масштабі важко переоцінити. Сьогодні наша держава перебуває у стані війни, але ми можемо стверджувати, що Україна має значний потенціал для розвитку авіаційного ринку. До війни ринок пасажирських авіаперевезень мав найвищі темпи зростання серед усіх видів транспорту*

України. Такі перспективи зумовлені, передусім, значним незадоволеним попитом авіаперевезення, і навіть вигідним географічним становищем у розвиток транзитних перевезень. При цьому особливе значення має розвиток інструментарію регулювання галузі на національному рівні. Пошуку шляхів удосконалення законодавчої та регуляторної бази авіатранспорту присвячується ця стаття.

Ключові слова: повітряний транспорт, нормативна база, безпека авіації, авіаційна безпека, національний рівень

Introduction. After the war, there is every chance to create a full-fledged competitive aviation market in Ukraine and develop a European logistics hub. According to pre-war forecasts, by 2030, passenger traffic through Ukrainian airports will increase 4.3 times compared to 2017 – to 71.2 million out of 16.5 million people [1]. Unfortunately, the war makes adjustments to these forecasts. However, it can be argued that the cessation of hostilities will lead to a rapid increase in traffic volumes. A similar situation was observed around the world with an unprecedented reduction in air travel during the COVID-19 pandemic. ICAO forecasts that air passenger demand in 2023 will rapidly recover to pre-pandemic levels on most routes by the first quarter and that growth of around 3 per cent higher than 2019 figures will be achieved by year end. Airline industry operating profits are expected to reach \$22.4 billion in 2023, much improved over the December forecast of a \$3.2 billion operating profit. It is also more than double the \$10.1 billion operating profit estimated for 2022 [2].

However, at present there are many obstacles on the way to this goal, and this is only one of them, the elimination of which requires appropriate scientific research. This determines the relevance of the study. One of the aspects of regulatory regulation of international air passenger transportation is the safety of passengers, aviation personnel and personnel involved in aviation activities, and aircraft.

Currently, the legislation of Ukraine contains regulations designed to ensure the safety of the use of aircraft in Ukraine, as well as passengers, aviation personnel and personnel engaged in aviation activities. However, despite the legal regulation of this

issue, there are many problems associated with ensuring the safety of aircraft use that require immediate consideration and solutions. Among them are the imperfection of the regulatory framework for ensuring flight safety, as well as the inconsistency of information support for flight safety with modern conditions, which complicates the situation.

The practice of Ukrainian and foreign air carriers shows that aviation is a modern, safe and popular type of passenger transportation. In general, the development of national regulation of air transport corresponds to international legislation, and also contributes to an increase in the number of such transport [3, p. 150].

The article is a logical continuation of a number of publications devoted to the development of air transport sustainable development of Ukrainian scientists D.Bugayko [4 – 10], Y.Kharazishvili [5 - 6, 8], M.Hryhorak [6 – 7], Y.Ierkovska [9 – 10], O. Ovdiienko [7], V. Marchuk [7], V Lyashenko [5, 8], V Sokolovskiy [8], V. Baranov [8], M. Bahrii [10], Polish scientists (Z.Zamiar [6]), Azerbaijan Scientists F. Aliev [10] and scientists of other countries.

The purpose of the article is to provide structural analysis and search for development paths of legislative and regulatory framework of Ukrainian air transport in order to ensure it sustainable development.

Presentation of the main results.

State regulation of air transport of Ukraine. As is known, the sources of legal regulation of international transport are not only international legal acts, but also national legislation of individual countries. Ukrainian legislation in this area needs to be revised due

to the low effectiveness of legislative provisions. State regulation of civil aviation activities of Ukraine is based on the Constitution of Ukraine, the Air Code of Ukraine dated 19.05.2011 No. 3393-VI1, other legislative acts, national regulatory and legal acts, state and industry standards, guiding documents on standardization, regulatory and legal acts of the former Ministry of Civil Aviation of the USSR, which have not lost their relevance and do not contradict the Constitution and current legislation of Ukraine, acts of international air law, documents of international organizations of which Ukraine is a member [5, 11].

The sustainable development of aviation transport is carried out in the context of comprehensive improvement of the transport system of Ukraine. In 2018, the Decree of the Cabinet of Ministers of Ukraine No. 430 approved the National Transport Strategy of Ukraine for the period until 2030. The implementation of the National Transport Strategy consists in ensuring the sustainable development of the transport sector of the economy.

The strategy includes five priority directions: development of effective public administration in the transport sector; provision of quality transport services and integration of the transport complex of Ukraine into the international transport network; ensuring sustainable financing of the transport complex; increasing the level of safety in transport; achieving urban mobility and regional integration in Ukraine. Air transport occupies a special place among its strategic initiatives.

In order to develop passenger air transportation, it is proposed to: continue certification of compliance with safety requirements at Ukrainian airports; to ensure compliance of the airport certification procedure and airworthiness review with the provisions of EU directives; to solve the issue of lack of funding needed to support infrastructure development; continue the process of harmonization of national legislation with the EU; create conditions for

promotion of new air carriers to the market, first of all, Low Cost models; systematically implement the policy of liberalization of the aviation market. In order to develop cargo air transportation, it is proposed to ensure the investment of modern multimodal service-oriented hubs, including cargo air traffic; to develop and implement a program for the development of cargo air transportation; to provide appropriate financing for the development of aviation cargo terminals and infrastructure [5, 12].

The development of airports and their infrastructure is the cornerstone of the sustainable development of air transport and aviation logistics. Considerable attention is paid to this direction by the state. Thus, on February 24, 2016, Resolution No. 126 of the Cabinet of Ministers of Ukraine approved the State target program for the development of airports for the period until 2023. The purpose of the Program is to ensure the sustainable development of air transport and its infrastructure, the implementation of world and regional standards in the operation of the national airport system, the development of transit and transfer transportation, increasing the efficiency of state property management.

Expected results of the Program: increase in air passenger traffic; doubling the capacity of airports; reduction of time for ground maintenance of each aircraft to 35-40 minutes; double the transit potential; development of public-private partnership and non-aviation activities of airports; creation of favorable conditions for Low-Cost airlines, creation of additional jobs. Unfortunately, the war temporarily suspended the possibility of its implementation, but after its end, the plan will be implemented [5, 13].

State regulation of aviation safety of Ukraine. According to the provisions of Annex 19 "Safety Management" to the Convention on International Civil Aviation (Chicago Convention of 1944) of the ICAO at the national level, the strategic management of aviation safety is implemented within the

framework of the State Aviation Safety Program (Safety State Program – SSP) [14].

In Ukraine, this area is regulated by the Flight Safety Program in the field of civil aviation, which was approved at the meeting of the Aviation Safety Council of the State Aviation Service of Ukraine on March 27, 2018. The program has a structure that meets ICAO requirements.

However, its main drawback is the level of signatories. Unlike most countries of the world, where this Program was approved by a legislative body (parliament), in some cases - by the Cabinet of Ministers or the National Security and Defence Council, in Ukraine it is promulgated at the regulatory level. Therefore, the basis of the Program is the resource provision of the safety of state aviation transport.

Only under the condition of real state support is it possible to assert the effectiveness of the Program. It also seems relevant to adapt the provisions of the program to the conditions of military operations and post-war reconstruction of the industry. This is undoubtedly a sure step forward on the way to the development of the national culture of air transport safety. [15, 16].

State regulation of aviation security of Ukraine. On March 21, 2017, the State Program of Aviation Security of Civil Aviation (hereinafter referred to as the Program) was adopted [17], which made in accordance with the standards and recommended practice of the Convention on International Civil Aviation (Chicago, December 7, 1944) and obligations arising from Ukraine's participation in the Convention on Crimes and Certain Other Acts Committed on board aircraft (Tokyo, September 14, 1963), the Convention for the Suppression of Unlawful Seizure of Aircraft (The Hague, December 16, 1970), the Convention for the Suppression of Unlawful Acts Against the Safety of Civil Aviation (Montreal, September 23, 1971), from the Protocol on Combating Unlawful Acts of Violence at Airports Serving International Civil Aviation (Montreal, February 24, 1988), the

Convention on the Marking of Plastic Explosives for Their Identification (Montreal, March 1, 1991), Annex 17 to the Convention on International Civil Aviation Security. Protection of International Civil Aviation from Acts of Unlawful Interference", Aviation Security Manual (Doc 8973), as well as other international acts and acts of Ukrainian legislation. That is, the State Program of Aviation Safety of Civil Aviation is developed in accordance with international standards.

However, the national mechanism for its implementation needs continuous development. In particular, the purpose of this Program is the distribution of responsibilities, establishment of implementation rules and implementation of measures to ensure the aviation safety of passengers, aviation personnel and personnel involved in aviation activities, aircraft, property transported by aircraft, facilities subjects of aviation activity regardless of the form of ownership and subordination.

In accordance with the provisions of Chapter 5 of the Program [17], the authorized body in the field of civil aviation security is the central body of the executive power, which implements state policy in the field of civil aviation (hereinafter - the authorized body on civil aviation issues). It follows from this that the powers of this body include the development, implementation and enforcement of the State Program of Civil Aviation Safety, in particular, in the area of ensuring the civil aviation safety of Ukraine.

The relevant duty to ensure aviation security is indirectly assigned to state authorities by Chapter 10 of the Rules of Air Transportation and Passenger and Baggage Handling, which states that "the air carrier has the right to refuse transportation at any stage of air transportation, cancel a reservation or remove a passenger from the aircraft:

- in connection with the need to comply with the requirements of the legislation of the country of departure, arrival or transit;
- at the request of the authorized bodies of the state authorities of Ukraine" [18].

Despite the high level of aviation security regulation in the country, war and the recovery of the system after military operations will require a review of existing and development of new approaches to aviation security, taking into account the changing nature and intensity of existing and newly emerging threats. Actual is the need for a strategic and operational response to new risks. By authors point of view, the Aviation Transport Strategy for the period until 2030 needs to be approved as soon as possible, according to the provisions of which "the ways to solve existing problems in the field of aviation safety are:

- implementation of state policy in the field of aviation security, taking into account the State Program of Aviation Security of Civil Aviation, approved by the Law of Ukraine dated March 21, 2017 No. 1965-VIII, ensuring supervision of the state of its implementation by subjects of aviation activity in accordance with Annex 17 to the Convention on International Civil Aviation;

- formation of a single center for collection and analysis of events in civil aviation to make the optimal decision in the event of an incident or an act of illegal interference" [19].

In our opinion, such measures will help to significantly develop aviation security

defense measures, which will contribute to more effective protection of the rights of passengers of international air transportation carried out by airlines, as well as the crews of aircraft.

Conclusions. In general, summarizing the above, we can conclude that the national legislation of Ukraine, which provides legal regulation of international air transportation of passengers, currently still needs to be improved.

In particular, the problem is that information support for aviation security does not fully correspond to modern conditions. In addition, the time has come to adopt an Air Transport Strategy that takes into account the military environment and with a focus on responding to new risks in the post-war recovery of the industry.

Moreover, there is already a fairly successful draft Air Transport Strategy until 2030, which could be taken as the basis for a new strategy adapted to realities.

Finally, it should be noted that the problems of air transport regulation require further scientific research in order to find ways to improve national legislation in this area in order to increase the level of protection of the rights of passengers and flight crews.

References

1. Official website of the Ministry of Infrastructure of Ukraine. URL: <http://www.mtu.gov.ua/> (date of application: 26.01.2020).
2. Directors General Of Civil Aviation - ICAO European And North Atlantic Regions 2023 Meeting (EUR/NAT-DGCA/2023) (Paris, France, 20 June 2023), URL: <http://surl.li/nfjeo>.
3. Radchuk O. P. International legal regulation of air transportation. Law forum. 2015. No. 2. P. 144-151.
4. D. Bugayko, Yu. Kharazishvili. Theoretical principles of strategic aviation safety management in the context of ensuring sustainable development of the national economy. Bulletin of Economic Science of Ukraine. 2020. № 1 (38). P. 166-175.
5. Kharazishvili Yu.M., Bugayko D.O., Lyashenko V.I. Sustainable development of aviation transport of Ukraine: strategic scenarios and institutional support: monograph / edited by Yu.M.Kharazishvili; NAS of Ukraine, Institute of Industrial Economics. Kyiv, 2022. 276 p.

6. D.Bugayko, Yu. Kharazishvili, M.Hryhorak, Z.Zamiar. Economic Risk Management of Civil Aviation in the Context of Ensuring Sustainable Development of the National Economy. Logistics and Transport– Wrocław: International School of Logistics and Transport in Wrocław. – 2020. - №1-2(45-46). – P.71– 82.
7. Ovdiienko O., Hryhorak M., Marchuk V., Bugayko D. An assessment of the aviation industry's impact on air pollution from its emissions: worldwide and the Ukraine. Environmental & Socio-economic Studies. [Katowice]. 2021. Vol. 9. № 2. P. 1-10.
8. Yu Kharazishvili, D Bugayko, V Lyashenko, V Sokolovskiy, V Baranov. Strategizing for sustainable development of transport systems in the safety dimension. IOP Conference Series: Earth and Environmental Science. IOP Publishing. P. 012025.
9. Dmytro Bugayko, Yuliya Ierkovska. Institutional Measures of Air Transport Safety Strategic Management at the Level of State Regulation. Intellectualization of Logistics and Supply Chain Management. The electronic scientifically and practical journal v.9 (2021). P.6 – 19. ISSN 2708 - 3195.
10. Dmytro Bugayko, Yuliya Ierkovska, Fariz Aliev, Mariia Bahrii. The Concept of National Integrated Risk Management of Aviation Transport of Ukraine. Intellectualization of Logistics and Supply Chain Management. The electronic scientifically and practical journal v.10 (2021). P.6 – 18. ISSN 2708-3195. 1
11. Air Code of Ukraine: Law of Ukraine dated 05/19/2011 No. 3393-VI. Information of the Verkhovna Rada of Ukraine. 2011. No. 48-49. Art. 536.
12. On the approval of the National Transport Strategy of Ukraine for the period until 2030: Decree of the Cabinet of Ministers of Ukraine dated 30.05.2018 No. 430-r. Government courier. 2018. No. 120 (June 27).
13. On the approval of the State target program for the development of airports for the period until 2023: Decree of the Cabinet of Ministers of Ukraine dated February 24, 2016 No. 126. Government courier. 2016. No. 41 (March 2).
14. ICAO. Annex 19 "Safety Management » to the Convention on International Civil Aviation (Chicago Convention of 1944).
15. Safety State Program on Aviation Safety, June 16, 2021. Decree of the Cabinet of Ministers of Ukraine No. 656 URL: <https://zakon.rada.gov.ua/laws/show/656-2021-%D1%80#Text>.
16. Bugayko D., Kharazishvili Y., Liashenko V., Kwilinski A. Systemic approach to determining the safety of sustainable development of air transport: indicators, level, threats. Journal of European Economy. Ternopol: West Ukrainian University, 2021. Vol. 20.1 (76). P. 146-182.
17. On the State Program of Aviation Security of Civil Aviation: Law of Ukraine dated March 21, 2017 No. 1965-VIII. URL: <https://zakon.rada.gov.ua/laws/card/1965-19> (date of application: 26.01.2020).
18. On the approval of the Aviation Rules of Ukraine "Rules of Air Transportation and Handling of Passengers and Baggage": Order of the State Aviation Service of Ukraine dated November 26, 2018 No. 1239. URL: <https://zakon.rada.gov.ua/laws/show/z0141-19> (date of application: 01.26.2020).
19. Aviation transport strategy for the period until 2030: project. URL: www.mtu.gov.ua (date of application: 26.01.2020).

UDC 658.5

DOI: <https://doi.org/10.46783/smart-scm/2023-22-3>

JEL Classification: E60, H11, H80, J18, L10.

Received: 15 November 2023

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USING OPEN SOURCES OF INFORMATION TO STUDY BUSINESS REPUTATION OF BUSINESS ENTITIES: FOREIGN EXPERIENCE

Igor Korzhevskiy "Using open sources of information to study business reputation of business entities: foreign experience". *In the context of increasing internationalization and the formation of an innovative economy, the role of reputation in achieving a high level of performance of enterprises and organizations is gaining new qualitative significance. Today, business reputation (reputation of products, services, works, top managers, etc.) is becoming an object of competitiveness and investment. In today's environment, brand reputation, reputation of the company's top executives, reputation of top managers, and reputation of the company's strategy are becoming the objects of significant material investments. This is primarily due to the growing influence of society on the activities of modern enterprises through information transparency. Experts agree that a good reputation makes a company more attractive to investors, increases its capitalization, allows it to increase revenue, and provides a stronger position when entering new markets. In addition, in a highly competitive environment, with a huge number of companies with approximately the same competitive advantages, a company can potentially stand out and thus receive significantly higher profits, sales, investments, etc. than others only due to its corporate reputation. Therefore, the formation of an effective system of business reputation is an urgent problem for companies.*

Keywords: open sources of information, business reputation, business entity, image, competitiveness, intellectual property.

Ігор Коржевський «Використання відкритих джерел інформації для вивчення ділової репутації суб'єктів господарювання: зарубіжний досвід» В умовах посилення інтернаціоналізації та формування інноваційної економіки, роль репутації в досягненні високого рівня результативності діяльності підприємств та організацій набуває новітнього якісного значення. Сьогодні ділова репутація (репутація продукції, послуг, робіт, топ-менеджерів тощо), стає об'єктом конкурентоздатності, інвестиційних вкладень. В сучасних умовах репутація бренду, репутація перших осіб компанії, репутація топ-менеджерів, репутація стратегії фірми стають об'єктами значних матеріальних вкладень. Це пов'язано, насамперед, з посиленням впливу суспільства на діяльність сучасних підприємств через інформаційну відкритість. Експерти сходяться на думці, що хороша репутація робить компанію більш привабливою для інвесторів, підвищує її капіталізацію, дозволяє збільшити дохід, забезпечує більш сильні позиції при виході на нові ринки. Крім того, за умов жорсткої конкуренції, за наявності величезної кількості компаній, що володіють приблизно однаковими конкурентними перевагами, підприємство потенційно зможе вирізнитись і таким способом отримувати значно вищі, аніж інші, прибутки, обсяги збуту, інвестицій тощо, лишень

завдяки своїй корпоративній репутації. Тому актуальною проблемою для компаній постає формування ефективної системи ділової репутації компанії.

Ключові слова: відкриті джерела інформації, ділова репутація, суб'єкт господарювання, імідж, конкурентоспроможність, інтелектуальна власність

Introduction. Business reputation is one of the most important intangible resources of any company, as it contributes to the formation of a general perception of the company among external stakeholders and allows for long-term competitive advantages. In addition, effective management of business reputation contributes to the growth of commercial profits and has a positive impact on business stakeholders. However, the mechanism of business reputation management as a factor of increasing the market value of a company and ensuring its competitive advantages in the market is not fully explored in the modern scientific literature.

Analysis of recent research and publications. The problems of researching business reputation are the subject of attention of such scientists as A. Bohoyavlensky, S. Gorin, O. Grebeshkova, O. Shymanska, G. Dowling, M. Purmel, and O. Shcherbakova: Baltatarova E., Bernitskaya D.I., Kravchuk N.O., Buksha K.S., Venediktova V., Gorin S.V., Grebeshkova O.M., Kochin V.V., Novik V., Rezontov S., Solomandina T., Shimanskaya O.V. and others. However, business reputation as a strategic factor of competitiveness is interpreted ambiguously and requires further research.

The formulation of the goals of the article is the analysis of open sources of information to study the business reputation of business entities, using the example of foreign companies.

Presentation of the main results. There are a significant number of legal entities in the Ukrainian market founded by foreign companies or foreigners. According to the Law of Ukraine "On Foreign Investments" dated 13.03.1992 №2198-XII [1], foreign investments may be made in the form of:

- partial participation in enterprises established jointly with Ukrainian legal entities and individuals, or acquisition of a share of existing enterprises

- establishment of enterprises wholly owned by foreign investors, branches and other structural units of foreign legal entities or acquisition of ownership of existing enterprises;

- acquisition of real or personal property not expressly prohibited by the laws of Ukraine, including houses, apartments, premises, equipment, vehicles and other property, by direct acquisition of property and property complexes or in the form of shares, bonds and other securities;

- acquisition of land use rights and concessions for the use of natural resources on the territory of Ukraine, either independently or with the participation of Ukrainian legal entities or individuals;

- acquisition of other property rights;

- in other forms of investment, in particular on the basis of agreements with Ukrainian business entities, which are not directly and exclusively prohibited by the current laws of Ukraine.

According to the National Bank of Ukraine, foreign direct investment in Ukraine's economy through equity instruments other than reinvestment of earnings amounted to USD 922,600,000 at the end of 2021.

The largest foreign investor in Ukraine is the Republic of Cyprus, followed by the Netherlands, Luxembourg, and the United Kingdom.

According to analysts of LLC "YouControl" [2], in 2019, more than 6,000 legal entities in Ukraine had Cypriot companies among their founders and Cypriot citizens among their beneficial owners.

They are present in about 30% of legal entities with foreign founders and almost 1% of limited liability companies. Among private joint stock companies, Cypriot participants are present in every fifteenth company.

From the above, it can be seen that the study of the business reputation of foreign investors is essential for ensuring the economic security of Ukrainian enterprises. Information on non-residents can be obtained from national and global registers.

According to the author's estimates, about 200 countries of the world provide access to open registers (there are 256 countries in the world).

Some of them, including the United States, China, Canada, Brazil, and the United Arab Emirates, have both national and regional registries. The United States has 48 registries of legal entities, one of which is national and 47 are state registries, China has 34 registries, one of which is national and 33 are provincial registries, Canada has 12 regional registries, and the United Arab Emirates has 4.

All registers are divided into:

- registers of legal entities, which contain data on managers, founders and their ultimate beneficial owners;
- statistical business registers containing data on the results of financial and economic activities of legal entities;
- business registers (repositories of procurement or tenders);
- registers of state aid;
- land and mortgage registers;
- registers of vehicles;
- registers of pledged property;
- intellectual property registers;
- tax registers (registers of taxpayers and debtors);
- registers of companies operating on the stock market;
- registers of enterprises subject to bankruptcy proceedings;
- registers of licensees.

In some countries of the world, so-called "Certificates of good standing" are in

circulation [3]. The form and content of the certificate may vary from country to country.

The Certificate shall contain: - the name and registration number of the company, its legal address, and a conclusion that the company is in good standing.

Such a conclusion indicates that the company is indeed registered in the specified jurisdiction, is not in the process of liquidation, is not excluded from the register, is not in bankruptcy and meets all the requirements of the country of registration, i.e., operates in accordance with local law, pays the annual state duty in full and on time, and, in the case of some jurisdictions, submits financial statements. In most cases, the document is issued on thick paper or official letterhead, contains the seal of the issuing authority, and in some cases, elements of state symbols. The validity period of the certificate is not specified, but it may be valid until the date of the next renewal of the company's activities or, if other circumstances come into force, as a result of which the company loses its "Good standing" status (for example, the beginning of the liquidation process).

The "Certificate of good standing" can be obtained from the state authorities of the country of registration of the company. Most often, such a body is the trade register, which is responsible for registering companies and controlling their activities.

A "certificate of good standing" can be obtained from the state authorities of the country of incorporation. Most often, such a body is a trade register, which is responsible for registering companies and controlling their activities. In particular, in the main jurisdictions, such authorities are:

- British Virgin Islands - Registry of Corporate Affairs, the cost of the certificate is USD 280, the terms of issuance with an apostille are 6-7 days, without an apostille - 1-2 days;

- Belize - International Business Companies Registry, the cost of the certificate is 270 USD, the term of issuance with an

apostille is 14 days, without an apostille - 7 days;

- Bahamas - Company Search Report, the cost of the certificate is USD 475, the term of issuance with an apostille is 14 days, without an apostille - 7-10 days;

- Great Britain - Companies House (cost data is given below);

- Hong Kong - Companies Registry, the cost of the certificate is USD 340, the term of issuance with an apostille is 5-6 days, without an apostille - 1-2 days;

- Cyprus - Department of Financial Agencies and Official Receiver, the cost of the certificate is 351 USD, the terms of issue with an apostille are 5-6 days, without an apostille - 2-3 days;

- Seychelles - Registrar of International Business Companies, the cost of the certificate is USD 215, the term of issuance with an apostille is 5-6 days, without an apostille - 1-2 days.

A "Certificate of Good Standing" about the company under investigation can be issued if the customer has paid the state duty in a timely manner and in full and is not in the process of liquidation itself. In some jurisdictions, the certificate can be ordered only after the company has fulfilled the requirement to submit financial statements.

A "certificate of good standing" cannot be obtained in respect of liquidated companies, those in the process of liquidation, and those companies that have been administratively struck off the register of registration for non-payment of state duty. These companies are considered to have ceased operations and thus lost their good standing status.

A "certificate of good standing" is usually ordered by:

1. At the request of the bank where the company has opened an account or where it is planned to open an account.

2. At the request of partners or contractors who want to make sure that the company is active.

3. In connection with changes in the corporate structure (director / shareholder / beneficiary of the company). At the same

time, the certificate does not provide the corporate structure, but only states the fact of the company's good standing.

4. When selling a company.

5. For submission to state authorities, for example, at the request of the court in case of the company's participation in court cases, etc.

The list of information contained in the above open registers is generally similar to each other. A number of foreign websites should be considered conditionally open, as they provide access to information only after registration, which can only be done by a citizen of their country and upon payment of a certain amount of money for providing information. The following are examples of websites available for use from the territory of Ukraine.

1. The website of the U.S. Securities and Exchange Commission (U.S. Securities and Exchange Commission) - <https://www.sec.gov/>

The Internet resource belongs to the U.S. Securities and Exchange Commission (SEC), which is an independent agency of the U.S. federal government established after the Wall Street crash of 1929 [4]. The main goal of the SEC is to enforce the law against market manipulation. To achieve this goal, the SEC requires quarterly and annual reporting from public and other companies. In addition, company executives must provide an extended corporate governance report (MD&A), which also outlines the results of the previous year's operations. The SEC maintains an online database called EDGAR (Electronic Data Gathering, Analysis and Retrieval System) from which investors can access information filed with the agency. This online system also accepts tips and complaints from investors to help the SEC track down violators of securities laws. The SEC has a strict policy of never commenting on the existence or status of an ongoing investigation of a company. The site provides access to information on: the name of the legal entity, its registration code, ownership information, address, information on the service agent, contact

numbers, quarterly reports on the results of financial and economic activities of legal entities.

The website of the U.S. Securities and Exchange Commission is free of charge, but it is quite cumbersome and difficult to understand.

2. *Websites of state secretaries of state (State Solicitation Registration Charities of America)* -https://charitystateregistration.org/essistant_category/secretaryofstate/

The site belongs to the state registration authorities that register companies. The email addresses of each state registry can be found on the website at the above URL. The website can only be accessed through proxy servers or a proxy browser. The website addresses are listed in alphabetical order.

The website contains data on the full name of legal entities registered in a particular state, their legal form, tax ID, business registration address, and the name of the registration agent. If the place of registration of a company in the United States is unknown, the search for information about it should begin with the Delaware registry, where more than half of the country's legal entities are registered. After Delaware, the most popular states for doing business are: Wyoming (specializing in startups) and Nevada (gambling). A significant number of companies are also registered in offshore jurisdictions of the United States: Puerto Rico, Guam, American Samoa, and the US Virgin Islands.

3. *Website of Companies House service - GOV.UK* - <https://www.gov.uk/>

GOV.UK is a public sector information website of the United Kingdom, created by the Government Digital Service to provide a single point of access to the country's public services [5]. Companies House service is engaged in the registration of companies in the United Kingdom and is part of the Department of Business, Energy and Industrial Strategy (BEIS). In 2020, about 4.3

million companies were registered in the Companies House register.

The website was launched on 31.01.2012 and by 2014 had replaced the separate websites of hundreds of government departments and state bodies. As of March 2022, GOV.UK combines the pages of 23 ministerial departments, 20 non-ministerial departments, and more than 410 agencies, public corporations, and other government bodies.

Some of the information on the website is available free of charge, including the full name of the legal entity and its previous names, address and date of registration, constituent data on current and former directors, data on mortgage loans, information on solvency, and certain financial indicators. The information is provided in the form of a document with a barcode. The user can also set up free email notifications about changes and updates to the data (change of directors, addresses). To do this, users need to register on the website.

More complete certified information and a certified Certificate of Good Standing can be ordered within 5 minutes.

The cost of the certificate and a standard certificate for a UK subscriber or international user will be £15. The certificate will be sent within 10 business days. The cost of a similar certificate in the express mode will be 50 pounds sterling. Express production may also include sending a copy to the customer's e-mail.

In addition to national sites, the Internet contains a number of global sites that are aggregators of open national registrar sites. For example, one of the most popular and information-rich sites is OpenCorporates.

4. *OpenCorporates website* - <https://opencorporates.com/>

OpenCorporates is an online resource that provides access to more than 300 national and regional websites of foreign registrars. As of the end of 2022, it provides information on 21,149,854 legal entities.

The data is uniformly structured and easy to use. Some of the information (company name, registration code, status, country, date and address of registration, data on directors, secretaries, history of changes, sometimes data on beneficial owners) is available without registration.

More detailed information on events, directors and secretaries of companies, their participation in other legal entities is provided only after registration. The search is performed by company name or by the data of its directors. To get direct real-time access to structured data in JSON or XML formats, you should subscribe to a paid version of access at a cost of £792 per year, for which you can make 1,000 queries per month and 200 queries per day, at a cost of £6,600 per year, for which you can make 2,500 queries per month and 500 per day, at a cost of £12,000 per year, for which you can make 5,000 queries per month and 1,000 per day, at a cost of £16,200 - 7,500 queries and 1,500 per day.

The site has been operating under the Copyleft open database license [6] since December 20, 2010. It was created by British citizens Chris Taggart and Rob MacKinnon. In July 2015, the OpenCorporates website was announced as the winner of the Open Data Award for its work in promoting data transparency in the corporate sector. The service is also used to study data on public procurement, online hiring market, visualization and analysis of company data, analysis of tax havens, and illegal activities of companies.

Conclusions. Studying and assessing the business reputation of legal entities and individuals is an important element of the functioning of business entities, public associations and organizations.

Only a set of documented information about a business entity makes it possible to conclude that its business and professional activities comply with the requirements of the law, and for an individual - also about the appropriate level of professional skills and managerial experience.

In order to comply with these criteria when assessing business reputation, the sources of information used to obtain data on legal entities and individuals are of primary importance. It is clear that open sets of state data managers are the most reliable, up-to-date and secure.

Open databases of state organizations and enterprises are created on the basis of Ukrainian legislation and are based on the principles of the International Open Data Charter. Information managers in Ukraine have created the Unified State Open Data Web Portal, as well as 138 websites and registers that contain information necessary for studying business reputation.

In accordance with the Law of Ukraine "On Access to Public Information" №2939-VI dated January 13, 2011, public information in the form of open data is made public for free and free of charge access. Open data is allowed for further free use and distribution. Any person may freely copy, publish, distribute, and use this data, including for commercial purposes. They can be combined with other information by including them in their own product with a mandatory reference to the source of their receipt.

In addition to the main Internet resources of data controllers, the study analyzed 5 non-governmental websites. These websites contain notices stating that the information posted on them is obtained exclusively from open official data sources.

Their study and analysis provide grounds to believe that this is true. The difference between them is mainly in the appearance of the user interface, the form of the report and the cost of providing certain services.

It should be borne in mind that the bulk of the information used by non-governmental sites was downloaded from the Unified State Open Data Web Portal and is located on servers outside of Ukraine, which may cast doubt on its reliability.

In accordance with the Resolution of the Cabinet of Ministers of Ukraine of 12.03.2022 No. 263 on "Some issues of ensuring the functioning of information and

communication systems, electronic communication systems, public electronic registers under martial law" [7], from 12.03.2022, data managers stopped the operation of information, information and communication and electronic communication systems and public electronic registers.

In order to preserve the integrity and confidentiality of information, prevent unauthorized interference and data distortion, and prevent cases of raiding, the Ministry of Justice of Ukraine and the State Enterprise "National Information Systems" suspended the operation of state registers and databases administered by the state.

At the same time, non-governmental aggregator sites continued to provide access to information, free access to which was terminated or restricted by data controllers, and continue to do so at the time of this study.

These circumstances have increased the popularity of non-governmental websites to the detriment of governmental ones, but the information displayed on them is no longer relevant, given that the data sets have not been updated by data controllers for 9 months.

These shortcomings may negatively affect the algorithms for assessing the

business reputation of legal entities and individuals. The analysis of open websites of foreign registrars and global aggregator websites shows that they publish much less information than Ukrainian ones. They do not have any advantages over domestic public websites. As a rule, foreign websites do not contain complete data on the founders and ultimate beneficial owners of legal entities, their places of registration and contact details. The websites also lack information on individual entrepreneurs, their places of registration and contact information.

At the same time, in some countries, such as the United Kingdom, there are official documents such as "Certificate of Good Standing" that actually certify the legal capacity of legal entities and their positive business reputation.

These certificates, if implemented in Ukraine, can greatly simplify the procedure for assessing prospective counterparties (business partners, etc.), especially their business reputation, in the context of the main vectors of processing the economic security system of state-owned and non-state enterprises.

References

1. On foreign investments: Law of Ukraine dated 13.03.1992 №2198-XII. URL: <https://zakon.rada.gov.ua/laws/show/2198-12#Text>.
2. The official site of YouControl (2023). URL : <https://youcontrol.com.ua/>
3. Certificate of good standing (2022). URL: https://en.wikipedia.org/wiki/Good_standing.
4. U.S. Securities and Exchange Commission (2022). URL: https://en.wikipedia.org/wiki/U.S._Securities_and_Exchange_Commission.
5. Companies House (2022), URL: https://en.wikipedia.org/wiki/Companies_House.
6. Copyleft (2022), URL: <https://en.wikipedia.org/wiki/Copyleft>.
7. Resolution of the Cabinet of Ministers of Ukraine of 12.03.2022 №263 on "Some issues of ensuring the functioning of information and communication systems, electronic communication systems, public electronic registers under martial law". URL: <https://zakon.rada.gov.ua/laws/show/263-2022-%D0%BF#Text>.

UDC 334

DOI: <https://doi.org/10.46783/smart-scm/2023-22-4>

JEL Classification: A10, E 65, F43, H11.

Received: 18 November 2023

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WAYS TO IMPLEMENT PUBLIC-PRIVATE PARTNERSHIPS AND THEIR ECONOMIC EFFICIENCY

Yana Koval *"Ways to implement public-private partnerships and their economic efficiency"*. Given the role of business in meeting the needs of society, it can be concluded that the state cannot fulfill its socio-economic functions without an efficiently functioning business. This is an important condition for the formation of partnerships between business and the state. Another important condition is that business cannot develop effectively without the help and assistance of the state. This is due to a number of reasons. The effectiveness of demand satisfaction is directly related to the rational use of economic resources and a flexible response to changes in the structure of demand. Efficient use of resources by each individual producer ultimately ensures the efficiency of the entire economic system. Business, performing its direct functions, ensuring the preservation and expanded reproduction of their property through the increase of private capital, simultaneously performs social functions related to the increase of social capital and the product capable of ensuring effective demand in the market of goods and services. The article substantiates the need to use the mechanism of public-private partnership as an effective tool for implementing the innovation policy of regions, and also identifies the possibilities of public-private partnership in projects for commercialization of intellectual property as a form of interaction between the state, research institutions and business.

Keywords: economic efficiency, security, crisis management, public administration, legislative regulation, reform, innovation.

Яна Коваль *«Шляхи реалізації державно-приватного партнерства та їх економічна ефективність»*. Враховуючи роль бізнесу в задоволенні потреб суспільства, можна зробити висновок про те, що виконання державою своїх соціально-економічних функцій неможливе без ефективно функціонуючого бізнесу. Це є важливою умовою формування партнерських відносин між бізнесом і державою. Іншою важливою умовою є те, що бізнес не може розвиватися ефективно без допомоги та сприяння держави. Це зумовлено рядом причин. Ефективність задоволення попиту безпосередньо пов'язана з раціональністю використання економічних ресурсів, гнучким реагуванням на зміну структури попиту. Ефективне використання ресурсів кожним окремим виробником в кінцевому результаті забезпечує ефективність функціонування всієї економічної системи. Бізнес, виконуючи свої прямі функції, забезпечуючи збереження і розширене відтворення належних їм об'єктів власності за допомогою збільшення приватного капіталу, одночасно виконує і суспільні функції, пов'язані зі збільшенням суспільного капіталу та продукту, здатного забезпечити платоспроможний попит на ринку товарів і послуг. У статті обґрунтовано необхідність застосування механізму державно-приватного партнерства як ефективного інструменту

реалізації інноваційної політики регіонів, а також визначено можливості державно-приватного партнерства в проєктах комерціалізації продукту інтелектуальної праці як форми взаємодії між державою, науково-дослідними інститутами та бізнесом.

Ключові слова: економічна ефективність, безпека, антикризове управління, державне управління, законодавче регулювання, реформа, інновації.

Introduction. The mechanism of public-private partnerships is of particular importance in the relations between the state and business in regional innovation activities. In recent years, given the fact that the state is pursuing a course of innovative economic development, the importance of organizing this kind of partnership has gained special meaning. In addition, at the current stage of development of the Ukrainian state, the problems of organizing and improving the interaction between government and business are particularly relevant. As a response to the growing demands placed on business, the need for a constructive dialogue between the state, business and society is increasingly being recognized. However, the balance of interests between business, the state and local authorities in terms of responsibility for the welfare of citizens, territory and the country as a whole has not yet been found.

Analysis of recent research and publications. Foreign and domestic scholars have made an important contribution to the development of public-private partnerships, including as a tool for implementing regional innovation policy: O.S. Andreeva, O.M. Golovinov, A.M. Dyrdonova, V.M. Ivanova, V.S. Ivanov, A.A. Starodubova and other scholars. Nevertheless, it can be argued that the problem of public-private partnership as an effective tool for implementing regional innovation policy requires further research.

The formulation of the goals of the article is proposals on the main ways to implement public-private partnerships and their economic efficiency.

Presentation of the main results. Ukraine's infrastructure sectors need more state regulation not only because of the economic efficiency of infrastructure projects,

but also because of the significant obsolescence of fixed assets in certain infrastructure sectors, which threatens to cause man-made disasters. This "unified strategy of infrastructure renovation of Ukraine" aims to renovate infrastructure sectors using the most cost-effective methods. One of its goals is to combine the infrastructure needs of two levels: the state and regional. It is the combination of all infrastructure needs and problems in one plan, as well as their objective assessment based on common criteria, that will allow the government to focus its efforts on the most urgent ones. The evaluation of the most important projects should include, along with indicators of economic efficiency (quantitative), indicators of social necessity (qualitative), including indicators of the level of technological threat to infrastructure facilities.

This approach is intended to help local authorities, which are currently trying to solve infrastructure problems on their own, which is extremely inefficient due to the lack of modern tools and experience in local communities. Another important element of the plan is an assessment of all infrastructure needs in Ukraine [1].

The next stage in the implementation of the "unified strategy for the infrastructure renovation of Ukraine" should be an analysis of the most effective options for implementing priority projects. Investments should be attracted to projects whose economic efficiency is beyond doubt. For those projects where the projected rate of return is lower than investors' commercial expectations or where the forecasts are subject to a certain degree of uncertainty, it is necessary to use the mechanisms of partnership between business and

government or to raise funds through government guarantees. Such a structure for organizing reforms would allow, for example, using state guarantees to raise funds to finance a "pool" of local projects. In the current situation, small towns and regional centers simply do not have the funds to renovate capital-intensive housing and communal services. Outdated infrastructure increases the costs associated with its use due to the failure to save resources and maintain its performance. By attracting a "cheap loan" under state guarantees and spending it on such projects, the government gets a double effect. First, the economic effect comes from an increase in domestic consumption; however, to fully realize this effect, contractors must be forced to use domestic materials and services to the maximum extent possible. Secondly, it is the future savings on energy costs, in the case of housing and communal services, and on the repair of these facilities maintained by local authorities.

Stricter legislative regulation of procurement related to infrastructure projects, which will force contractors to purchase domestic materials in the construction of infrastructure facilities, has, in addition to the positive aspects related to domestic consumption, an anti-corruption effect. Its essence lies in the fact that suppliers of materials or services for infrastructure reconstruction projects, when applying for participation in a tender, must submit documents that would disclose the origin of these goods or services throughout the entire chain from the first supplier [2].

Unfortunately, as can be seen from the domestic experience, the mechanisms of partnership between business and government in Ukraine do not reduce corruption in the implementation of infrastructure projects, but are used as a modern mechanism for gaining control over important infrastructure facilities.

The analysis of the experience of implementing business-government partnership projects in Ukraine allows us to draw conclusions about two main approaches

to implementing the infrastructure renovation program and increasing demand within the state, which involve the creation of a "unified strategy for the infrastructure renovation of Ukraine" and optimization of the tools for implementing this strategy.

The creation of a management system for infrastructure projects involves: unification of project priority analysis methods; maintaining a unified system of distribution of investment subsidies taking into account regional development priorities; centralization of management mechanisms for partnership relations between business and government in the Cabinet of Ministers of Ukraine; establishment of a special Center for Public-Private Partnership with definition of its functions, duties and powers; clear demarcation of responsibilities and duties of other central and local authorities; establishment of public control over the use of funds allocated for infrastructure reconstruction at the state and local levels; increasing the transparency of reforms due to the introduction of a cumulative project accounting system; establishment of rules for the publication of information regarding the implementation of business and government partnership projects in parallel with the development of the audit structure; strengthening the manageability of the infrastructure investment market by guaranteeing the inclusion of local-level projects in the "unified infrastructure renovation strategy of Ukraine"; introduction of a multi-level system of participants in business-government partnership projects at the expense of local authorities of various levels and a gradual increase in the participation of the private sector in infrastructure renovation; strengthening of the budget, accounting and financial management component due to the development of a modern infrastructure project management structure [3].

The creation of a system of infrastructure reform using public-private partnership models will certainly also be affected by the implementation of a number of measures:

- the development by the Ministry of Economy of Ukraine together with other ministries and bodies of central and local authorities of the "unified strategy of infrastructural renovation of Ukraine", where priority projects will be determined each year;
- the development by the center for the development of business and government partnership under the Cabinet of Ministers of Ukraine of the conditions for the implementation of infrastructure projects with the determination of the possible participation of private investors in infrastructure projects with the calculation of the distribution of risks between the state and the private partner;
- carrying out a coordinated policy of the relationship between state investments and attracting private investors;
- the development of partnership relations between business and the government, increasing the number of professional participants in the public-private partnership market (mainly large domestic and foreign companies and commercial banks) with the aim of guaranteeing an increase in the efficiency of the mechanisms of partnership relations between business and the government due to increased competition among both investors and companies from management and contractors;
- conducting open tenders for the supply of basic materials according to a certain schedule (taking into account compliance with the norms of "nationality" of materials and services);
- integration of state and local infrastructure needs when entering international capital markets;
- a change in the structure of the state debt due to an increase in the share of financing infrastructure projects;
- refusal to make one-off decisions that are not subject to the "unified strategy of infrastructural renovation of Ukraine";
- conducting an independent examination of infrastructure projects that are

implemented at the expense of loans under state guarantees;

- ban on the use of external state borrowings for loans;

- reducing the volume of foreign loans guaranteed by the government (complete rejection of this practice), or providing state guarantees in the presence of counter-unconditional guarantees from domestic commercial banks, ensuring conditions for attracting investors' funds to infrastructure;

- introduction of external audit on infrastructure projects for loans under state guarantees;

- resolution of issues of reorganization and restructuring of infrastructural enterprises-debtors in accordance with adopted government decisions; application of such an administrative procedure as the termination of the employment contract concluded with them to the managers of debtor enterprises that ignore the fulfillment of debt obligations;

- the introduction of administrative punishment for persons responsible for deficiencies in the use of funds provided for the implementation of projects of the "unified strategy of infrastructural renovation of Ukraine" [4].

The solution to the problem of foreign credit lines, which Ukraine receives from the governments and banks of foreign countries, will also affect the development of the economy in terms of investments in infrastructure. Further attraction of so-called commodity (linked) loans can be carried out only under the conditions of defining criteria and carrying out a thorough assessment of the effectiveness of these credit resources, subcontractors that are linked to these loans. It is necessary to ensure clear management of the process of attracting, using and returning such external loans.

High-quality information support for projects, in particular, information systems supporting the processes of project preparation and implementation, designed to increase transparency and control by the public, will also contribute to the creation of

an effective system of partnership between business and government. Providing information support is very important, taking into account the involvement of a larger number of interested private entities in the development of Ukraine's infrastructure.

The Internet page of the Center for the Development of Business-Government Partnership under the Cabinet of Ministers of Ukraine, the holding of exhibitions and forums on the territory of Ukraine, as well as the participation of our specialists in foreign infrastructure forums should be part of an active information campaign. The availability of information on the status of business-government partnership projects should increase the interest of the private sector in infrastructure reforms [5].

Moreover, along with information on the actual projects, this information system should also contain data on planned projects that will involve private institutions. The analytical information should also include calculations of savings for already implemented projects. Such a system will increase the effectiveness of infrastructure reforms and the reliability of control over the implementation of these projects. The main principles of information presentation should be promptness and reliability of reports and analytical references [6].

International experience shows that modern and efficient infrastructure sectors have a positive impact on the investment potential of regions and regional development plans, stimulate business activity, help to increase incomes and reduce unemployment. Based on the above analysis, the following conclusions and recommendations can be made.

1. Implementation of a "unified strategy for infrastructure renovation of Ukraine" is appropriate and useful. It will allow for the most efficient distribution of efforts of the state and local authorities in the issues of infrastructure renovation of Ukraine.

2. The "Unified Strategy for Infrastructural Renovation of Ukraine" should be approved by the Verkhovna Rada of Ukraine at the

legislative level to protect its main directions and emphasis from the change of governments, as the systematic nature of reforms is a key factor in their success.

3. Establishment of the Center for Development of Business-Government Partnership under the Cabinet of Ministers of Ukraine is a necessary step to start active and faster implementation of infrastructure reforms in Ukraine, which are urgent.

4. An active and well-thought-out information policy should become a tool that will increase attention to the infrastructure sectors of Ukraine's economy from foreign investors and specialists.

5. Completion of the regulatory framework reform in the short term should be the basis for launching reforms in the infrastructure sectors. The regulatory framework should provide investors with the necessary guarantees to participate in business-government partnership projects, and the government should increase domestic consumption in addition to infrastructure reforms.

6. A government loan guarantee program could be useful to ensure access to financing for regional projects if such projects have received priority status in the "unified strategy for infrastructure renovation of Ukraine" but have low investment attractiveness and where attracting private capital, even through the use of business-government partnership mechanisms, is difficult, as confirmed by the Center for Business-Government Partnership Development.

7. Infrastructure reforms need to be diversified by sector and territory, with the Center under the Cabinet of Ministers of Ukraine setting a system of appropriate limits, and the maximum amount of state investment in projects of partnership between business and government in a particular region. The importance of balanced regional development has been demonstrated in the third section of our study.

8. It is important that not only large suppliers, but also small domestic companies

are allowed to participate in supply tenders, which will reduce the cost of the project. For this purpose, the Center for Business and Government Partnership Development should check the tender procedures of contractors and disseminate information on future procurements and conditions of participation in tenders for the supply of materials and services for business and government partnership projects as much as possible.

9. In order to increase the responsibility and efficiency of the owners and directors of infrastructure enterprises, it is advisable to conclude agreements with private partners on the basis of performance-based contracts (when the profit of the private partner managing the project depends on the efficiency of the project), so that these persons are materially interested in the successful implementation of the project.

10. Given that local authorities often operate at the regional level, and project development directly depends on the policy of local governments, it is worth creating a system of guarantees in contracts of partnerships between business and government in regional projects, in which local governments would participate. Moreover, it is advisable that the nationwide program of loan guarantees should operate only in those regions where local governments sign an agreement with the government of Ukraine on joint guaranteeing of projects of partnership relations between business and government for the regions.

11. With the participation of the Cabinet of Ministers of Ukraine and the Center for Development of Business and Government Partnerships, it is necessary to organize a system of continuous training and transfer of know-how to regional authorities to increase their tools for implementing reforms in the regions.

The introduction of public-private partnerships in Ukraine should become a priority area of interaction between the public and private sectors of the economy.

The main priorities of public-private partnership in Ukraine should be:

- solving strategic issues of Ukraine's economic development by attracting private capital;
- meeting the shortage of financial resources for the technical development (modernization) of the infrastructure for the provision of various socially necessary services;
- reducing the burden on the state and local budgets for the implementation of investment projects;
- directing the released funds of the state and local budgets to the implementation of socio-economic programs;
- meeting the public demand for better services and consumption of products.

In implementing public-private partnership mechanisms, the Government of Ukraine should be guided by the following principles

- balancing the interests of public and private partners;
- selection of a private partner on a competitive basis;
- fair distribution of risks between the public and private partners;
- state participation in financing public-private partnership projects;
- ensuring the legitimate rights and interests of consumers of goods (works, services);
- ensuring stability in fulfillment of the terms and conditions of concluded PPP agreements.

Conclusions. Thus, an important factor in the success of business-government partnerships in Ukraine will be the positive attitude of private partners to the government's policy on public-private partnerships, which should be based on the invariability of the above principles.

First of all, Ukraine needs to:

1. Create a legislative environment for the implementation of public-private partnerships, including improving the legal framework governing existing forms of public-private partnerships, namely, to

regulate the interaction of the Law of Ukraine "On Public-Private Partnership" and other legal acts, including the following:

- The Civil Code of Ukraine;
- The Commercial Code of Ukraine;
- The Law of Ukraine "On Concessions";
- The Law of Ukraine "On Concessions for the Construction and Operation of Roads";
- The Law of Ukraine "On Production Sharing Agreements";
- The Law of Ukraine "On Financial Leasing";
- The Law of Ukraine "On Lease of State and Municipal Property".

2. To expand the scope of public-private partnerships, namely, using international experience of partnerships between business and government, to attract private partners to projects in medicine, energy, mining, etc.

3. To develop and implement mechanisms of guarantees and risk reduction in public-private partnership projects.

4. Form an institutional environment: identify executive authorities at both the state and local levels that will be responsible for public-private partnerships, independent organizations that will carry out project expertise and consulting, etc.

5. Identify priority forms of public-private partnerships in certain sectors of the economy that will most effectively contribute to the development of industries and reduce corruption.

6. Ensure public discussion and independent audit of projects implemented with the use of public-private partnerships and informing the public about the progress of such projects in order to maximize public support for business-government partnership projects (stakeholder support).

7. To create a system for monitoring the implementation of public-private partnership projects, including in order to determine the effectiveness of their chosen form, and to take adequate measures to eliminate the identified shortcomings, as well as to assess the fulfillment of obligations by the partners.

8. It is possible to create and implement a sustainable framework for the effective functioning of public-private partnerships in various sectors of the Ukrainian economy by creating a legislative environment for the implementation of all forms of public-private partnerships, including through the improvement of the current legislative framework governing existing forms of public-private partnerships.

References

1. Antonov, V. V. (2013), "Methodological approaches to assessing the level of socio-economic development of the regions of Ukraine", *Management of the modern city*, № 7, pp. 51-61.
2. Golovinov, O. M. (2010), "Public private partnership in innovation", *Bulletin of Economic Science of Ukraine*, vol. 1, pp. 47-51.
3. Koval, Yana and Zahorodnia, Alona (2023), *Management of innovation processes in the business environment in the context of digitalization of the economy. The development of innovations and financial technology in the digital economy: col.mon. Pussi, Estonia. OÜ Scientific Center of Innovative Research*. Pp. 107-126. URL: <https://mono.scnchub.com/index.php/book/catalog/view/29/71/592> DOI: <https://doi.org/10.36690/DIFTDE-2023-107-126>
4. Gerrard, M. B. (2001), "What Are Public Private Partnerships, and How Do They Differ from Privatizations?", *Finance & Development*, vol. 38, pp. 48-51.
5. Rozum, G. M. (2017), "Public-private partnership as an effective tool for the implementation of innovation policy of the regions", *Investments: practice and experience*, № 20, pp. 90-92. URL : http://www.investplan.com.ua/pdf/20_2017/20.pdf.

6. Azarenkova, G., Alekseev, I., Gurkovsky, M., Orekhova, K., Golovko, O., & Kurylo, O. (2022), "The mechanism of public-private partnership", *Financial and Credit Activity Problems of Theory and Practice*, №5(46), 240-248. DOI : <https://doi.org/10.55643/fcaptp.5.46.2022.3887>.

UDC 339.1:658

DOI: <https://doi.org/10.46783/smart-scm/2023-22-5>

JEL Classification: M29, O31, O32.

Received: 26 November 2023

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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.

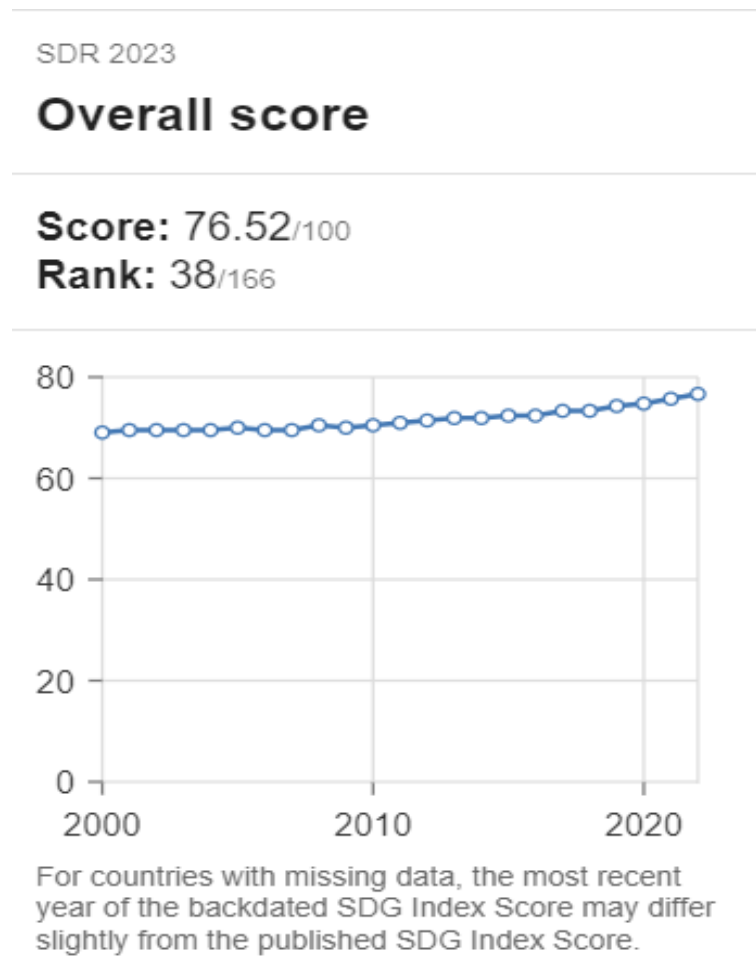


Figure 1 – Overall score of Ukraine for 2023

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://ipi.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.
8. Krykavskyy E.V. (2004). Lohistyka. Osnovyteoriyi [Logistics. Basictheory]. Lviv. «Intelekt-Zakhid» [in Ukrainian].

UDC 338.47

DOI: <https://doi.org/10.46783/smart-scm/2023-22-6>

JEL Classification: M21, M11, L21.

Received: 29 November 2023

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

Fuad Mirzayev Fuad, Kovsar Dadashova, Dmytro Bugayko. *"Development of a system of key performance indicators in the management system of aviation training complex". The relevance of the research topic is due to the fact that Air Training Complexes (ATC) are systems of many interconnected business processes, where the violation of one of the processes can hinder the achievement of the company's goals. Modern approaches to managing the commercial activities of companies define key performance indicators (KPIs) as a system of indicators that assess the degree of achievement of certain business objectives. Our study of the commercial activity of AZAL "Flight Training Centre" shows that the system of key performance indicators is not used to assess the effectiveness of commercial activity, although the sphere of ATC services requires increased attention to the construction of effective management with the possibility of assessing the results. In addition, the authors propose the use of Dupond's analysis as a tool for comprehensive assessment of the efficiency of the commercial activity of the ATC in order to identify the weaknesses of the ATC and timely development of measures to improve and increase the efficiency of its commercial activity. The purpose of this study is to develop a system of KPI indicators for a comprehensive assessment of the effectiveness of the management of the commercial activities of aviation training complexes, taking into account the specifics of the airline and the main areas of activity, using the tools of strategic management and marketing. Research methods - in the process of research the authors used both empirical and theoretical research methods,*

qualitative methods of interpretation and explanation of the characteristics of the studied economic object, methods of system analysis and decomposition. Significance of the study - the theoretical and practical results obtained can be used by ATC management as a tool for assessing and improving the efficiency of business activities. Results of the research - as a result of the research conducted on the basis of the analysis of the commercial activity of AZAL "Flight Training Centre" ATC, a system of key performance indicators of commercial activity in the following main areas has been developed: financial, production, customer relations and development indicators.

Keywords: flight training centre; Key Performance Indicators; Dupond analysis; financial indicators; production indicators; customer relationship indicators; development indicators

Фуад Мірзоев, Кевсар Дадашова Кевсар, Дмитро Бугайко. «Розробка системи ключових показників продуктивності у системі менеджменту авіаційних тренажерних комплексів». Актуальність теми дослідження зумовлена тим, що авіаційні тренажерні комплекси (АТК) є системами з багатьох пов'язаних між собою бізнес-процесів, де порушення одного з процесів може перешкоджати досягненню цілей компанії. Сучасні підходи до управління комерційною діяльністю підприємств визначають ключові показники ефективності або KPI як систему показників, що оцінюють рівень досягнення певних бізнес-цілей. Проведене дослідження комерційної діяльності AZAL «Flight Training Centre» показує, що для оцінки ефективності комерційної діяльності система ключових бізнес-показників не застосовується, хоча сфера послуг АТК вимагає підвищеної уваги до побудови ефективного менеджменту з можливістю оцінки результатів. Також, авторами як інструмент комплексної оцінки ефективності комерційної діяльності АТК запропоновано використання аналізу Дюпонда для виявлення слабких місць АТК та своєчасної розробки заходів щодо покращення та підвищення ефективності його комерційної діяльності. Метою даного дослідження є розробка системи показників KPI для комплексної оцінки ефективності управління комерційної діяльності авіаційних тренажерних комплексів з урахуванням специфіки авіапідприємства та основних напрямів діяльності, використовуючи при цьому інструменти стратегічного менеджменту та маркетингу. Методи дослідження - у процесі проведення дослідження авторами були використані як емпіричні, так і теоретичні методи дослідження, якісні методи для інтерпретації та пояснення властивостей економічного об'єкта, що вивчається, методи системного аналізу та декомпозиції. Значимість дослідження – отримані теоретичні та практичні результати можна використовувати менеджментом АТК як інструмент оцінки та підвищення ефективності комерційної діяльності. Результат дослідження – в результаті проведеного дослідження на основі аналізу комерційної діяльності АТК AZAL «Flight Training Centre» розроблено систему ключових показників ефективності комерційної діяльності за такими основними напрямками: фінансові, виробничі, робота з клієнтом та показники розвитку.

Ключові слова: авіаційний тренажерний комплекс; ключові показники ефективності; аналіз Дюпонда; фінансові показники; виробничі показники; показники роботи із клієнтом; показники розвитку..

The relevance of the research topic is due to the fact that Air Training Complexes (ATC) are systems of many interconnected business processes, where the violation of one of the processes can hinder the achievement of the company's goals. Modern approaches to managing the commercial

activities of companies define key performance indicators (KPIs) as a system of indicators that assess the degree of achievement of certain business objectives.

Our study of the commercial activity of AZAL "Flight Training Centre" shows that the system of key performance indicators is not

used to assess the effectiveness of commercial activity, although the sphere of ATC services requires increased attention to the construction of effective management with the possibility of assessing the results.

In addition, the authors propose the use of Dupond's analysis as a tool for comprehensive assessment of the efficiency of the commercial activity of the ATC in order to identify the weaknesses of the ATC and timely development of measures to improve and increase the efficiency of its commercial activity.

The purpose of this study is to develop a system of KPI indicators for a comprehensive assessment of the effectiveness of the management of the commercial activities of aviation training complexes, taking into account the specifics of the airline and the main areas of activity, using the tools of strategic management and marketing.

Research methods. In the process of research the authors used both empirical and theoretical research methods, qualitative methods of interpretation and explanation of the characteristics of the studied economic object, methods of system analysis and decomposition.

Significance of the study. The theoretical and practical results obtained can be used by ATC management as a tool for assessing and improving the efficiency of business activities.

Presentation of the main results. As a result of the research conducted on the basis of the analysis of the commercial activity of AZAL "Flight Training Centre" ATC, a system of key performance indicators of commercial activity in the following main areas has been developed: financial, production, customer relations and development indicators.

Today, ATC is trying to develop its business in the current market environment and improve its efficiency. Among the main factors that have a significant impact on ATC's commercial activities are:

- changes in the preferences of airline customers, who are becoming increasingly

demanding in terms of the quality of service provided;

- internationalization trends of ATC's partners (e.g. travel agencies);

- digitalization of the industry (digital training and microlearning of aviation specialists).

The conditions created are contributing to the intensification of competition between ATC, which are operating more and more freely on the services market. In this context, it is important for each ATC to continuously monitor its performance in relation to other participants in the market of training services for aviation professionals.

To this end, it is necessary to analyze the indicators of commercial activity in order to understand the trends and possible directions of ATC growth.

ATC's commercial activity is a set of business processes and operations for the production and realization of services on the ATC market, taking into account the interests of each market participant.

The main goal of a commercial organization, regardless of the chosen development strategy and methods of implementing this strategy, is to conduct commercial operations that lead to a positive financial result. Therefore, continuous assessment of the efficiency of commercial activities not only helps the company to achieve its strategic goals, but also enables it to identify ATC's weaknesses and develop timely measures to improve and increase the efficiency of commercial activities. Assessing commercial performance requires a thorough analysis of operations, sales and financial results. This is achieved by tracking relevant key performance indicators.

Key Performance Indicators or KPIs - are business indicators that form the culture of business success and reflect the completeness of achievement of certain goals within a particular job or the indicator of solving a particular task.

KPIs have proven their effectiveness in the management system and have found wide application in most companies of

different industries. Our study of the commercial activity of AZAL "Flight Training Centre" shows that the system of business indicators is not used to assess the effectiveness of commercial activity, although the sphere of ATC services requires increased attention to the construction of effective management with the possibility of assessing the results.

As our research into the aviation training centre market shows, key performance indicators typically include:

1) obtaining an EASA Certificate (for simulator training). EASA sets safety standards and regulations for aviation in Europe and the EASA certificate enables ATCs to provide training that meets these standards. The process of obtaining an EASA certificate can be complex and requires strict adherence to standards and regulations and involves several steps and requirements:

– Registration and Training: The ATC should be registered as a legal entity and have the necessary structure and resources for training in accordance with EASA requirements;

– Compliance with Standards: The ATC should develop and implement training programmes and standards that comply with EASA regulations. This includes the preparation of training materials, instructors and infrastructure;

– Application for certification: The ATC shall submit an application for certification to EASA. The application usually includes

information on the training centre structure, training programmes and other documents;

– Audit and verification: Upon receipt of the application, EASA will audit and verify the ATC to ensure that all requirements are met. This includes checking the infrastructure, the qualifications of the instructors and the quality of the training;

– Certification: If the ATC meets all requirements, EASA will issue a certificate allowing the training centre to provide training in accordance with EASA standards;

– Update and maintenance: The ATC must regularly update its training programmes and continue to comply with EASA standards to maintain its certificate.

2) increase in the number of trainees; increase in the percentage of certified trainees;

3) achievement of a certain volume of services provided (number of programmes and courses);

4) acquisition of a certain level of material and technical support.

Although there is a strong link between commercial activity and end results, positive financial outcomes alone do not confirm the effectiveness of ATC's commercial activity. To conduct a thorough evaluation of ATC's commercial activity effectiveness, we have developed a range of indicators in key areas such as financial, production, client relationships and development (see Fig. 1).

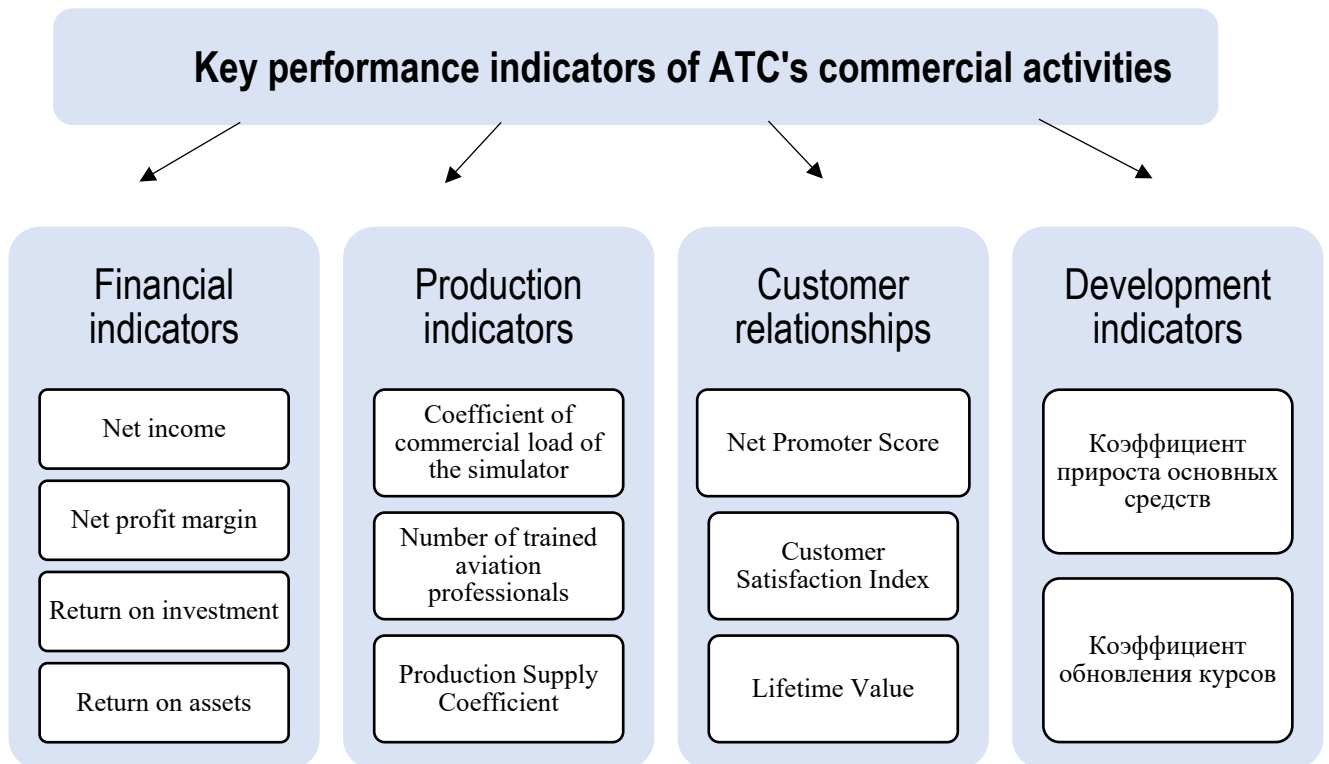


Figure 1 – System of key performance indicators of ATC commercial activity

Source: compiled by the authors

Our proposed system of key performance indicators of ATC commercial activity includes:

1. Financial indicators:

1.1. *Net income* – the final financial result of the enterprise's activity, numerically

$$\text{Net income} = \text{Profit} - \text{Costs} \quad (1)$$

For a thorough analysis of ATC's commercial activity, it is necessary to compare the indicator results for the same period as the previous year (quarter, month). The net profit indicator alone does not provide a comprehensive picture of current conditions or future business prospects. This comparison identifies and analyses deviations. It should be considered in correlation with other financial and production indicators.

reflecting the capital growth for the reporting period and is calculated as the difference of revenue (Formula 1).

1.2. *Net profit margin* – is a measure of a business's net profitability, revealing the efficacy of a company's cost management. Technical terms will be explained when first used. Regular academic sections, consistent citation, and formatting features will be followed. The tone will be passive and grammatically correct with clear, concise, and objective language. It is defined as the ratio of net profit to ATC revenue (Formula 2):

$$\text{NPM} = (\text{Net Profit}/\text{Revenue}) \times 100\% \quad (2)$$

A high net profit margin signifies ATC's resilience to external changes, such as declining service prices or escalating spare part production costs.

1.3. *Return on investment (ROI)* – is a measure of the efficiency or profitability of an investment that determines the amount of

return on a particular investment relative to its cost. It is a tool for assessing the potential investment of funds, for example, this business metric can be used when making a decision to invest in the purchase of a new flight simulator or the construction of a new building of a training complex (Formula 3):

$$\text{ROI} = \frac{\text{investment income} - \text{costs}}{\text{investment costs}} \times 100\% \quad (3)$$

1.4. *Return on assets (ROA)* – is an indicator of the efficiency of use of all ATC assets (flight simulators and their spare parts, which are stored to ensure the continuity of the service provision process; buildings and production facilities, which are used to produce services; rights, licences, certificates and other

intangible assets that ATC can use for its business, i.e. it indicates the extent to which ATC's business processes are fine-tuned. Return on assets is calculated as the ratio of ATC's net profit to total assets and is usually expressed as a percentage (Formula 4):

$$\text{ROA} = \frac{\text{Net profit for the reporting period}}{\text{Amount of assets for the reporting period}} \times 100\% \quad (4)$$

1.5. *Break-even point (BEP)* – is a financial indicator that defines the threshold of profitability of ATC services and shows the level of price, sales volume and cost of service

at which all costs of ATC will be equal to the revenue from sales. This business metric is calculated by formula 5:

$$\text{BEP} = \frac{\text{Fixed costs}}{\text{Unit selling price} - \text{Variable unit costs}} \quad (5)$$

Calculation of the break-even point will help ATC to determine its desired volume of production of services, to decide on the range of services and pricing by type of training and to determine the strategy of investment and innovation projects.

2. Production indicators:

2.1. *Coefficient of commercial load of the simulator:*

2.1.1. *Maximum commercial load factor of the simulator* – determines the maximum possibility of utilization of each flight simulator, taking into account maintenance;

2.1.2. *Coefficient of planned commercial load of the simulator* – determined for each type of aviation simulator, taking into account the maximum load standard, the actual achieved load level for the previous period, as well as industry forecasts;

2.1.3. *Coefficient of actual commercial load of the simulator* – determines the efficiency of actual utilization of each flight simulator;

2.1.4 *Coefficients of threshold commercial load of the simulator* – determines the break-even point of production, and in combination with actual coefficients - characterizes the real situation of ATC.

2.2. Number of trained aviation professionals:

2.2.1 *Number of aviation specialists who have undergone simulator training* – this figure determines the total number of aviation specialists who have received simulator training (by aircraft type) at a specific time.

2.2.2 *The number of aviation specialists who have undergone theoretical training* – this figure determines the total number of aviation specialists who have received theoretical training (by course type) at ATC at a specific time.

2.3. Production supply coefficient:

2.3.1. *The spare parts supply coefficient* – determines the quantity of spare parts necessary to maintain the readiness level of each flight simulator.

2.3.2. *The teaching staff supply coefficient* – including instructors, determines the number of instructors necessary to deliver a specified number of courses by course type.

3. Customer relationship indicators:

3.1 *Net Promoter Score (NPS)* – reflects the willingness of the customer (aviation professionals who have used ATC's services) to recommend the course;

3.2. *Customer Satisfaction Index (CSI)* – usually measured in tandem with NPS and allows tracking the relationship between customer satisfaction and their loyalty to ATC's product (theoretical or simulator training and retraining of aviation specialists);

3.3 *Lifetime Value (LTV)* – determines the length of time a customer is an active user of ATC service. This is the profit that the client brings for the entire time of interaction with the brand (since airlines use ATC services more than once). Analysis of this business metric provides the following benefits: identifying the most loyal customers, optimizing retention efforts, understanding customer behavior when making a purchase.

4. Development indicators:

4.1. *Fixed assets growth coefficient* – characterizes the process of fixed assets renewal, determining both acquisition of new

fixed assets and retirement of existing fixed assets of ATC (the complex building, aircraft simulators, long-term spare parts, etc.) for the reporting period. This business metric is calculated as the ratio of the growth of fixed assets for the reporting period to the value of the organization's fixed assets at the end of the reporting period (Formula 6):

$$GC_{FA} = FA_{RP} / FA_E \quad (6)$$

4.2. *Course renewal coefficient* – characterizes the share of new types of courses or individual courses in the total range of educational services provided in the reporting period. Since the main product of ATC activity is an educational service, the dynamics of updating the range of services, which in turn indicates their compliance with the requirements of industry standards, is one of the key indicators of ATC competitiveness. This business metric is calculated as the ratio of the number of courses (types of courses) developed during the reporting period to the total number of courses (types of courses) at the end of the reporting period (Formula 7):

$$C_{CR} = C_B / C_E \quad (7)$$

Based on the results of assessing the effectiveness of ATC's commercial activities in all the selected areas, it is necessary to work continuously on their improvement and to develop measures to improve ATC's commercial activities that will contribute to maximising their effectiveness. Dupond's analysis can be a useful tool for identifying ATC's strengths and weaknesses and developing strategies to improve ATC's effectiveness.

Conclusions. The Dupond analysis method is a financial tool that breaks down profit performance into several components and assesses which aspects of the business affect overall profitability. It consists of three key components: return on assets (ROA), return on equity (ROE) and price/earnings (P/E) multiple. In order to assess the efficiency

of ATC's commercial operations using Dupond's analysis, it is necessary to:

1. Break down profit into its components: return on assets (ROA), return on equity (ROE), and P/E (price/earnings) multiple (defined as the ratio of market value of stock (or company value) to earnings) and evaluate each of the components for ATC, using financial statements and company data to calculate these measures.

2 Identify the aspects of the business that affect each component. For example, increased profits or efficient use of assets may increase ROA, and increased equity may improve ROE.

3. Develop strategies to improve each component. For example, this may include optimizing ATC's asset management, increasing training efficiency or increasing profit.

4. assess the impact of the current strategy on ATC's overall profitability and consider what changes can be made to improve commercial performance.

Based on the practices of advanced enterprises, the use of a KPI system will enable ATC to manage its operations more effectively, identify areas for improvement and respond quickly to changes in the environment or intra-organizational challenges.

References

1. Aleksey Savkin. 10 Step KPI System. Lulu.com, 18 Apr. 2017.
2. Baroudi, Rachad. KPI Mega Library. Createspace Independent Publishing Platform, 28 Oct. 2016.
3. Brisendine, Greg. Measuring Success: A Practical Guide to KPIS. G. Brisendine, Las Vegas, Nv, 2019.
4. Brooks, Peter H M. Metrics for Service Management: Designing for ITIL. Zaltbommel, NI, Van Haren Publishing, 2012.
5. Lobza, A.V., and K.V. Shcherbina. "DEVELOPMENT of a SYSTEM of STAFF ASSESSMENT: IMPLEMENTING the APPROACH of KPI." Young Scientist, vol. 64, Dec. 2018, <https://doi.org/10.32839/2304-5809/2018-12-64-70>.
6. Marr, Bernard. Key Business Analytics. Pearson UK, 10 Feb. 2016.
7. Posokhov, Igor Mikhailovich, and NTU KPI Chepizhko Kharkiv. "EVOLUTION of THEORETICAL APPROACHES to the COMPETITIVENESS CONCEPTION." Theoretical & Applied Science, vol. 48, no. 04, 30 Apr. 2017, pp. 177–188, <https://doi.org/10.15863/tas.2017.04.48.29>.
8. Smith, Bernie. Getting Started with KPIs. Metric Press, 18 Mar. 2018.
9. Smith, Bernie. KPI Checklists : Develop Meaningful, Trusted, KPIs and Reports Using Step-By-Step Checklists. Sheffield, Metric Press, 2018.
10. Smith, Jeff. The KPI Book. Insight Training & Development, Limited, 2018.
11. Vetluzhski, Yelena. Systema voznagrazhdeniya. Kak razrobotat' celi i KPI. Alpina Publisher, 2014.
12. Zellefrow, Nikki. Key Performance Indicators Book. Independently Published, 6 Mar. 2021.

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INTELLECTUALIZATION OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

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Electronic scientifically and practical journal “Intellectualization of logistics and Supply Chain Management” included in the list of scientific publications of Ukraine in the field of economic sciences (category "B"): **Order of the Ministry of Education and Culture of Ukraine dated October 10, 2022 No. 894 (Appendix 2)**

Field of science: Economic.

Specialties: 051 – Economics; 073 – Management

ISSN 2708-3195

DOI: <https://doi.org/10.46783/smart-scm/2023-22>

The electronic magazine is included in the international scientometric databases:
Index Copernicus, Google Scholar

№ 22 (2023)

December 2023

ISSN 2708-3195

DOI: <https://doi.org/10.46783/smart-scm/2023-21>



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