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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.

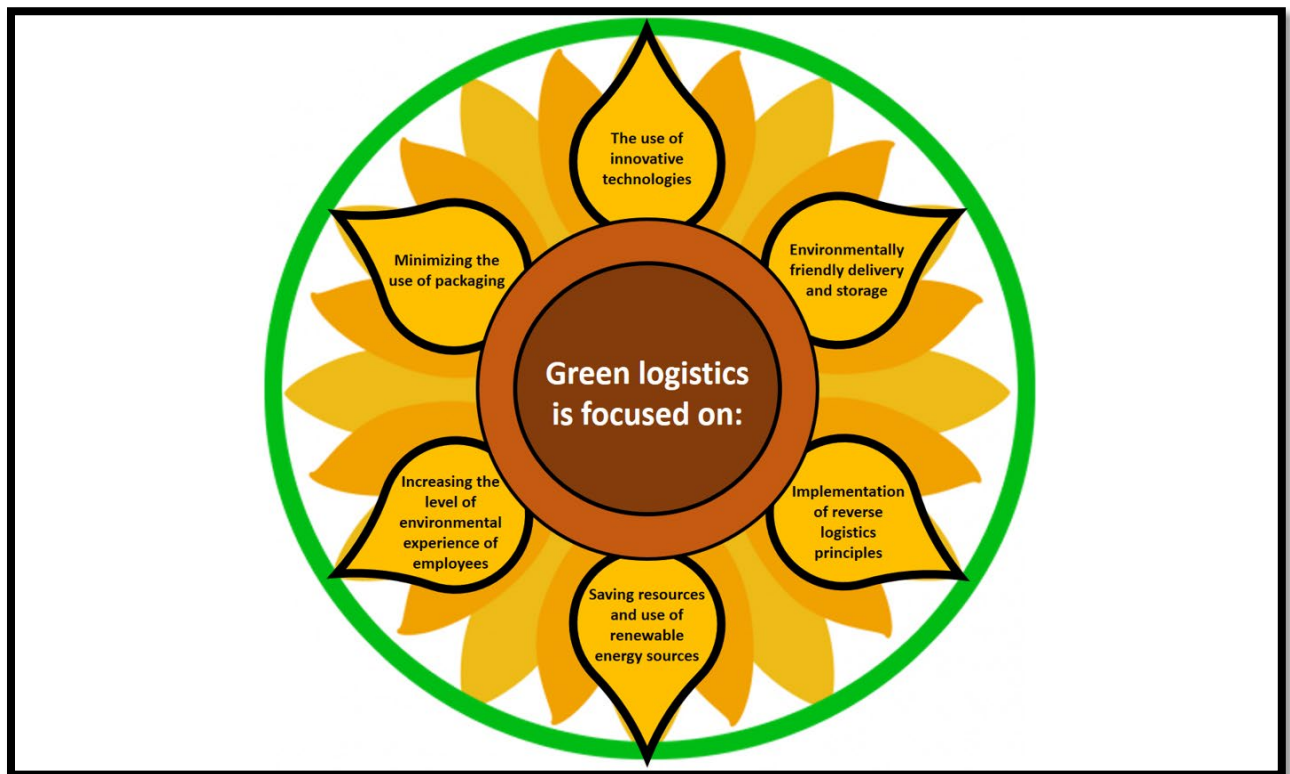


Figure 3 – Focus of logistics companies on important goals of green logistics
Source: Developed by Vladyslav Marchenko

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

No	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

№	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.

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