



Министерство образования Республики Беларусь
Белорусский национальный технический университет
Факультет горного дела и инженерной экологии

ЗНАНИЕ ИНОСТРАННОГО ЯЗЫКА КАК ОСНОВНОЙ ФАКТОР ДЛЯ РАБОТЫ В ИННОВАЦИОННЫХ УСЛОВИЯХ

Сборник материалов
79 – й студенческой научно-технической
конференции
20 апреля 2023 г.

Минск
БНТУ
2023

Составители:

Хоменко С.А., Личевская С.П.

Редакционная коллегия:

Хоменко С.А., Личевская С.П.

В сборник включены материалы докладов 79-й студенческой научно-технической конференции «Знание иностранного языка как основной фактор для работы в инновационных условиях» по кафедре «Английский язык №1» факультета горного дела и инженерной экологии.

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TOP 6 ENERGY OF THE FUTURE

student Yurenia I.I.

scientific supervisor – lecturer Bankovskaya I. N.

Belarusian National University of Technology

Minsk, Belarus

It would seem that a person has learned to extract energy from the wind, pump electricity from sunlight, but we still continue to burn coal and oil on a global scale in the old fashioned way, polluting the atmosphere with their processing products. Is there still no alternative to traditional power plants? There is an alternative, and it will appear very soon.

Solar power plants. Solar systems have one huge and irreparable drawback: they are dependent on the position of the sun in the sky. No sun, no energy, because daylight hours cannot last forever. We have already learned how solar panels can convert sunlight into direct current, then convert it into a variable and feed it into the network. In space, everything is the same, but how to supply electricity to the earth? This is possible with the help of radio waves. It is these microwaves that will be received on the surface of the earth by a special antenna. The difficulty is that the weight of the space structure will be within 1000 tons [2].

Paving slabs. It turns out that energy can be obtained not only from coal or oil, but also with the help of pedestrians. Each person walking on the sidewalk creates pressure on the surface. If you force, bending only five millimeters, the site to convert mechanical energy into electrical energy, you get a mini power plant [1].

Human muscle strength. Electrical energy can be drawn from our daily lives using natural human power. The principle of a bicycle is a prime example of this. Using a footswitch to activate and power, say, a television set would be of benefit to both the viewer and the planet's global electrical system.

Glass facades. In fact, this is the thinnest solar panel in the form of tinting, placed between two glasses. The semi-transparent material, made on the basis of organic photovoltaic technology, has a low efficiency, within 8 percent. But if we take into account that in every major city there are at least two tens of millions of windows in total, this complex will be able to provide up to 10 percent of the energy consumption of a skyscraper.

Nuclear fusion. The energy of nuclear fusion is one of the inexhaustible sources of electricity. But so far, scientists have not been able to create the conditions for launching a stably controlled reaction [3]. This can only be done if a magnetic field with fully controllable characteristics is generated. So far, scientists have been able to create the strongest magnetic field with a force of 1200 Tesla for just 100 microseconds.

Flying wind farms. A conventional ground-based wind generator has a lot of disadvantages, although it is one of the promising sources of renewable energy on the planet. However, it is effective only when the wind speed exceeds 4-6 meters per second. Hence all its shortcomings. Predicting the amount of energy is very difficult. The flying wind generator can solve this problem.

Mankind has clearly outlined the development vector for an alternative way of energy production. Of course, we will succeed, but development takes time and, importantly, huge investments.

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THE SUDDEN BOOM OF CRAZY “GREEN” TECHNOLOGIES

student Yatsuk P.M.

scientific supervisor – lecturer Bankovskaya I. N.

Belarusian National University of Technology

Minsk, Belarus

The country's energy system relies on many sources, so it is stable, but of course this is an ideal situation on the scale of entire countries, but now even the most stubborn politicians are looking in this direction, both in the west and in the east. For example, China is building a new coal-fired thermal power plant with one hand and investing in the development of electric transport and generally green technologies in a race between the USA and Europe, formally from-for worrying about the climate, but when the tiger takes care of the lambs. It is worth thinking about whether there is anything else here besides love tenderness and here the experts will rightly pull me wait, what independence and autonomy with green technologies? And what about lithium for batteries and rare earth metals for all electronics without them?

It will simply be impossible to build any electric car unless every country has these resources so that we can talk about freedom from. Of course, there are no sellers, it is proved that five countries control most of the reserves. Everything that is so necessary to translate our lives into renewable sources of energy and electricity from transport to housing and communal services, it turns out that in the new energy sector we simply change one dependence to another more expensive and complex one. That's the point.

But then it's impossible to understand how interesting everything is changing if you don't look at what is happening with research and development in green technologies, progress in them and the direction of their development [1]. The skeptics are right when they shake their heads with all the victorious relations, we are about to transfer energy to the green rails in 2050. Let's push

with the wind, the sun and other alternatives, we will most likely transfer everyone to electric cars, but only nuclear power can compete directly with gas oil, but you can't put a reactor in every house or car.

Then what is the advantage of green technologies that are now actively developing in their diversity and possibilities for use? On a small scale one of the problems of wind turbines and solar panels is that they cannot constantly generate energy, the weather is bad at night and that's it, then let's convert abandoned coal mines or oil wells into gravity batteries sounds futuristic. But this is the idea of weights from a pendulum clock brought to a new level, you understand the weight is charging, it goes down [2].

Meanwhile, China is laying the next hundreds of billions of dollars and this year for the development of solar wind energy electric cars and batteries. In a word, we are seeing only the beginning of a very large scientific and technological race, which now has the most powerful pragmatic economic and political drivers, they are simply recitation of the salvation of our planet. We are too spoiled by the semiconductor revolution and the information technology boom. But this is an exception if you look back at other industries in solid technologies where everything depends on metallurgy chemical industry resource extraction evolution.

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SPACE EXPLORATION: VOYAGERS

student Bezhelev V.R.

scientific supervisor – lecturer Bankovskaya I. N.

Belarusian National University of Technology

Minsk, Belarus

There is the meaning of «Space robot» in space robotics. Space robots, are robots that are adapted to work in the endless space. The advantage of space robots is that they can work in dangerous environments and run on solar energy. It will also be much easier to overcome the loss of such a robot than the death of an astronaut. Usually, the task of a space robot is to operate some scientific activity, but a simple robot working on the surface of a planet can do the same. In order to meet all these requirements, scientists have been creating more and more advanced devices that save money and energy and have a high toughness. Study has showed that sending a person to Mars will cost about 200-300 billion dollars, despite the fact that it will be an irrevocable departure. A few months will be spent on an adaptation of the members in a new environment. While sending a ship, with a robot, will cost about 5-10 billion dollars [1].

Voyagers. On April 15, 2021, the New Horizons automatic research station became the fifth spacecraft in the history of mankind to overcome the milestone of 50 AU from the Sun. Before it, this conditional border was crossed by the Voyagers, and even earlier by the Pioneer-10 and Pioneer-11 research probes. It is considered, none of these space wanderers will ever return to Earth. Some of them are still continuing their mission, while others remain in silent.

The launch of the Voyager 1 mission on September 5, 1977. Its main purpose was to explore Jupiter and Saturn. It is now at a distance of 154 AU from Earth, moving away at a speed of about 17 km/s or 3.6 A.U./year.

The contribution of Voyager 1 to the study of the solar system can hardly be overestimated. Thanks to him, several satellites of Jupiter were discovered, as

well as an unknown early system of rings. Voyager's cameras recorded eruptions of Io's volcanoes and convincingly showed that Jupiter's great red spot is a giant storm. The device sent to Earth hundreds of images of the largest planet of the solar system and its satellites, and after the station crossed the orbit of Neptune, its instruments transmitted to Earth a lot of valuable data on interstellar plasma. It is impossible not to mention another mission apparatus that left Earth on August 20 of the same year, speaking about Voyager 1. The targets of Voyager 2 were Saturn, Uranus and Neptune. However, it also moved closer to Jupiter to gain additional acceleration. The pictures taken by this spacecraft suggested the presence of a subsurface ocean in Ganymede and Europa. Having reached Saturn, «Voyager 2» got the data of the temperature of the gas giant and its magnetic field, as well as, discovered several previously unknown satellites of the planet and, of course, many photos were taken of the surface of both Saturn itself and its rings [2].

We have come into the age of space exploration and interplanetary research probes are only the first steps of mankind to study the infinite universe. They may be destroyed as a result of a collision with some cosmic body. One day our distant descendants may return the technology of interstellar flights to the earth and turn them into museum exhibits. But, most likely, fragile mechanisms will spend many years in endless flight through lifeless space. And finally, radioactive radiation and rare particles of cosmic dust will turn them into that will vanish in the universe in millions of years later.

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THREADED FASTENINGS FROM ANCIENT TIMES TO NOWADAYS

students Aleynikov M.V. Vislavskiy I.O.

scientific supervisor – senior lecturer Beznis Y.V.

Belarusian National University of Technology

Minsk, Belarus

The most common way of joining elements of various structures is a threaded fastening which is a unit coupling in the form of a thread. It is widely used in construction, pipeline installation, mechanical engineering and many other industries. The popularity of this method is due to the following advantages: high reliability and long service life; creation of detachable connections, ease of installation and dismantling using publicly available tools; tightening force control during assembly; small weight and dimensions of fasteners; wide availability, large selection of fastener sizes [1].

Threaded assemblies of any kind perform several basic functions. The main purpose is to ensure a tight fastening of the joined parts with the achievement of the required value. In addition, the parts are fixed in a predetermined position, and the possibility of their displacement during the operation of the structure or mechanism is prevented. Another common purpose of threaded connections is to provide a given distance between parts.

Threaded fastenings are classified into bolted, screw and stud. Bolted connections differ from others in that they use bolts as a fastener. A bolt is a fastener in the form of a rod with an external thread at one end, with a head at the other, forming a connection with a nut or a threaded hole in one of the connected products. Screw connections use screws as a fastener. A screw is a fastener for connecting or fixing parts. It is made in the variant of the rod, together with an external thread in one end, and also a system component that transmits a rotating period, in another; This useful component has every chance to be: a head with a slot, a head with knurling (in the frontal border) or, in the

presence of a lack of a head, a notch at the end of the rod. The screw stands out from the screw along with the fact that it does not contain a cone at all in the end and the presence of screwing does not form threads in the used material [2].

Screws also have every chance of being a fulcrum for the purpose of rotating elements, serve as a guide for rectilinear or rotary motion, and can also be used for other purposes. The screw mechanism was already known in ancient. In the 1st century BC wooden screw gears were widely used in the Mediterranean countries in the mechanisms of oil and wine presses. Handicraft screwdrivers originated in the end of the 16th century. At first, screws were available as one of various types of fasteners in the construction, and in addition were used in carpentry and blacksmithing. The extensive use of iron screws started with the appearance of motor vehicles in 1760-1770.

A stud is a construction fastener, which is a rod with an external thread. It is used in conjunction with a nut or other part having a metric thread. The design and dimensions of the studs are standardized (GOST 22032-76-22043-76 series, DIN 525, DIN 835, DIN 939, DIN 940, DIN 975, DIN 976). The stud is designed to connect parts with smooth or threaded holes. It is manufactured with a nominal thread diameter from 2 to 52 mm with a different combination of large and small pitches.

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EXOSKELETONS: THE HISTORY OF CREATION AND THEIR USE TODAY

students Bobrovich A.O., Charniak V.I.
scientific supervisor – senior lecturer Beznis Y.V.
Belarusian National University of Technology
Minsk, Belarus

Human capabilities are quite limited, and as a result, people's main goal was to come up with devices that would increase strength, speed, and the ability to survive on Earth. With the development of technology new ways of expanding the capabilities of one's body were invented, one of which was the idea of an exoskeleton – an external frame that is a supporting structure, and at the same time, performs the function of increasing the capabilities. An exoskeleton is a robotics product designed to expand the physical capabilities of the human body, reduce the load on the user's musculoskeletal system and replenish the lost functions of the limbs.

Exoskeletons are divided into active and passive. Active exoskeletons are devices usually with electric servos (it is also possible to use pneumatics and hydraulics) that enhance the physical abilities of users, their speed, endurance, strength. They help people lift heavy loads, increase the speed of movement and reaction, allow to move around any terrain. Thanks to various installed sensors, data on the changes in environmental conditions are collected.

Passive exoskeletons are devices that do not require any energy source to function. The principle of their operation relies on the basic laws of mechanics: through the use of counterweights and levers, the passive exoskeleton redistributes the load on body parts. The action of a passive exoskeleton reduces the load on active muscles, on average, about 30%.

Today, exoskeletons are used in a wide variety of fields. The largest number of products are produced for emergency services, medical, industrial areas. In industrial enterprises, passive exoskeletons are usually used. They protect the musculoskeletal system of workers from damage and users can easily perform operations that require a lot of effort without getting tired.

Some active industrial exoskeletons work on the principle of a «third hand». A device is attached to the hip joint, in which a tool is placed. Active exoskeletons also help workers in moving cargo, assembling metal structures and other operations that involve working with heavy products.

Medical exoskeletons are used to facilitate and accelerate the rehabilitation of patients after injuries and illnesses, complex operations, etc. They allow the user to move and hold an upright position, thereby improving blood circulation, restoring metabolism and accelerating recovery. Thanks to exercises with an exoskeleton, pain sensations are reduced, complications are prevented. These devices are equipped with power sources, can be controlled using a smartphone. Patients use the exoskeleton several hours a day. The direction of development of exoskeletons in the medical field is also promising: passive-active exoskeletons, mobile exoskeletons of the lower extremities and pelvis, exoskeletons with adaptive combined control principle will find more and more widespread use. As a more distant prospect for the development of this direction, the use of a combined exoskeleton with a protective spacesuit to work in charged areas or, for example, in space both to relieve the load from a person and to increase it on the muscles of an astronaut in various situations of space flight can be noted.

HOW TO SIMPLIFY CONSTRUCTION USING MECHATRONIC SYSTEMS

students Hlushakou P.M., Profit A. D.
scientific supervisor – senior lecturer Beznis Y.V.
Belarusian National University of Technology
Minsk, Belarus

Mechatronics is a fast evolving technology branch dealing with the design, production and operation of mechanisms and systems with advanced computer control, which is based on knowledge in the field of mechanics, electronics, as well as microprocessor technology and computer science [1].

Mechatronic objects have a synergetic form of integration of their constituent elements. Construction is a rather extensive and old topic, a lot has been invented in it for simplification and convenience, but much more will be invented, because science does not stand still and is always developing. To ensure the safety and stability of construction sites, devices have been used since ancient times to adjust the horizontal and vertical structures. Various mechanical devices were used to align objects, such as thread plumb lines, water and bubble levels. But the progress has leading to their replacement by digital technologies and laser devices.

Laser level or level is a device that performs the construction of light lines on vertical or horizontal planes of the room. The purpose of the device is to accelerate and ensure high accuracy of marking walls, floors or ceilings of residential or public premises. Using a laser level to repair an apartment, you can significantly save time and labor resources, since the device is ready to work immediately after switching on, and one person can make a marking [2].

Laser levels can be used not only by professionals, but also for household needs. Thanks to intuitive controls and detailed instructions, a person who does not have any skills in working with laser devices will understand how to apply

it. Everyone can glue wallpaper, put tiles or hang a picture, spending only a few seconds to turn on the device and point the beam at the surface. Laser levels can be grouped into pinpoints (used in everyday life for a smooth marking), linear levels (working only in the direction of an object) and rotary ones (cover 360 degrees of action).

Practically everyone has once had to drill a hole in the wall to hang a picture or a shelf, with just one thought in their minds concerning the presence of electrical wiring or accessories in the wall. Nowadays such worries can be eliminated with a help of special devices, e.g. hidden wiring detectors, that will indicate the presence of electrical wiring in the right place. Operating electric wires generate an electromagnetic field around them, that can be easily detected by such mechanisms. Then a special amplifier in the cable detector amplifies the signal and shows the conductor location [2].

In many areas of technology, mechatronic systems are replacing traditional mechanical machines that no longer meet modern quality requirements. The mechatronic approach to the design of new generation of machines relies on transferring the multifunctional load from mechanical components to intelligent, electronic, computer, and information components that can be easily reprogrammed to solve new problems. All these innovations affect all the branches of engineering including repairing and construction.

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IMPROVEMENT OF A COMPONENT MANUFACTURING PROCESS

students Maisiuk V.M., Lubinski N.O.

scientific supervisor – senior lecturer Beznis Y.V.

Belarusian National University of Technology

Minsk, Belarus

The manufacturing process involves several steps which are necessary to ensure the production of high-quality parts. The process usually starts from the design phase where the part to be manufactured is planned and the information regarding the structure and the functionality of the component is analyzed, followed by the production phase where the material is cut and machined to produce the final product.

Despite the importance of the manufacturing process, many manufacturers still face challenges such as poor quality output, long production time and high production costs.

One of the main limitations of the current manufacturing process is the number of steps involved. Each step increases the time and cost of production and also increases the likelihood of defects. Therefore, the first step in improving the process is to reduce the number of steps involved. To achieve this, the entire manufacturing process will be redesigned to combine some of the steps into a single operation.

Another limitation of the current process is the accuracy of the finished part. The part requires high precision to meet the required specifications. However, the current process can result in variations in the final product due to the use of multiple machines and operators.

To address this issue, a new process will be implemented that uses a single machine to perform all the required operations, thereby eliminating variations caused by multiple machines. Furthermore, the current process

generates a significant amount of waste, particularly in the form of scrap material. This waste can be reduced by implementing a new cutting tool that generates less waste and is more efficient. This will not only reduce waste but also decrease production time and cost.

The proposed new manufacturing process involves reducing the number of steps, improving accuracy, reducing waste, and implementing real-time quality control. The new process involves the following steps:

Step 1: Turning and milling operations will be combined into a single operation, reducing the number of steps involved.

Step 2: A new machine that combines turning, milling, drilling, and grinding operations will be used to perform all the required operations, eliminating variations caused by multiple machines and operators.

Step 3: A new cutting tool that generates less waste and is more efficient will be used to reduce waste and decrease production time and cost.

Step 4: Real-time quality checks will be incorporated during each operation to detect defects early and prevent rework and waste [1].

In conclusion, the improvement of the manufacturing process of the component under consideration is critical to optimizing production efficiency, reducing waste, and increasing overall product quality. The proposed new process addresses the limitations of the current process and incorporates real-time quality control by early detecting of the defects and preventing rework and waste of human costs, raw materials and manufacturing expenses.

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INTRODUCTION OF DIGITAL DOUBLES AS A KEY FACTOR DIGITALIZATION

student Mikhniuk A.Y.

scientific supervisor – senior lecturer Beznis Y.V.

Belarusian National University of Technology

Minsk, Belarus

In modern conditions, the economy is being transformed into an information economy, which consists in doing business with the mandatory use of the Internet technologies, computer networks, digital communications and modern communications, without which the enterprise does not have enough competitive advantages, in other words, digitalization. If we consider the digital economy as a whole, such a key tool of digitalization as the concept of digital twins should be mentioned. This concept was first mentioned in 2003 by Michael Greaves, a professor at the Florida University of Technology [1].

Digital twin (DT) is a virtual interactive representation of a real material object or process that is not a copy of it, or involves taking into account the connections between elements of human facts, the learning ability of the system itself, and all this together guarantees the formation of a digital life cycle of a product or service.

Digital twins are gaining popularity on the world stage, as they have a number of advantages that increase production efficiency by solving tasks such as: testing a process or production system quickly enough and with minimal costs, identifying bottlenecks and problems before starting production or operating an object, reducing financial risks, as well as risks associated with the safety of the personnel at work. There are fewer disadvantages of using a DT, but they are no less significant: the high cost of technology, little research into the processes, unpredictability in the behavior of artificial intelligence and low people's awareness of digital twin application and operation.

At the present stage, digital doubles are used in various industries. In the field of mining and processing of minerals. Siemens Corporation uses DT to develop engines, communication systems and even high-speed trains. In the energy sector, this technology is used in order to optimize the operation of power plants and avoid failures in the supply of electricity. The scope of application is wide including construction, design, retail, logistics, education, medicine [1].

According to the forecast of the largest research company Markets and Markets the global digital twins market will grow to \$48.2 billion by 2026. Domestic companies are also introducing digital doubles. At the moment, the use of digital doubles is just beginning to gain popularity in the Republic of Belarus. Since 2020, digital twins of oil fields have been actively introduced at Belarusneft software. Recently, Belarusian companies have been actively offering services to create a digital double.

Digital twin technology is one of the main strategic technological trends at the present time, which will continue to develop in the future. This technology is designed to change production methods, optimize processes, stimulate productivity growth and other performance indicators, as well as create new types of products.

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BENCHMARKING: DEFINITION, TYPES, AND PROCESSES

student Siyanovich I.V.

scientific supervisor – senior lecturer Beznis Y.V.

Belarusian National University of Technology

Minsk, Belarus

Benchmarking is the process of comparing the performance, quality, or other characteristics of one company, product, service, or process with those of other more successful companies, products, services, or processes in the same industry [1]. Benchmarking can be used in various areas of business, including manufacturing, sales, marketing, information technology, etc. It helps companies identify their strengths and weaknesses and develop strategies to improve quality, reduce costs, increase efficiency, and competitiveness.

There are different types of benchmarking, including internal, external, functional, and strategic benchmarking. Internal benchmarking involves comparing the performance of one department or process with the performance of another department or process within the same company. This can be useful for identifying best practices within the company and spreading them to other departments or processes. External benchmarking is the comparison of a company's performance, quality, or other characteristics with competing companies or products on the market. Functional benchmarking involves comparing the performance of one function within a company with the performance of a similar function in another company. Strategic benchmarking involves comparing a company's strategic plans with the plans of other companies in the industry.

The benchmarking process involves the following steps: 1) to define the objectives and comparison parameters; 2) to select benchmarking companies; 3) to collect information on the performance, quality, or other characteristics of

benchmarking companies; 4) to analyze the data and identify differences in performance, quality, or other characteristics; 5) to develop and implement an improvement plan based on benchmarking results; 6) to evaluate the results and repeat the process for continuous improvement. It is important to note that benchmarking is not a means of copying practices from other companies, but rather a process of adapting best practices for one's own company. This means that companies should analyze benchmarking results to understand which practices can be adapted to their own needs and how they can be implemented in practice.

One of the main advantages of benchmarking is the ability to learn from more successful companies by studying their strategies, practices, and methods, which can lead to improved performance and product quality. However, benchmarking can also be a costly process that requires a lot of time and resources, so companies should evaluate the costs and potential returns from this process before embarking on it. Some well-known companies use benchmarking for continuous improvement of their performance and competitiveness. For example, Toyota uses benchmarking to compare its car manufacturing processes with those of other automakers for the purpose of continuously improving the quality and performance of its cars. Overall, benchmarking is an effective tool for companies that are looking to improve their performance and competitiveness in the market.

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SHARING ECONOMY

students Tsvirko A. A., Ryazantev E. I.

scientific supervisor – senior lecturer Beznis Y. V.

Belarusian National University of Technology

Minsk, Belarus

The sharing economy is a system of exchange where individuals and organizations share access to goods, services, and resources on the principles of collaboration, community, and sustainability. The sharing economy has been enabled by technology, particularly through online platforms that connect individuals and organizations with others who are willing to share their resources. Examples of the sharing economy include car-sharing services like *Zipcar* and *Uber*, home-sharing platforms like *Airbnb* and *VRBO*, peer-to-peer lending platforms like *Lending Club* and *Prosper*, and crowdfunding platforms like *Kickstarter* and *GoFundMe*, which allow individuals to share their resources and access resources from others, creating a more efficient and sustainable system of exchange [1]. One of the main benefits of the sharing economy is that it can help to reduce waste and overconsumption. By sharing resources, individuals can make better use of existing resources, reducing the need to produce new ones. This can help to reduce the environmental impact of consumption and promote sustainability. The sharing economy has also created new opportunities for individuals to earn income by sharing their resources. This can be particularly beneficial for those who have spare capacity in their homes, cars, or other resources, allowing them to earn extra income by sharing these resources with others. The sharing economy has got a number of advantages:

Cost savings: Sharing economy platforms often offer services at a lower cost than traditional providers, which can be a significant benefit for consumers.

Convenience: Sharing economy platforms make it easy for consumers to access a wide range of goods and services with just a few clicks, without the need for long-term commitments or contracts.

Increased sustainability: Sharing economy models can help to reduce waste and overconsumption by encouraging the efficient use of existing resources.

Job creation: Sharing economy platforms have created new opportunities for individuals to earn income by sharing their resources, which can be particularly beneficial for those who may have difficulty finding traditional employment [1]. However, the sharing economy also raises concerns about issues such as: a) safety concerns by putting consumers at risk; b) limited protection in comparison with the level of protection by traditional providers, which can leave consumers vulnerable in the event of a dispute or accident; c) regulatory challenges as the sharing economy is often subject to less regulation than traditional providers, which can lead to uncertainty and challenges for both providers and consumers; d) negative impact on traditional providers [1]. Overall, the sharing economy has the potential to offer many advantageous and highly demanded benefits. On the other hand, as the sharing economy continues to grow and evolve, it also raises important questions and concerns that must be addressed in order to ensure that this model of exchange is safe, fair, and sustainable for all participants.

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**ENTEPRENEURAL EDUCATION, PROCESS AND PRINCIPLES IN
MODERNITY**

student Charnukha A.V.

scientific supervisor – senior lecturer Beznis Y.V.

Belarusian National University of Technology
Minsk, Belarus

In this fast-paced, seriously dangerous, and more international world, the nature of business has changed. Organizations have been compelled to reevaluate their fundamental purposes and adapt significantly in how they approach servicing a variety of stakeholders as a result of dramatic and continuous changes. The market economies are dynamic, organic, and always developing, as opposed to being an established system that has already arrived. Entrepreneurial businesses provide two essential services to market economies.

Firstly, they play a crucial role in the transformation process that characterizes market economies. Entrepreneurial businesses are essential to the breakthroughs that bring about technical advancement and increased production. Because they alter market structure, they are, in essence, about change and competition. Secondly, the major way that millions of people reach the mainstream of the economy is through entrepreneurial enterprises. Millions of individuals, have access to the pursuit of economic success because to entrepreneurial businesses [1].

Entrepreneurship's practical application is the main component of creating entrepreneurial consciousness. This has been demonstrated by tens of thousands of prosperous businesspeople over the past 35 years. Our world has been altered forever by them and their new endeavors! But, it's critical to recognize the distinctions between opportunistic moneymaking and true entrepreneurship. For instance, during the «dot-com» boom of the late 1990s, everyone mistakenly believed they were business owners just because they

posted the name of their company online. The cash-burning internet start-ups and the venture capitalists who financed them were not the only victims of the dot-com crisis. The actual entrepreneurial spirit of turning one's dream into an enduring thing was destroyed by the epidemics rapid spread.

Teaching today's students the basis of the actual entrepreneur ought to be the goal of all entrepreneurship instructors. In order to demonstrate the actual challenges and issues linked with their endeavors, it is recommended to make sure that current practicing entrepreneurs and their engaging tales are portrayed. Students need to be exposed to business owners who have had setbacks, difficulties, and failures. The advice from seasoned business owners should make a difference. The properly understanding of the true application of entrepreneurial ideas and processes can be reached only by reading, studying and analyzing the practices of present-day business owners.

If a person can find a viable concept within the turmoil and cynicism that also pervade such an atmosphere, the persistently hard economic situation might offer a steady supply of prospective chances. As each person forms thoughts with a distinct frame of reference, there are thousands of choices offered. Entrepreneurial thinking has thus emerged as an essential competency for the twenty-first century [2].

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NEURAL IMAGE RECOGNITION

student Khilchuk N. A.

student Yarushin V. R.

scientific supervisor – senior lecturer Vanik I. Y.

Belarusian National University of Technology

Minsk, Belarus

Image recognition is a crucial task in computer vision, with applications in fields such as autonomous driving, medical imaging, and facial recognition. The goal of image recognition is to accurately identify and classify objects or features within an image. Neural image recognition focused on convolutional neural networks (CNNs) is discussed in this paper.

CNNs are a type of neural network that is particularly well-suited for image recognition tasks. CNNs consist of several layers, including convolutional layers, pooling layers, and fully connected layers. Convolutional layers use filters to extract features from images, while pooling layers downsample the features to reduce computational complexity. Fully connected layers then use these features to classify the image [1].

The subsequent procedures of image recognition include the following. The first one is preprocessing techniques which are used to improve image quality and reduce noise, which can help improve the accuracy of image recognition models. These techniques include filtering, normalization, and edge detection. The next procedure is transfer-learning which is the process of using pre-trained CNN models to improve accuracy and reduce training time. This is particularly useful for small datasets, where training a CNN from scratch may not be feasible. Then hyperparameters such as learning rate, batch size, and dropout rate can significantly impact the performance of CNNs. Hyperparameter

optimization techniques such as grid search and random search can help identify the optimal hyperparameters for a given image recognition task [1].

It is imperative to assign an input image to one of several possible classes or categories, this is the reason why programmers use multiclass classification. *Multiclass classification* is the process of classifying images into multiple classes. There are different approaches to multiclass classification, including one-vs-all, one-vs-one, and softmax regression [2]. Neural image recognition has numerous real-world applications, including object detection, federated learning, facial recognition, medical imaging and so on. For instance, *object detection* is a critical component of autonomous Tesla's driving systems. Autonomous vehicles use object detection to identify pedestrians, other vehicles, traffic signs, and road markings to make decisions about driving safely and efficiently. *Facial recognition technology* is widely used in security systems to identify and track individuals. It is used in access control systems, border control, and law enforcement. In conclusion, neural image recognition is a crucial task in computer vision with numerous real-world applications. CNNs have made significant progress in image recognition thanks to advances in deep learning techniques and large-scale image datasets.

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ChatGPT – THE QUINTESSENCE OF NEURAL NETWORKS

student Andronchik D.S.

student Denisyuk N.S.

scientific supervisor – senior lecturer Vanik I.Y.

Belarusian National University of Technology

Minsk, Belarus

Neural networks are one of the most important and relevant topics in computer science today. With the help of AI, humanity is one step away from the next technological revolution. Already today, AI is beginning to actively take root into everyday life and help people around the world: prototypes of unmanned taxis are driving around the cities; many homes use devices such as smart speakers, search engines have built-in voice assistants or assistants.

However, the most popular and relevant AI-based innovation today is ChatGPT. ChatGPT is a large language model developed by OpenAI, one of the world's leading artificial intelligence research institutes. It is designed to mimic human language and communication patterns, allowing it to engage in natural language conversations with users. ChatGPT has made a significant impact in the field of natural language processing, enabling computers to understand and interpret human language with greater accuracy and efficiency [1].

The development of ChatGPT involved training it on a massive amount of data, specifically on a dataset called "Common Crawl" which is a large dataset of web pages that have been crawled and indexed by web search engines. The model was trained using deep learning techniques, specifically the transformer architecture, which has been shown to be highly effective in natural language processing tasks. ChatGPT is a generative language model, meaning that it is able to generate text based on the input it receives. It can answer questions, provide recommendations, engage in small talk, and even write stories and

poems. The model's responses are generated based on the patterns it has learned from the massive amount of training data it has been exposed to.

One of the most impressive features of ChatGPT is its ability to adapt to different domains and contexts. The model is able to understand the context of a conversation and tailor its responses accordingly. For example, if a user is asking about a particular topic, ChatGPT can provide relevant information and insights. Similarly, if a user is expressing emotions or feelings, the model can respond with empathy and understanding [1].

However, like any technology, ChatGPT has its limitations. One of the biggest challenges in natural language processing is dealing with ambiguity and understanding the nuances of human language. ChatGPT can sometimes generate responses that are irrelevant or nonsensical, and it can also exhibit biases that reflect the biases present in the training data.

In conclusion, ChatGPT is a remarkable achievement in the field of natural language processing, representing a significant step forward in enabling computers to understand and communicate with humans in a natural and intuitive way. While it has its limitations, ChatGPT has the potential to revolutionize the way we interact with each other and with the technology, paving the way for a more seamless and efficient future.

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FIRST VIDEO GAMES

student Korotchenia A.D.

scientific supervisor – senior lecturer Vanik I.Y.

Belarusian National University of Technology

Minsk, Belarus

Game development includes many different areas of programming like code writing, sound design, sprites artist, game design, game engine and much more. Nowadays we have a large variety of tools for making games such as game engines like Game maker, Unity, Unreal engine and others. They have large libraries of pre-made functions that allow you to code fast and simply and even an individual after some trainings and study can make his own game. But what about the past of game development? About 40 years ago we didn't have such handy tools and the internet was not so accessible, so let's discuss this.

It is likely to say that OX0 is one of the first digital graphical games that was running on a computer. It was developed by Alexander S. Douglas in 1952 at the University of Cambridge [1]. It was simple to operate, because it simulated a game of noughts and crosses. The game was launched on EDSAC computer and rounds alternated between a human player and his computer opponent. The results were displayed on the specific device called cathode ray tube. The program was simple, but it performed its tasks perfectly and met all the requirements of the original game.

Three-dimensional displays became available on computers in early 1960s, but only massive and powerful machines could deal with those screens. However, the things changed after 1980s [2].

Battlezone, a first-person tank game, was made possible by a vector display unit [2]. Even with more modern technologies, the game was not that

simple inside and required three microprocessors to run: one to operate the game play in the whole, the second custom processor for the display and graphics and the third one for the mathematics.

Like in any vector game, all objects in Battlezone is a simple structure of nodes and lines connecting them, there is no entire filled figures but, anyway, it looks very interesting even nowadays. This kind of graphics is called a raster image. Even so, this simple graphics allows to control the occupancy of objects and, in result, the processors load has been reduced. But there are still some bugs, for example, the game has problems with hidden lines: if any object is getting closer to the player camera, some nodes can move out of the screen and this object totally disappears even if some nodes still in vision of a player and must be connected by lines.

As you might have noticed, game development in the early days was not so simple, the games could only be very simple in technical terms due to the resource constraints, they also required a large amount of knowledge including programming and understanding of complex electronic devices. And if you were involved in a conceptually complex project, then you had to deal with a lot of errors and bugs. Nowadays, there has been a strong technological jump and no one even thinks about these problems, but do not forget about the hard work of many people to achieve this.

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BASIC CONCEPTS OF WEB 3.0

student Rezko T.G.

scientific supervisor – senior lecturer Vanik I.Y.

Belarusian National University of Technology

Minsk, Belarus

The Internet and its global network are among such contemporary phenomena that change the world in a million possible ways. They provide endless opportunities for the development and introduction of a new reality for our society. The Web 3.0 concept is a great example that is worth talking about in more detail [1]. Web 3.0 is using decentralized online ecosystem, so its main aim is to help people in development and maintenance the web products and services they use. But Web 2.0 deals with amusing and dynamic web pages. In result, a lot of information could be deleted or changed. The main fact is that user's personal data is protected to avoid cybercrimes. And no one has access to your posts, videos, personal information and etc.

In Web 2.0 users have freedom to create dynamic apps, while current Web 3.0 has the blockchain technology. It is an encryption technology and registry, which are distributed across a variety of computers connected to a common network. This technology makes attacks more expensive and unreliable [1]. The addition of blockchain to the Web 3.0 allows apps to be dapps (decentralized apps). It means that apps which use this technology can't be deleted or blocked. There are a lot of blockchain platforms: Ethereum, BigChainDBand, etc. Ethereum has the open-source code which gives the opportunity to create dapps. It also allows creating and maintaining existing cryptocurrency. NFTs or non-fungible token support is the monetary aspect of Web 3.0. It has its own economic system without linking with central banks.

The demand for digital goods appeared long before people create NFTs. Many gamers have bought skins in CS:GO, Dota 2 and other games. Moreover, the cost of such skins was often expressed in completely non-symbolic figures. At that time, they bought programming code of skins, but now they understand that it is similar on NFT. All goods are unique, so that they cannot be replaced. And the most important thing is that a “digital token” is created by people who become owners and can dispose of their currency themselves. There is another way how to earn on NFTs. You need to buy or create new NFTs, just buy at a low price and resell higher.

Previously, Web 3.0 has been described as a decentralized system, because being self-governing entities that don't depend on central authorities [1]. So, users can exchange information without being under the oversight of intermediaries and can share *resources or functionality to other computer programs* and vice versa. And every peer or node has an identical copy of the ledger database. This makes Web 3.0 more transparent.

In conclusion, Web 3.0 is a decentralized online ecosystem, which relies on security, convenience, adaptability. This technology is just beginning to appear in everyday life, but one can find cases where it is used very well. People don't really want to switch because they're used to Web 2.0. Nevertheless, Web 3.0 gives more opportunities like working at home without leaving your house, creating NFT-pictures and dapps and selling them for digital currency.

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BLOCKCHAIN SECURITY SYSTEM

student Kvachenyuk G. V.

scientific supervisor – senior lecturer Vanik I. Y.

Belarusian National University of Technology

Minsk, Belarus

Blockchain technology enables the creation of distributed databases that are capable of storing various types of information, such as financial transactions, contracts, and records of intellectual property ownership. It consists of a collection of technologies that work together to ensure that data stored on the blockchain is secure and tamper-proof.

With blockchain, there is no need for a central authority or intermediary to manage transactions, and multiple parties can have access to the same information. This technology can be applied to a variety of use cases, including supply chain management, digital identity verification, and voting systems, offering increased transparency, security, and efficiency compared to traditional centralized systems.

A primary aspect of blockchain technology is its ability to generate secure and unchangeable records in a decentralized setting. This is achieved by storing data across various devices, and any updates to the databases are automatically propagated to all devices, decreasing the risk of data loss or manipulation.

The development of cryptocurrencies is among the primary uses of blockchain technology. Bitcoin, for instance, leverages blockchain to store transaction details for the digital currency. All members of the network possess a copy of this database and can verify its accuracy [1].

The automation of processes, such as financial transactions, is another potential application of blockchain technology. This can lead to faster transaction times and lower commission costs.

It can also be used to improve voting systems, create smart contracts, and combat corruption by providing a genuine and secure record of transactions and deals.

Nonetheless, blockchain technology is not free of disadvantages. For instance, it requires significant energy consumption to uphold the network. Additionally, some blockchain-based cryptocurrencies can be exploited for illegal activities, such as money laundering or terrorist financing.

Another noteworthy application of blockchain technology is the development of smart contracts that can be implemented across various industries. These contracts enable the automation of contract-related processes and ensure the enforcement of their terms and conditions [2].

To summarize, blockchain technology marks a significant advancement in digital innovation with diverse applications in numerous industries. Nevertheless, it is essential to acknowledge that blockchain technology is not flawless.

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AI SYSTEM FOR CREATING REALISTIC IMAGES

student Melnichuk A.V.

student Oboznaya A.A.

scientific supervisor – senior lecturer Vanik I.Y.

Belarusian National University of Technology

Minsk, Belarus

Currently, in our modern world, neural networks are beginning to gain momentum. They are used where we don't even expect: in speech recognition and synthesis, navigation systems, and even in industrial robots.

Neural networks, also known as artificial neural networks (ANNs) or simulated neural networks (SNNs), are a subset of machine learning and are at the heart of deep learning algorithms. Their name and structure are inspired by the human brain, mimicking the way that biological neurons signal to one another [1].

The aim of this paper is to discuss the DALL-E 2 neural network. DALL-E 2 is an AI system that can create realistic images and art from a description in natural language. At the beginning of 2021, OpenAI company released an AI system called DALL-E that could generate realistic images from the description of the scene or object. The generator's name was a frankenword coined after combining the artist Salvador Dali and the robot WALL-E from the Pixar movie of the same name. Within days, it had taken the world of computer vision and artificial intelligence by storm [2].

How does DALL-E 2 work? DALL-E 2's goal is to train two models. The first is Prior, it is trained to take text labels and create CLIP image embeddings. The second is the Decoder, which takes the CLIP image embeddings and produces a learned image. After training, the workflow of inference looks like

this. The entered caption is transformed into a CLIP text embedding using a neural network [3].

Next, Prior reduces the dimensionality of the text embedding using Principal Component Analysis or PCA. Image embedding is created using the text embedding. In the decoder step, a diffusion model is used to transform the image embedding into the image. The image is upscaled from 64×64 to 256×256 and then finally to 1024×1024 using a Convolutional Neural Network [3].

Here's a quick rundown of the DALL-E 2 text-to-image generation process. A text encoder takes the text prompt and generates text embeddings. These text embeddings serve as the input for a model called the Prior which generates the corresponding image embeddings.

Finally, an image decoder model generates an actual image from the embeddings. Sounds straightforward, but how does each of these steps actually work? The text and image embeddings used by DALL-E 2 come from another network created by OpenAI called CLIP [3].

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УДК 811.111 (075.8): 620.9

THE PROSPECTS OF THE ENERGY INDUSTRY IN BELARUS

student Kaluta V.E.

scientific supervisor – associate professor Vasilyeva T.I.

Belarusian National University of Technology

Minsk, Belarus

The energy industry is an essential sector of the global economy, and Belarus is no exception. As a landlocked country in Eastern Europe, Belarus relies heavily on imported energy to meet most of its energy requirements. However, the country is taking steps to reduce its dependence on imported fuel and transition towards renewable energy sources. In this essay, we will discuss the prospects of the energy industry in Belarus. Belarus has favorable conditions for the development of wind and solar energy. Additionally, Belarus receives an average of 1,600 kilowatt-hours of solar energy per square meter per year, making it suitable for solar energy production. The Belarusian government has set an ambitious target to increase the share of renewable energy in its energy mix to 30% by 2030. The country is offering subsidies, tax breaks, and simplified procedures for obtaining permits and licenses to investors in the renewable energy sector.

The prospects of wind energy in Belarus are significant. The country's wind potential is estimated to be around 9.6 gigawatts. Currently, Belarus has two wind farms with a total installed capacity of 101 MW, and the government has plans to develop more wind farms. The government aims to generate at least 1,000 MW of wind energy and supply ten percent of its electricity consumption from wind by 2025. The prospects of solar energy in Belarus are also significant. The country's solar potential is estimated to be around 98.8 GW. In 2019, the Belarusian government launched a program that provides grants to businesses that install solar panels on their rooftops. The government is also

offering tax breaks to businesses that install solar panels. With these incentives, the deployment of solar energy in Belarus is likely to increase in the coming years. Apart from wind and solar energy, Belarus is exploring other renewable energy sources such as hydropower, biogas, and geothermal energy. The government aims to increase the share of hydropower in the country's energy mix by 2025. Belarus has several rivers and streams, making it suitable for hydropower production. There are also several biogas plants in the country that generate energy from agricultural waste. The government aims to increase the deployment of geothermal energy in the country, primarily for heating systems in buildings.

In conclusion, the prospects of the energy industry in Belarus are promising, mainly due to the country's favorable conditions for wind and solar energy production. The Belarusian government's policy of offering incentives to investors in the renewable energy sector is increasing the deployment of renewable energy sources in the country. In the future, we can expect to see significant growth in the production of wind and solar energy in Belarus. Additionally, the integration of digital technologies such as AI, machine learning, and IoT is likely to become increasingly important in the Belarus energy sector in the coming years, driving efficiency and productivity.

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NEURAL NETWORKS IN THE LIVES OF ORDINARY PEOPLE

student Radyuk D.D.

scientific supervisor – lecturer Dzerhachova A.A.

Belarusian National University of Technology

Minsk, Belarus

Neural networks have become an integral part of our daily lives, penetrating into various fields of activity, from entertainment to medicine. In this paper, we will consider the influence of neural networks on the daily life of ordinary people. We will explore how neural networks help improve the quality of life of people in various areas, as well as assess the risks and challenges associated with the use of neural networks. The results of this work may be useful for people who want to better understand how neural networks affect their lives and what to look for when using this technology.

Neural networks are machine learning algorithms that have been developed to mimic how the human brain works. Neural networks are used to analyze large amounts of data and solve complex problems that were previously impossible for computers.

Today, neural networks are used in various fields, including medicine, finance, advertising and entertainment. They have become an integral part of our daily life, improving its quality and facilitating tasks.

The influence of neural networks on people's lives:

Neural networks are used in medicine to analyze medical data and diagnose various diseases. For example, neural networks can help diagnose cancer and predict the likelihood of developing cardiovascular disease. This helps doctors to more accurately determine the diagnosis and develop a more effective treatment plan.

Neural networks are also used in the financial sector for data analysis and market forecasting. This helps investors and traders make more informed decisions and reduce risk. Neural networks can also be used to detect financial fraud, which reduces losses for companies and investors.

Despite the many advantages of neural networks, there are also risks associated with their use. For example, neural networks can become the target of cyberattacks and hacker attacks, which can lead to the leakage of personal data and confidential information.

It is also important to consider ethical aspects when using neural networks. For example, when developing neural networks for medical purposes, patient privacy and ethical standards must be respected.

Neural networks have become an integral part of our daily life, penetrating into various fields of activity. They help improve people's quality of life by making it easier to complete tasks and make decisions.

However, it is necessary to take into account the risks and challenges associated with the use of neural networks, and to comply with ethical standards. Understanding how neural networks affect our lives and how to use them effectively and safely is important for every person.

AUTOMATION OF PRODUCTION IN RUSSIA AND BELARUS

Student Zherko V.E.

scientific supervisor – lecturer Dzerhachova A.A.

Belarusian National University of Technology

Minsk, Belarus

Automation of production has become a popular trend in many countries, including Russia and Belarus. With the advancements in technology have led to automation becoming an integral part of the manufacturing industry, offering numerous benefits to businesses. This article will examine the current state of automation in Russia and Belarus.

In recent years, Russia and Belarus have experienced rapid development in their automation industry. According to a report by Mordor Intelligence, the automation market in these countries is projected to grow at a CAGR of 7.3% from 2021 to 2026, with the manufacturing industry expected to hold the largest share.

The manufacturing industry in Russia has made significant investments in automation technology, particularly in robotics. Raconteur reports that Russia has been experiencing a "robotic revolution" with a significant increase in the number of robots being used in the manufacturing industry. There has been a substantial increase in the number of automation technology being adopted, as well as the challenge of a shortage of skilled labor [1].

Similarly, Belarus has also been adopting automation technology in its manufacturing industry. An article by The European Times states that the country's manufacturing industry is focusing on automation to increase its competitiveness in the global market. The article also highlights the benefits of automation in reducing production costs and increasing product quality.

However, the adoption of automation technology in both countries is not without its challenges. As reported in the IOP Conference Series: Materials Science and Engineering, one of the significant challenges facing the adoption of automation technology in Belarus is the lack of skilled labor to operate and maintain the machines. Similarly, in Russia, there is a shortage of skilled professionals specializing in automation and robotics.

Despite these challenges, both countries are actively working towards addressing these issues. PwC highlights the importance of investing in the education and training of the workforce in the field of automation to overcome the shortage of skilled labor in Russia. Additionally, Deloitte emphasizes the need for businesses to prioritize technology investments to improve productivity and competitiveness in the market [2].

In conclusion, automation of production is rapidly becoming a crucial aspect of the manufacturing industry in Russia and Belarus. The adoption of automation technology is driven by the need for increased productivity, efficiency, and cost savings. However, the shortage of skilled labor remains a significant challenge. As such, investing in the education and training of the workforce in the field of automation is vital for the continued growth and success of the automation industry in both countries.

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WHAT IS A “SMART HOME”

student Antoniuk V. V.

scientific supervisor – lecturer Dzerhachova A. A.

Belarusian National University of Technology

Minsk, Belarus

Today the world is changing so rapidly that we can hardly keep up with the news. Every day, high technologies enter our lives more densely: houses are printed on 3D printers, people move on hoverboards, manufacturers announce transparent phones or jetpacks. Of course, developers pay great attention to home comfort, because home is the place where we spend the best part of our lives.

The idea of a smart home is not new. In fact, the concept has been around since the 1980s. However, it is only in recent years that the technology has become sophisticated enough to make it a reality.

The concept of "smart home" speaks for itself. This is a complex system that combines various functions and programs. It allows not only pressing a few buttons to control all the processes of the property at a distance, but also completely entrust the management of the house to the system.

A smart home is a home equipped with automation devices and systems that can be remotely monitored and controlled over the internet. Such devices can include smart thermostats, lighting systems, sound systems, smart locks, video cameras, and many other devices.

Smart homes utilize Internet of Things (IoT) technologies to connect devices within the home to a single network and enable them to interact with each other. This allows for the automation of many tasks that previously had to be done manually, such as managing lighting, temperature, media devices, and security.

The “Smart Home” system manages your household according to a pre-set program and allows you to store different scenarios in the device's memory that are most convenient for the owner.

For example, to save resources, you can set the heating or air conditioning not to run around the clock on weekdays, but to run long before you get home. Water the garden at a certain time or turn on the security system when needed.

Today, several electronic home control systems are shared. The first is responsible for the order of the property. It controls the microclimate of the premises, electricity, security and fire alarms, warning and telecommunications. The second controls the processes in the backyard - watering the garden, external lighting, video surveillance, autonomous opening of the gate, and so on.

There are several ways to control a smart home: smartphones and tablets, voice assistants (Amazon Alexa, Apple Siri and etc.), wall-mounted panels, motion sensors and etc.

The demand for automation devices is increasing every year due to the ease of use, a wide range of opportunities and tasks, and simple control offered by the "smart home" system. This system is now being used not only in residential buildings but also in offices, restaurants, hotels, and business centers.

In conclusion, a smart home offers a variety of benefits that can make your life easier, safer, and more comfortable. From saving time and money to enhancing your entertainment experience, a smart home is a worthwhile investment for anyone who wants to live in a more connected and convenient world. With the right technology and careful consideration of the risks, a smart home can be a game-changer for homeowners everywhere.

AUTOMATION OF POWER GRIDS IN THE CIS COUNTRIES

Student Derkach B. S.

scientific supervisor – teacher Dzerhachova A. A.

Belarusian National University of Technology

Minsk, Belarus

Today, most of the developed and developing countries are striving to modernize various technologies in all possible industries. Just one of these key areas for improving technical processes has become automation. In the energetic sphere, as well as in other production areas, it can significantly increase the efficiency and speed of completing tasks, the stability and safety of equipment operation, as well as the quality of the working environment for employees. And, as a result, these benefits positively affect the living conditions of the population.

Such reasonableness in the use of modern technologies could not fail to be noticed by the governments of the CIS countries. In order to keep up with the times and keep up with other states in technical development even more, representatives of the Commonwealth are actively trying to promote various innovations in power supply systems to this day. In addition to the previously mentioned advantages of using automated power grids, countries such as Belarus, Russia, Kazakhstan, Ukraine and others note that such innovations also reduce the cost of maintenance, in addition to expanding the range of functions, from monitoring the state of the network to predictive analysis to simulate changes.

One of the successful examples of the implementation of an automated power grid can be considered the experience of Kazakhstan, which launched the Smart Energy project and thus indicated the vector of development in the energy sector. As a result, "KazTransOil" has added new digital solutions to the energy

system they have. Innovations included: diagnostics and monitoring of the electrical network, due to which the company has improved management processes throughout the territory of the Republic of Kazakhstan and increased reliability with the stability of power transmission.

Particularly relevant are projects to develop autonomous systems in Russia. In remote and less populated regions, such as Siberia and the Far East, the introduction of the latest technologies is especially important. For example, many projects (for example "ERMS") involve the deployment of multiple digital control devices, such as controllers or sensors, to constantly monitor the state of the power grid and respond quickly in case of accidents, failures and other network problems.

Belarus is also trying to keep up with technological progress, stating that the modernization of technology is one of the directions in the program to improve the production of the energy sector. Thus, "Belenergo" is actively discussing and taking actions to solve problems with the throughput, wear rate and reliability of power supply to power grids. In conclusion, it becomes obvious that in the modern world, automation is a natural step in the development of technologies for almost any industry, including energy. As a result, the CIS countries are actively trying to introduce new technologies to improve the stability of energy systems and resistance to loads, reduce the cost of their maintenance, promptly track and troubleshoot, and improve the economic development of the regions. Moreover, with current trends in the development of technologies that automate technical processes (for example artificial intelligence, controllers, various sensors, etc.), the desire for such modernization will only grow.

BNTU - speciality FITR (CAD)

Student Gabrinevskii A.S.

scientific supervisor – lecturer Dzerhachova A.A.

Belarusian National University of Technology (BNTU)

Minsk, Belarus

Belarusian National Technical University (BNTU) is one of the leading technical universities in Belarus. Founded in 1920 and has over 100 years of experience in teaching students. The university offers more than 70 undergraduate, graduate and postgraduate majors. It is the largest technical university in Belarus and currently has over 25,000 students. The university is located in the capital of Belarus, the city of Minsk, on Independence Avenue. The university campus has more than 50 buildings and a total area of about 180 thousand square meters.

BNTU pays special attention to scientific activity. The university has more than 40 scientific centers and laboratories, including the Research Institute for Problems of Mechanics and Mechanical Engineering, the Research Institute for Welding and Design of Welded Structures, the Energy Efficiency Research Institute and others. It also develops international cooperation and has partnerships with more than 80 universities around the world.

BNTU is an indispensable source of training highly qualified engineers in various fields such as mechanics, energy, information technology, construction, automotive, materials science, and others. BNTU graduates have excellent job prospects due to their high level of education and their professional skills.

Thus, BNTU is one of the most prestigious technical universities in Belarus, which offers students a wide range of educational programs, scientific and recreational opportunities. As a BNTU graduate, you are guaranteed to receive a professional education and excellent prospects for the future.

CAD

Today, more than 32 thousand students study here, choosing more than 35 specialties in eight faculties. One of these specialties is "Computer-aided design and process control systems" (CAD), which trains specialists to work in the development, design and maintenance of technological processes in various industries. In this specialty, students receive deep knowledge in the field of mathematics, physics, programming, operations research, automation and computer technology. In the process of learning, students study modern methods and means of automation and design of technological processes, learn to solve problems of optimizing production, maintain and modernize production management systems.

An important component of the educational process of students in this specialty is practical classes in computer classes and laboratories, where students are engaged in real tasks of designing, modeling and managing technological processes. Students can also do internships at enterprises and organizations, where they practically apply the knowledge gained at the university.

Upon completion of their studies, CAD graduates can work in various industries, such as aviation, machine building, electric power, chemical and others. They may be engaged in projects for the automation and modernization of production processes, work in engineering and design offices, the development of computer control systems, programming and software testing.

The Belarusian National Technical University is one of the leaders in higher technical education in Belarus, and the CAD specialty is one of the most demanded in the modern labor market. Studying in this specialty allows graduates to gain the necessary knowledge to successfully start their careers and work in one of the most promising industries.

THE HISTORY OF THE CREATION OF THE PROGRAMMING LANGUAGE PASCAL

student Naumets S.A.

scientific supervisor – lecturer Dzerhachova A.A.

Belarusian National University of Technology

Minsk, Belarus

Programming languages are an essential tool for developers to build and develop software applications. Pascal is one of the programming languages that has gained significant popularity among developers due to its numerous benefits. Pascal was developed in 1969 by Niklaus Wirth as a programming language intended to teach structured programming. Pascal is named after the mathematician Blaise Pascal and is used for a wide range of applications, including desktop applications, scientific and engineering applications, and education. One of the benefits of Pascal is its simplicity. The syntax of Pascal is easy to understand, making it an excellent choice for beginners. Pascal's structure emphasizes structured programming and modularity, making it easier to write code that is maintainable and scalable. In addition, Pascal's syntax enforces good programming practices and reduces the likelihood of errors in code. For instance, Pascal requires that all variables are defined before use, which helps catch errors that might arise from uninitialized variables.

Another benefit of Pascal is its portability. Pascal is a cross-platform language, meaning that code written in Pascal can run on different operating systems with minimal modifications. This feature makes Pascal a suitable language for writing applications that can run on different platforms such as Windows, Linux, and macOS. Pascal also supports libraries, which are collections of pre-written code that can be used to simplify the development process.

Pascal is also a high-level language, meaning that it is designed to abstract away the complexities of the underlying hardware. This feature allows developers to write code that is more focused on the problem at hand than on the details of the hardware. Pascal also supports object-oriented programming, which is a programming paradigm that emphasizes the use of objects to represent data and the behavior of the program.

In addition, Pascal is a compiled language. This means that code written in Pascal must be compiled before it can be executed. Compiling a program involves translating the human-readable code written in Pascal into machine code that the computer can understand. This process results in programs that are faster and more efficient than interpreted programs. Pascal's compiled nature also allows for easier debugging since the compiler can catch errors before the program is executed. Although Pascal has been around for several decades, it continues to be relevant in modern programming. Pascal has influenced the development of other programming languages, including Delphi, which is a popular programming language used for developing Windows applications.

In conclusion, Pascal is a powerful programming language that offers numerous benefits to developers. Pascal's simplicity, portability, and support for high-level programming and object-oriented programming make it a popular choice for a wide range of applications. Furthermore, Pascal's compiled nature makes it an efficient language that produces faster programs. As a result, Pascal remains a popular language for developers, especially those involved in scientific and engineering applications, desktop applications, and education.

In addition, Pascal has inspired the development of other programming paradigms, such as the Object Pascal language. With its continued relevance, simplicity, and efficiency, Pascal is an excellent language for both beginners and experienced developers who want to create efficient, portable, and maintainable applications.

AUTOMATED ELECTRIC DRIVES

Student Ogiy A. A.

scientific supervisor – lecturer Dzerhachova A. A.

Belarusian National University of Technology

Minsk, Belarus

Automated electric drive specialization is a field of study that focuses on the development, design, and implementation of automated electric drive systems. It involves the use of advanced technologies such as sensors, controllers, and actuators to automate and control electric drive systems. This specialization is important in industries such as automotive, aerospace, and manufacturing, where the use of automated electric drive systems has become increasingly popular.

What are the trends that deserve the most attention these days? Firstly, the rapid development of technology. Secondly, the rising cost of energy. Specialists say that this has a direct bearing on the automated electric drive (a.e.d.). The main point is that it should be made so that it saves energy.

A.e.d. are special structures, which have in their set gears, electric motors and controlling equipment, which gives efficiency of movement and control by main systems in working machines. It has such advantages as: 1. it improves the purchasing power, 2. if needed, the drive can be networked with the data collection server with the advantage of remote access, 3. It controls the speed, acceleration power and sets the suitable modes for many mechanics.

The a.e.d. does not need to be monitored by the operator, because it operates completely in automatic mode. Whereas with a non-automated actuator, all the adjustments of the device will be done manually. So you need a person who will watch the work - the operator. A.e.d. systems can be used in a variety of applications, from industrial processes to home appliances. They have

made our lives easier and more efficient by reducing the need for manual labor and increasing precision.

One of the main benefits of a.e.d. is that they can be used in manufacturing processes to streamline production lines and reduce downtime. This means that products can be produced faster and with greater accuracy, which ultimately leads to cost savings for companies. Additionally, a.e.d. can be used in transportation systems, such as trains or buses, to improve efficiency and reduce emissions.

Another advantage of a.e.d. is their ability to improve safety. By reducing the need for human intervention, these systems minimize the risk of accidents caused by operator error. They also allow for remote monitoring and control, which means that operators can monitor and adjust systems from a safe distance. This is particularly important in hazardous environments, such as chemical plants or oil refineries.

A.e.d. can also be used in household appliances to make everyday tasks easier. For instance, vacuum cleaners can be equipped with a.e.d. to adjust suction power depending on the surface being cleaned.

Despite the many advantages of a.e.d., there are some concerns about their impact on employment. As these systems become more prevalent, there may be a decrease in the number of jobs available for manual laborers. However, it is important to remember that a.e.d. require skilled technicians to design, install, and maintain them. This means that there will still be job opportunities in this field.

In conclusion, automated electric drive are a valuable technological advancement that can be used in a wide range of applications. They offer numerous benefits, including increased productivity, improved safety, and greater efficiency.

THE CHALLENGES OF OBJECT-ORIENTED PROGRAMMING

student Zelenukho A.D.

scientific supervisor – lecturer Dzerhachova A.A.

Belarusian National University of Technology

Minsk, Belarus

Since it would be difficult to tell the facts in such a small volume, I will try to explain as best and as simply as possible. Object-oriented programming (OOP) is a programming paradigm that allows you to organize code into reusable, modular units called classes. C++ is an object-oriented language that was designed to support this paradigm, but it also has some problems associated with it. Here are some of the problems of object-oriented programming in C++:

Complexity: One of the biggest problems with object-oriented programming in C++ is the complexity of the language. C++ has a large number of features that allow you to write complex programs, but this complexity can also make it difficult to learn and use effectively. This can result in longer development times, more bugs, and higher maintenance costs.

Memory management: In C++, memory management is the responsibility of the programmer. This can be a problem because it requires a good understanding of how memory works and how to manage it effectively. If memory is not managed properly, it can lead to memory leaks, crashes, and other performance problems. However, there are tools and libraries available, such as smart pointers and garbage collection frameworks, that can help simplify memory management and reduce the risk of these issues.

Performance overhead: Object-oriented programming in C++ can also have performance overhead, especially when compared to procedural programming. This is because of the additional work that is required to manage objects, perform dynamic dispatch, and perform other object-oriented tasks. However, with modern compilers and optimization techniques, much of this

overhead can be minimized or eliminated, and object-oriented programming can be just as performant as procedural programming.

Inheritance issues: Inheritance is a key feature of object-oriented programming, but it can also cause problems in C++. In particular, multiple inheritance can be difficult to manage, and it can lead to ambiguities in the code. However, C++ also provides a number of mechanisms for dealing with these issues, such as virtual inheritance and access control.

Code bloat: Object-oriented programming in C++ can also lead to code bloat. This is because of the additional code that is required to manage objects and perform other object-oriented tasks. However, modern C++ programming practices, such as using templates and generic programming, can help reduce code bloat and improve code maintainability.

Encapsulation issues: Encapsulation is another key feature of object-oriented programming, but it can also cause problems in C++. Specifically, encapsulation can make it difficult to access internal class data, which can make debugging and testing more difficult. However, there are techniques and patterns, such as friend functions and the Pimpl idiom, that can help mitigate these issues and make encapsulation more effective.

In addition, it is also essential to keep up with the latest developments in C++, such as updates to the language standard, new libraries, and tools. Staying current with the latest advancements can help you write better code and improve your overall productivity as a C++ programmer. It's also important to collaborate with other developers and participate in online communities. By continuously learning and growing as a C++ programmer, you can become more proficient in your craft and better equipped to tackle complex programming challenges.

EXPLOITATION OF AUTOMATED ELECTRIC DRIVES

student Grebenko A.D.

scientific supervisor –lecturer Dzerhachova A.A.

Belarusian National University of Technology

Minsk, Belarus

Electric drives in general

Electric drives are primarily necessary to control the speed, torque and direction of movement of moving objects. They are mainly used to control the speed and movement of various objects, such as cars, vehicles, robots and fans. If we consider drives from the point of view of speed classification, then there are two types of electric drives: with constant speed and with variable speed.

Constant speed drives are the simplest type of electric drive and are less efficient when it is necessary to change the speed, in this case variable speed drives are used to control loads of any magnitude over a wide range of speeds.

Variable speed drives require precise and continuous control of speed, position and torque for various loads. In addition to these advantages, there are many other reasons for using variable frequency drives. These reasons include Achieving high efficiency: electric drives can use a wide range of power, from MW to MW for different speed values.

As a result, the total cost of operating the system can be reduced. To improve the accuracy of stopping and the speed of reversing the engine. To control the inrush current To provide protection For the organization of complex control systems with different temperatures, pressures and other parameters. Advances in high-power electronics, microprocessors and digital electronics are leading to the emergence of modern electric drives that are more compact, efficient, cheaper and more efficient than bulky, inflexible and expensive

traditional electric drive systems that organize variable speeds in a multi-motor configuration.

Revolutionizing the industry

In a word, automated electric drives revolutionize the industry, providing a high level of accuracy, efficiency and reliability. Automated electric drives change the way machines work, making them more stable and productive. As technology develops, we can expect the emergence of new innovative applications of automated electric drives in a wide variety of industries.

With the development of technology, automated electric drives will become even more efficient, reliable and economical. As the world moves to more sustainable energy sources, the demand for electric drives in solar and wind energy systems will grow. Electric drives can optimize the operation of these systems, increasing their efficiency and reliability. Another expected area of growth for automated electric drives is robotics. With the growth of automation, robotics is becoming increasingly important in various industries, from manufacturing to healthcare. In addition, automated electric drives are expected to play an important role in the development of self-driving cars. Electric drives are already used in electric vehicles, and it is expected that their importance will only increase with the development of autonomous driving technology. Electric drives can provide the precise control needed for safe and efficient navigation in self-driving cars. In a word, the future of electric drives for autonomous driving is very rosy. They are expected to play an important role in a wide variety of industries, from renewable energy to robotics and self-driving cars. As the technology evolves, new innovative applications of electric drives for autonomous driving are expected to emerge, leading to a further transformation of the industry.

THE BEST VERSION OF YOURSELF
students Brynkevich Y.S., Kukhtevich V.S.
scientific supervisor – senior lecturer Korzun O.F.
Belarusian National University of Technology
Minsk, Belarus

Today, in order to remain competitive in the market, to be efficient and successful, you need to perform one simple task - every day becomes the best version of yourself yesterday. And here are 12 ways to become the best version of yourself.

1. Stop making excuses for yourself. Justifying your actions, you slow down your development, indulge your weakness, insecurity, doubts. Analyzing your actions and deeds, you must find the missing pieces of the puzzle, because of which you didn't do everything the way you wanted, find them and try again.

2. Don't try to become reasonable. In the real world, mediocre efforts lead to mediocre results. Don't try to be reasonable. Harmony is what you need.

3. Get better. Try not to blame anyone for anything. Don't waste your energy on things that don't matter. Don't let yourself be tormented by doubts. Ask yourself, "What can I do better next time?"

4. Be different from others. To be truly successful means to be different from others. Do not copy someone else's course of actions or thoughts. You will achieve more and be more honest with yourself if you put in the effort to excel.

5. Eager to learn. To learn is to learn the lessons of life that come your way.

6. Keep a strict discipline. Discipline is as much about what you do as it is about what you refuse to do. Being addicted is a bad model for a life full of inspiration. Incredibly destructive.

7. Be generous. Generosity can change the trajectory of your life. If you want to receive something, you must give something in return. And your gifts

will definitely bear fruit. By giving, you change people's lives. Everything is simple. And there is no other way to get the result.

8. Understand other people. Most people believe that human behavior is controlled by reason. However, they are wrong. Behavior is driven by emotions. Irrational, illogical emotions. It is worth learning to understand and manage them. Then it becomes easy to understand people.

9. Love more. Love is a huge source of inspiration for people around the world. We all try to fill our lives with it. We try to love, forgive, care and inspire. Change the world for the better.

10. Listen. Think about it: if you want support, chances are you won't reach out to a friend who only talks about himself. Listening is the key to a healthy relationship.

11. Stop criticizing. Any relationship is a two-way street. Imagine what would happen if, instead of blaming the other side, everyone would analyze their own role in the development of the relationship and take responsibility for changing their course. The answer is obvious: you will get a strong and healthy relationship.

12. Be outstanding. The key to being extraordinary is to live in the moment. It is at this moment that you stand at a crossroads. Right now you are choosing the ending of your life story. Make the right choice.

So, we have listed 12 ways that will definitely help you become the best version of yourself. Using these methods, you will be able to remain effective and successful, understand other people, their thoughts and emotions, stop criticizing and be outstanding. If you begin to apply regularly in practice at least 30% of the listed methods, then you will find a completely new quality of life and awareness in it.

DOGS IN THE ARMY

Students Burshtyn K.B. , Mychko R.V.

Scientific supervisor – senior Korzun O.F.

Belarusian National University of Technology

Minsk, Belarus

The first evidence of the use of fighting dogs belong to the Middle East. Dogs are present on many images of pharaohs. The combat use of dogs in Assyria, Greece and Ancient Rome is also known. Dogs were used both directly in combat and for carrying out guard duty. Each civilization has found its application for dogs according to their lifestyle and their needs. The animals were versatile because they were trainable and loyal. Dogs are considered the first animals to be used by humans for combat purposes.

As mentioned earlier, dogs have long shared the hardships of military service. However, in the First and Second World Wars, as well as in modern conflicts, their participation has reached a new level. Perhaps this was due to a change in the conduct of hostilities. A sharp increase in the strength, intensity, accuracy and range of gun and rifle fire led to the transition to positional, trench warfare. It is precisely in such conditions that the need for dogs with their keen nose, endurance and ability to learn has increased. The Germans were the first to use dogs in such conditions. Their experiments were crowned with success and the issue began to be considered at the state level. Throughout Germany, units were created with the appropriate army training of dogs. With the outbreak of the First World War, they were mobilized to the front. Other European countries also showed great interest in the German experience of using dogs, although their success was quite modest.

Years have passed, but the army still needs the help of a true friend of man. Modern technologies are in many ways capable of facilitating military

service, but they cannot completely replace four-legged fighters. For example, an expensive bulky detector can detect explosives planted in a car, but only trained sniffer dogs can identify the intruder and detain him, find a weapons cache or search a smuggling truck. To do this, nature endowed them with the finest tools: a scent that is hundreds of times more sensitive than a human and a hearing that is 7 times sharper than ours. The current use of dogs is no exception. Cynological service has become widespread in our country. Dogs serve in various units and formations of the Ministry of Defense, border troops. Dogs serve in the army today. Of course, they do not throw explosives at tanks, and do not deliver medicines to the wounded, but even now the modern army cannot do without a sharp eye and a subtle scent of four-legged assistants. The extraordinary instinct of a dog cannot be replaced even by the most advanced electronic equipment. It is no secret that the border service, even with modern equipment, is impossible today without the use of service dogs. Military dogs must be assiduous, intelligent and hardy. The most suitable for training are German Shepherds, Rottweilers, Dobermans and Collies. At the same time, specialists avoid accepting light-colored dogs, because they are much easier to notice. Animal education begins at the age of two months. First, all puppies go through a general training course, and by 10 months they begin their adult life, and special training begins. As a rule, by this time, each dog has its own talents, in accordance with which they begin to learn and develop their best qualities. All military service dogs are divided into search, drill, guard and breeding. Accordingly, training takes place according to different programs and principles. Service dogs are not aggressive, they love affection and care, but their job is to bite the criminal, attack, look for danger, so you should not joke with them.

As a rule, military service dogs serve 7-8 years, after which they are sent to a well-deserved rest. All these animals fulfilled their duty to the country, therefore they deserved a quiet life, care and respect.

**THE INVENTION OF INFLATION
OR HOW JOHN LAW RUINED FRANCE**

student Drichits D.D.

scientific supervisor – senior lecture Korzun O.F.

Belarusian National University of Technology

Minsk, Belarus

In Mark Twain's novel "The Yankees at the Court of King Arthur", the main character falls into the dense English Middle Ages. Using his modern school education, he significantly pushes the technological progress of England, and at the same time he easily achieves a privileged position. Unfortunately, we have not yet learned how to transfer from car to car on the time train. But if one-day time travelers did appear, you can be sure that John Law would almost certainly be one of them. That's just unlike the hero Twain, Law did not rely on his knowledge of physics, chemistry or astronomy [1].

Law had a very simple idea – the economy needs money. The content may seem shocking. You have nothing to pay the workers, they have nothing to pay the shopkeepers, the shopkeepers have nothing to pay taxes with... well, you understand. No money – no honey. In Luo's time, money was mostly metallic – good old gold and other, less noble metals. And the number of metal coins is limited. Handsome, gambler and adventurer, he quickly became friends with Duke Philippe of Orleans and shared with him his ideas on how to pull France out of debt. So let's just make banknotes that everyone in the country will accept for money, and then we will print such banknotes just indecently a lot. And we'll cover the debt. Philippe liked this idea and, becoming regent of the king in 1715, he immediately handed over the reins of financial rule to Law. Law did not sit idle and in 1716 founded the first private bank in France, calling it modestly – "Universal Bank". That's how it all started. At first, all Parisians, and then the French in general liked the new bank very much – free and understandable bills,

banknotes with a fixed amount of cashing, anonymity and, finally, the breadth of use – the bank was under the king, they trusted him, so you can use banknotes it was to pay everywhere. The duo of Law and Philippe Orleans seemed to be leading France to a bright future. In 1720, the Royal Bank and the Company of All the Indies officially merged, Law was appointed Comptroller General of Finance, the entire economy of France was in his hands then. And the system began to slowly crumble.

The Pierce brothers were the first to notice that. They saw the main, obvious flaw in the Law plan – the bank issued more banknotes than it could cash out. The Piers began to massively buy banknotes of the Royal Bank and demanded to exchange them for gold. Ordinary people also noticed that something was wrong - the mad printing press of the Royal Bank printed too many banknotes, inflation flooded Paris. Prices rose by almost 90%, people rushed to the bank in an attempt to exchange rapidly depreciating pieces of paper for real gold. But the finances of France were Law at that time, and in February 1720 he forbade keeping more than 500 livres at home.

In March, street stock trading was banned, but the crisis could not be stopped – Law completely lost the trust of the population. The banknotes of the royal bank were rapidly losing their value. Famine began in Paris. France took a long time to recover. It took almost half a century for the French to be ready to found one big bank again, and even then they called it the "Cash Register" - away from sin and bad associations.

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FINANCIAL PYRAMID “MMM”
students Karachun V.I. Pivankova L.V.
scientific supervisor – senior lecturer Korzun O.F.
Belarusian National University of Technology
Minsk, Belarus

Life without money is impossible to imagine. Everyone wants to improve their financial situation, and this is not surprising. But these goals are achieved in different ways: someone works more, someone invests, and someone earns outside the law.

In 1989, the cooperative "MMM" was born in Moscow, named after the first letters of the surnames of its founders — Sergey and Vyacheslav Mavrodi, as well as Olga Melnikova. The activity of the young company consisted in the sale of foreign office equipment in the Soviet Union. The profit from this became the basis for the future pyramid.

Already in 1991, the company became number one in the office equipment market and allowed to conduct a large-scale advertising campaign - citizens' travel for one day was paid in all directions of the metro. The MMM Foundation is a successful and well—known company, which, against the background of the collapse of the USSR, seemed to have the brightest future. On February 7, 1994, the company took an important step — announced the launch of bilateral and independent quotations. This approach guaranteed margin when buying and selling issued shares. The demand for "MMM" securities has increased sharply, and their prices have also increased [1].

At the beginning of August 1994, the number of depositors reached huge proportions. A new stage in the turnover of issued tickets was the transition from purchase and sale to voluntary donations. The depositor allegedly gave his own savings to the needs of Mavrodi, and the papers were handed to him as a souvenir.

Already on August 4, the founder of the pyramid scheme was arrested on official charges of tax evasion. The tax authorities announced the discovery of gross violations of the law and ordered to recover almost 50 billion rubles from the state budget. The organization's activities were outlawed — "MMM" lasted only six months. On April 28, 2007, a Moscow court sentenced Sergei Mavrodi to four years and six months in prison, serving his sentence in a general regime colony.

While in custody, Mavrodi tried to nominate his candidacy for deputy. Having won the election, he was released. He refused all material privileges in connection with his new position.

In September 1997, AOOT "MMM" was declared bankrupt. The number of officially recognized victims is more than 10 thousand people. Moreover, when "MMM" ceased its activities, many people lost everything. After all, in pursuit of easy money, they invested, as well as personal savings, and borrowed from loved ones, sold apartments, cars and everything that had at least some value. After being released, Sergey Mavrodi did not stay in the shadows for long. Already in 2011, he launched a new pyramid – "MMM-2011". The scheme of work remained the same.

You should always remember that there is no easy money. People, seeking to earn a lot of money, can do anything, including cheating. That was the example of the company "MMM".

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THE TAXES WE ACTUALLY PAY

students Kukhtevich V.S., Brynkevich Y.S.
scientific supervisor – senior lecturer Korzun O.F.
Belarusian National University of Technology
Minsk, Belarus

Since ancient times, in different states, the authorities began to impose taxes to replenish the treasury. This money is spent on the needs of the state. For the most part, the taxation was sound and uncontroversial. Nevertheless, in history, as in modern times, there are cases when certain taxes are difficult to justify with common sense.

Cowardice tax (UK)

There was a strange tax in the Middle Ages. It was paid by the knights, who for some reason were not going to participate in the upcoming hostilities. In fact, it was a legal way to pay off from going to war, but this obviously did not affect the reputation of a particular knight in the best way.

Gypsum tax (Austria)

The tourists from all over the world come to Austria to ski and to get extreme impressions. The Austrian government considered that the health insurance that every tourist entering the country does not fully cover the state's expenses for endless dislocations and fractures of people. So, an additional amount in the cost of ski services was included, which is intended to cover the cost of plaster, if a tourist suddenly breaks any part of the body.

Dust tax (Armenia)

In Armenia, it was decided to introduce a tax on dust. More specifically, the government felt that there was too much dust in the courtyards of the country, and organizations that monitor cleanliness could not cope. The official appeal to the citizens of Armenia reads: “Having discussed the issue of removing excess dust from yards by sanitary cleaning organizations, the

Ministry of Economy decided: the population must pay the cost of dust removal at the rate of 1.91 drams per 1 square meter.”

Window and door tax (France)

In France, there was a tax on windows and doors up until the 19th century. This was measured by a residence’s number of inhabitants, location, and number of doors and windows. Even today, you can see bricked up windows and doors on particularly old buildings – especially the front part of the house which usually consisted of only an entrance and small window.

Shade tax (Italy)

In Italy in 1993, a nationwide law was introduced charging €100 a year from shopkeepers whose signs created shade on public walkways. Another tax also hit Italian store owners whose awnings create shade or who put tables or chairs outside their shop.

Sparrow tax (Germany)

The sparrow tax was invented in one of the cities of Germany in the XVI century. The local authorities have not found a better explanation for the unexpected collection of money than that the poor birds chirp too loudly and interfere with sleep. Every inhabitant of Württemberg had the opportunity to avoid paying the tax by killing a dozen sparrows, for which he also received 6 kreutzers. If the owner of the house did not hand over the bodies of the dead birds by the right time, he had to replenish the state treasury for 12 kreutzers. The laziest residents of the city bought dead birds from underground sellers.

So, taxes are used by the state to redistribute national income and serve as the main source of state revenues necessary for the implementation of its main functions: the maintenance of the administrative apparatus, law enforcement and social services, and financing of the social security system. Also, with the help of taxes, the state can level income inequality among different groups of the population in order to increase its well-being in general.

THE THEORY OF "HUMAN CAPITAL"

Students Pivankova L.V., Karachun V.I.

Scientific supervisor – senior lecturer Korzun O.F.

Belarusian National University of Technology
Minsk, Belarus

“Human capital” is the accumulated knowledge and skills of a person.

Meaning that those who invest in their education are calculating to increase their capital, which will in turn lead to higher income.

According to this theory, sufficient investment in people will lead to economic growth. For example, some countries provide their citizens with free higher education because they recognize that a more educated population tends to earn and spend more, which boosts the economy.

Theodore Schulz was the first person to coin the phrase "human capital" in his address to the American Economic Association in 1960. He believed that people and nations should invest in education to improve job opportunities and economic growth.

The basis of human capital development is a theoretical pipeline that consists of three main dimensions: preparation, recruitment, and retention. These three dimensions make up the foundation of a company's strategic human capital plan. And fulfilling these three dimensions of development, companies will be able to produce a staff that is talented and effective as both workers and leaders. The first principle of the pipeline, preparation, focuses on strengthening human capital of an individual by fostering work-related skills or knowledge. These types of trainings and professional development opportunities are tailored specifically to fit the needs of either certain organizations or branches or of individuals wanting to qualify in specific areas. The second principle of this pipeline, recruitment, addresses procurement of individual assets and is directed at more general characteristics of future employees such as

self-efficacy, problem-solving skills, and other broader abilities. The third principle of this pipeline, retention, explores human capital and the promotion of individual self-exploration. Exploring one's traits, abilities, interests, and skills by providing them the opportunity for further education or educational experiences. Organizational culture, or the specific way of doing business, is based on shared subconscious assumptions and implied beliefs that affect daily behavior and organizational performance.

From sociologists, education and training, the theory of “human capital” caused a lot of criticism. In the 1960s, during the Marxist revival, it was attacked for recognizing the importance of bourgeois individualism, this was especially acutely felt in the United States, the birthplace of this theory. Criticism of internal norms arose at the moment when it was believed that people's high income may be due to their giftedness or coming from more affluent families, and not the usefulness of the knowledge and skills they acquired. According to G. Becker, “human capital” can be consumer capital - one that is created in creative and educational activities; and productive - one that benefits society (for example, products or technologies) [1].

Human capital can be divided into: total human capital is the knowledge, skills and abilities that can be implemented in various organizations; specific human capital - knowledge, skills and abilities that are used only in a particular workplace, human intellectual capital - capital embodied in people in the form of their education, qualifications, professional knowledge and experience.

Human capital in the economy is seen as a store of knowledge of the individual, his experience and skills that he uses to maximize income.

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RISK MANAGEMENT

students Potachits N.U., Chepelnikov E.C.
scientific supervisor – senior lecturer Korzun O.F.
Belarusian National University of Technology
Minsk, Belarus

There has always been such a problem as risk management. Today, risk accompanies almost all areas of activity. Thus, risks arise in any activity of an economic entity, and they should be paid careful attention to in order to find optimal solutions in the field of risk management. Currently, the theory of enterprise risk management continues its active development, based on economic and mathematical methods and information technologies. But the modern period of development requires maximum disclosure of the specifics of this procedure for managing special systems, the expiration of their uncertainty principle. There is a large number of papers devoted to reliability issues, but scientists have not made a generally accepted decision.

Some authors note the physical component of reliability, some – economic, and others consider that reliability is one of the elusive conditions for the systems functioning. The concept of the stability of the functioning of the enterprise and the reliability of its management is directly related to the concept of risk. In general, under the risk, they usually imagine something terrible, the worst possible situation, which can lead to various kinds of losses, failures and various losses. Risk is a complex phenomenon that has many different, and sometimes opposite, bases. This leads to the existence of a number of different definitions of the concept of "risk", to various degrees corresponding to the scope of their application. To date, there is no such universal interpretation of this concept in science. If we consider the risk in the company's activities, it recommends considering the possibility of adverse

situations and consequences. Risk management should take place through preliminary research and analysis of the situation, the formation of a system of modern impacts through various measures aimed at reducing the likelihood of risk. Sometimes, when making difficult decisions, a person is rarely guided by economic and financial models. Losses frighten us, so people try to risk even more than necessary, but it does not always end well.

Then it is necessary to identify the main actions necessary to prevent or reduce risk. All procedures and actions aimed at reducing the volume and price of risk, as well as the operating factors, are very costly in their implementation. This means that in order for the firm not to lose its competitiveness in the system and maintain financial viability and literacy, the costs of reducing the amount of risk must be compared with the expected losses that make up the price of risk. If we consider the main risk factors, it can be noted that: limited resources in decision-making and implementation, lack of information about the state of the external environment. Therefore, the main task is to create a risk management system to prevent and minimize them, in order to narrow down the range of factors that cannot be determined at the initial stage.

Risk management is a combination of several methods, models and approaches to reduce the risk and the losses from it. With the observance of a comprehensive risk management system, the accuracy of step-by-step implementation and the principles of risk management, it is possible to prevent or at least minimize the impact of unexplained factors. If there is a negative reaction to such impacts, it is impossible to predict the outcome of events.

Effective risk management will help us solve many problems arising in various unforeseen situations, ranging from the possibility of their complete prevention to partial minimization of risks, which in turn will help the company to use all opportunities for its development, as well as to keep risks at an acceptable and manageable level.

THE USE OF NEURAL NETWORKS IN THE WORLD

students Smolsky A.U., Spiridovich Y.A.
scientific supervisor – senior lecturer Korzun O.F.
Belarusian National University of Technology
Minsk, Belarus

To find out where neural networks are used, the first step is to understand what they are. Neural networks are one of many ways to develop artificial intelligence. At the moment, almost all people talk about them, but first heard about neural networks in 1943. By the way, at that time, even the concept of «artificial intelligence» did not exist, and networks already existed [1].

Neural networks have come to be called that, because the way they work is quite similar to the functioning of the human nervous system. Specifically, its ability to learn and correct mistakes. This is the main feature of any neural network - it is able to learn independently and act on the basis of previous errors, each time gaining more experience, not to step on the same rake.

What is the feature of neural networks in learning? Without it, they would simply be another mathematical model like the others, but through learning they can shock the profane. Neural networks can recognize more complex, sometimes even unexpected, patterns in data. Explaining this in simple language is not so easy. In general, learning is about finding the correct connection coefficients between neurons, as well as generalizing data and identifying complex relationships between input and output signals. If it gets tricked very easily in the beginning, a few hundred thousand steps, it'll know if you're trying to give it something wrong.

The neural network mimics even the structure of our nervous system. Such networks consist of a large number of separate computational elements («neurons»). The parameters of each «neuron» can be changed depending on the results obtained on the previous input data sets.

Neural networks are used in many areas of our lives, especially those where it is necessary to reach the maximum level of human functionality. Today large companies, healthcare institutions and scientific institutions are increasingly using neural networks. But to create an effective technology that can operate in complex environments requires powerful equipment and a lot of information.

The main tasks that are solved through neural networks are: classification and recognition. The neural network groups objects by specific classes, such as company clients. Neural networks are also used to filter letters and advertisements. Neural networks are able to identify a particular object among many others, such as the face in the photo. It is already possible to create pictures, music and other difficult tasks with the help of neural networks.

The list of their applications is very wide. Here are some of the most useful and famous in history:

1. Diagnose diseases of crops and other plants by photo to 99.35%.
2. Forecast the weather with high accuracy.
3. Help you drive around the traffic is now, and in the future to work as assistant autopilots cars, constantly analyzing the information received.
4. Neural networks already have significant knowledge of human faces. They can determine age, sex, and mood from photos. Photography can now be used to identify humans.
5. Moreover, neural networks can process not only images, but also sound. For example, the Massachusetts Institute of Technology has developed a neural network called Speech2Face, which defines age, sex, and nationality by voice.

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HOW THE DOLLAR BECAME A GLOBAL CURRENCY

students Smolsky A.U., Spiridovich Y.A.
scientific supervisor – senior lecturer Korzun O.F.
Belarusian National University of Technology
Minsk, Belarus

The industrial Revolution in the 19th century led to a rapid increase in productivity. The formation of a positive trade balance has led to the expansion of international trade. There was a problem when comparing different currencies in calculations, and gold began to be considered a universal monetary value. In most large countries there is gold, from which coins were minted. The combination of the national currency with gold helped to balance the reserves of the national currency.

The leading country in the world was the UK, and it was in pounds that gold rates were set at 4,248 pounds per ounce. Despite the fact that other currencies were also backed by gold, no one could compare to the volume of trade with the United Kingdom, and eventually the countries came to express their currency through the British pound.

Even then, the United States was not satisfied with this. They ensured that the US dollar was fixed at \$ 20,672 per ounce of gold, and established a rule according to which gold transactions can only be carried out in London or New York.

However, the outbreak of the First World War greatly shook the global financial system, and Britain could no longer provide its own currency. In order not to go bankrupt, in 1922 it was proposed to establish a "gold standard", assuming that the US dollar is on a par with gold as a universal measure of value. The US dollar is pegged to gold, and the British pound is pegged to US dollars, but it is no longer possible to exchange the British pound for gold.

The United States, which was not directly affected by the war, began to "seize" Europe economically. In order to protect the United Kingdom and European countries have introduced appropriate duties. International settlements have declined sharply. However, the US banking system was obsessed with the idea that with the help of the dollar, it could occupy the world market, and it would become the world's reserve currency. The Second World War made a huge contribution to this.

Therefore, the Bretton Woods Conference of 1944 can be considered the beginning of the expansion of the dollar on the world market, where representatives of 44 of the most economically powerful countries gathered to determine the further development of world financial laws. The reason was the chaos of the financial system from 1918 to 1939. The Americans proposed a system similar to the previous one, but with some changes, namely: the US dollar is pegged to gold at the rate of 35 US dollars per ounce, all other currencies have fixed interest rates against the US dollar, and to buy gold in any direction, you must first buy a dollar or pound, because other currencies did not replace gold. More than 70% of the world's gold belonged to the United States, and the US dollar was used in 60% of world settlements.

In exchange for the approval of the agreement, the United States provided huge loans for the reconstruction of post-war Europe, but on small terms: they could only print the amount of currency they owned in US dollars, the world's reserve currency. Thus, the United States controlled almost the entire economy of the earth [1].

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SOCIAL NETWORKS. IMPACT ON MENTAL HEALTH AND WORLDVIEW

students Chepelnikov E.C., Potachits N.U.,
scientific supervisor – senior lecturer Korzun O.F.
Belarusian National University of Technology
Minsk, Belarus

In 1971, the first email was sent. Since then, for more than 40 years social networks have started to evolve. Nowadays we can't imagine our life without them. Such a surge is generally a harmless phenomenon, but some researchers believe that social networks can affect our health and worldview.

In 2012, a study was published saying that using the Facebook network can fuel internal anxiety and increase a person's sense of inferiority.

Study, led by psychiatrist Ethan Cross from the Medical University of Michigan, showed that using the Facebook network can even reduce the level of happiness.

At first glance, social networks provide an endless resource to fulfill a person's basic need for communication, says Dr. Cross. But we found that instead of improving the worldview, using the Facebook network often provokes the opposite result.

Social networks are sites that allow people to communicate with each other from anywhere in the world, send messages, photos and videos and audio recordings.

Social networks call its goal: to give people the opportunity to communicate, to make the world more sociable. People can always be in touch with family and friends, find out what is happening in the world and share news.

Most users log in to the network daily. The main goal pursued by these people is entertainment. A system of conditioned reflexes that strengthen

psychological dependence is developing very quickly. Many people spend long hours sitting glued to their laptops.

Those who post status updates receive constant positive reinforcement in the form of comments and likes. Of course, if this habit is fixed for years, it is not so easy to give it up.

The phenomenon of Facebook addiction is so widespread that a special addiction scale has even been developed, which is called the Facebook Addiction Scale. This scale was developed by Dr. Cecilie Andreassen and her colleagues from the Medical University, and uses six questions to measure the degree of psychological dependence on Facebook. If you answer four out of six questions often or very often, then this directly indicates your psychological dependence on Facebook.

Based on these studies, scientists conclude that many users who are addicted to Facebook use it as a way to get other people's attention and increase their self-esteem. But can a social network have a negative impact on the mental health and well-being of the user?

Many people use social networks to compare themselves with others, and such a comparison can lead to negative emotions. Comparing their life achievements with those of their friends – they lose self-confidence.

This problem has certainly been gaining momentum lately. We know that people on social networking sites often create idealized versions of their lives, embellish reality, which can lead to distorted perceptions and negative emotions.

Another problem of social networks is virtual violence. As mentioned above, the bulk of social media users are people under 30 years of age, of which the lion's share falls on teenagers.

It is absolutely advisable for every parent to introduce a time limit on the use of social networks in families. This is a very important and persistent way to protect the psyche of a teenager.

COMPANY «BAYERISCHE MOTOR WERKE AG»

students Mychko R.V., Burshtyn K. V.

scientific supervisor – senior lecturer Korzun O.F.

Belarusian National University of Technology
Minsk, Belarus

Company «BAYERISCHE MOTOR WERKE AG» (BMW AG) is a manufacturer of motorcycles, bicycles, engines and cars. The company's motto is the phrase: «Fre`ude am Fahren», which means: "With pleasure at the wheel", and for the countries of the Great Britain: «The Ultimate Driving Machine». This company is included in the list of companies that have high sales figures.

The skyscraper, which consists of four cylinders pressed close to each other, is the head office of the company «BMW» since 1973. The building has 22 floors in its construction, 101 meters high. The first logo is very different and not at all similar to the current one, which was created by Karl Rapp. The logo depicted the silhouette of a black horse, around which there were broken circles. Today there are several variants of meaning of the logo, such as:

1. Since the company was previously engaged in the production of aviation equipment, there is a version that the emblem looks like an airplane propeller that flies against a blue sky. In the 1920s, a magazine was published in Germany in which the logo was combined with the image of an airplane flying in the clouds.

2. In its color scheme, the BMW AG logo has similarities with the flag of Bavaria. The four parts of the circle, two of which are painted blue and the other two are painted white, are very symbolic for Bavaria, where the company itself was born.

It was founded in 1913 in the German city of Munich, after the merger of two small companies that had previously been founded by Karl Rapp and

Gustav Otto. Gustav Otto is the son of Nikolaus August Otto, who was a famous inventor of internal combustion engines. Increasing economic benefits is the main goal that was laid down in the connection of companies. The first goods to be produced were aircraft engines. For example, one of the most famous passenger liners of the 1950s, the Junkers 52, was equipped with three BMW 132 engines at once. In 1919, according to the Versailles Peace Treaty, a ban was imposed on the production of aircraft in Germany. And the BMW company was forced to switch to the production of agricultural activities and the braking system of trains. After that, the BMW company begins to manufacture engines for motorcycles, and then motorcycles at all. BMW motorcycles quickly captured the hearts of people, as they were comfortable and efficient in the racing environment. In 1923, the first BMW motorcycle was released.

After taking off in the production of motorcycles, the company did not want to stop there, and in 1928 the company began to produce cars. The first cars were produced with small-liter engines. The first car produced by BMW was the Dixi 3/15 PS. The speed of this car could reach up to 80 km/h.

Currently, the company is conducting a market analysis of what is required by buyers. It equips new cars with modern technologies that have not been used in cars of other brands yet. The company places great emphasis on environmental protection, because it is the first company to introduce environmental compliance requirements for its production. It produces many cars that are powered by electric motors and do not release excess gases into the environment. The company is one of the leaders in the automotive industry, and occupies a huge place in the market, competing with other companies. The quality, exterior, technical data and ease of management, which invariably accompany absolutely all products of this brand, have been speaking for themselves for more than a hundred years.

ELECTRIC VEHICLES AS OUR FUTURE

student Artsymenia D. A.

scientific supervisor - senior lecturer Ladutska N. F.

Belarusian National University of Technology
Minsk, Belarus

An electric car is the future of cars. It is gaining popularity due to the rapid improvement of its technology. It has an environmentally friendly concept, as well as economic efficiency. So, what is an electric car, and what are its advantages?

Electric vehicles are those vehicles that use one or more electric motors to drive. This electric car concept was first conceived in the 1880s. Hungarian Anjos Yedlik is the first person who invented the original type of electric motor, from which in 1828 he created a small car model. As the technology developed, the desire to create a better model for electric vehicles grew [1].

Why should people use electric cars? Why do people choose an electric car in spite of conventional cars with an internal combustion engine (IC) being affordable?

Firstly, electric vehicles are harmless to the environment, because they are silent and do not emit carbon dioxide during operation, unlike diesel analogues. That's because electric cars don't burn any fuel. Instead, they have an electric motor that runs quietly, propelling the car forward.

Secondly, the presence of an electric motor inside an electric vehicle also means that there is no gearbox. These engines are much more responsive, they accelerate faster than the gasoline counterparts. And it also explains why electric cars can seem easier and more maneuverable to drive.

Thirdly, the power plant in an electric car is not as complex as an internal combustion engine. Consequently, their maintenance costs are lower.

Fourthly, it is more convenient. The electric car is easy to charge, and the best part is that you can even use an ordinary household outlet to charge the electric car.

Fifthly, electric cars are much safer than gas cars. They do not explode or catch fire in accidents, and their batteries are designed in such a way as to minimize the risk of electric shock.

In addition, electric cars enjoy privileges in some cities. They can park for free in public areas, and in some cases electricity is provided free of charge [2].

Also, the popularity of electric vehicles is growing. With increasing popularity, new types of unique cars are entering the market, which provide you with a rich choice in the future.

Today, electric cars are great for short-distance trips and are ideal for weekends or for those who work at home. Electric car manufacturers continue to develop new technologies for electric vehicles on a daily basis to make this car efficient and worthwhile for everyone. You may be pleasantly surprised at what they can achieve in the next couple of years.

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**MODERN INFORMATION TECHNOLOGIES
IN LOGISTICS**

student Batalova M. A.

scientific supervisor - senior lecturer Ladutska N. F.

Belarusian National University of Technology
Minsk, Belarus

Currently, it is almost impossible to ensure timely logistics without the use of information systems and special software tools. Modern information technologies serve as a reliable tool in improving the efficiency of logistics operations and ensuring faster and better delivery of goods. Nowadays, many companies use modern technologies in logistics to improve the efficiency of their activities. One of the important technologies is the integration of the logistics chain. This technology allows all participants in the logistics chain to access the same set of data, which helps to improve coordination and communication between all participants. Thanks to this, it is possible to significantly reduce the time for processing orders, simplify the workflow processes and additionally speed up the delivery of goods [1].

Modern communication technologies also perfectly bring potential customers closer to logistics services and contributes to the preservation of relationships. For example, e-mail, mobile applications, online chats and SMS notification systems allow customers to quickly and easily establish communication with a logistics company. With the help of such technologies, it is possible to provide customers with the ability to track the location of their cargo in real time, monitor the status of order fulfillment and promptly respond to emerging problems. This allows logistics companies to meet customer needs in real time and improve the quality of service.

Modern information technologies also provide effective methods of inventory management. Companies use automatic inventory management

systems that help to properly distribute stocks of goods in warehouses. This allows logistics companies to avoid hidden costs associated with storing goods in warehouses and minimize the costs of logistics operations [2].

Finally, modern automation technologies make it possible to speed up the delivery of goods. Technologies such as drones, automated trucks, unmanned vehicles and others are already being used to deliver goods with maximum accuracy and speed. They allow you to minimize the time and costs of logistics operations and significantly increase the efficiency of the cargo delivery process.

Thus, modern information technologies have a huge potential for optimizing logistics processes and increasing the competitiveness of logistics companies. The use of these technologies allows you to deliver goods faster and more accurately, reduce the number of errors in the delivery process and increase control over the timing of orders. It is important to remember that modern information technologies should be used in combination with the optimal organization of logistics operations and qualified personnel in order to achieve maximum efficiency and improve the quality of service to all stakeholders.

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SUPPLY CHAIN MANAGEMENT

students Bezrukov G.V. and Smirnova M.A.

scientific supervisor – senior lecturer Ladutska N.F.

Belarusian National University of Technology
Minsk, Belarus

Supply chain management (SCM) involves the coordination and management of all activities involved in the production and delivery of products and services. They are order processing, raw materials procurement, production, transportation, etc. An effective SCM system is essential for businesses to succeed in today's competitive environment. If you look around, almost everything you see has appeared thanks to a supply chain. Millions of people are involved in a supply chain operation, and global economy is based on SCM. Supply chains have existed since ancient times starting with the first product or service created. With the start of industrialization, SCM capabilities have developed significantly which have enabled companies to produce and deliver goods and services more efficiently. For generations SCM has remained linear and isolated being run by supply chain specialists. The internet and technological innovations have changed everything. Today, the supply chain is not linear, but a complex set of interconnected networks that are accessible 24 hours a day. At the core of these networks are consumers who expect their orders to be fulfilled and delivered on time. Effective SCM is crucial for businesses to meet customer demands and remain competitive. SCM involves the integration of various functions such as planning, sourcing, manufacturing, logistics, and customer service to ensure that products are delivered to customers in a timely and cost-effective manner [1]. SCM provides several benefits:

1. Better inventory management: SCM enables businesses to optimize inventory levels and reduce waste, resulting in better cost management. As a consequence, a company can remain competitive in its field.

2. Improved customer service: A well-coordinated supply chain ensures that products reach customers in time, resulting in greater customer satisfaction. Businesses can implement the following best practices to improve their supply chain management:

1. Use Technology: The use of technology such as cloud-based inventory management software, warehouse management systems, and transportation management systems can help in automating processes, and gain real-time visibility into the supply chain. 2. Collaborate with Key Suppliers: Collaborating with key suppliers for better communication, data sharing and joint business planning helps businesses to manage supply chains more effectively. 3. Optimize Inventory Management: Using a Just-In-Time (JIT) inventory management system or implementing a vendor-managed inventory program can help optimize inventory levels, reduce waste, and improve the efficiency of the supply chain.

Effective SCM is crucial for businesses to remain competitive and meet customer demands. By using technology, collaborating with key suppliers, monitoring performance metrics, and optimizing inventory management, businesses can improve their supply chain management practices. In today's complex and fast-paced business world, having an effective SCM system is no longer an option but a necessity to succeed.

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TRANSPORT OF DANGEROUS GOODS

student Kosmovich K.A.

scientific supervisor – senior lecturer Ladutska N.F.

Belarusian National University of Technology

Minsk, Belarus

International transport of dangerous goods must be safe, innovative and efficient. The transport of dangerous goods by road is regulated to prevent accidents and damage to people and the environment as well as to facilitate their transport.

Dangerous goods are considered to be substances that can cause an explosion, fire and damage to a vehicle, people and animals during their transport. That is why the safety regulations must be followed precisely during the transport of dangerous goods, and the special marking and labelling of packages is required to indicate the hazard of freight. Not every lorry driver is allowed to transport dangerous goods, only the drivers with an ADR license after the training course where the drivers are instructed what to do in the case of an accident and goods damage. There are nine classes that help to identify the hazard of goods.

Class 1 "Explosives". This class includes solid or liquid substances that can cause a chemical reaction. So, every lorry driver must have a first aid kit and a fire extinguisher. Special rules for such vehicles operation and maintenance must be followed.

Class 2 "Gases". This class includes compressed and liquefied gases, and mixtures of gases with other vapours. These substances can be toxic and can react with oxygen. So, the lorry must be equipped with a special equipment, as well as appropriate license plates and identification marks. Non-flammable gas is transported in white or black cylinders. Toxic gases are transported in cylinders with the image of skull and crossbones.

Class 3 "Flammable liquids". This class includes acetone, benzene, gasoline, diesel fuel and others. There is a high risk for such liquids to ignite during transport because they need a much lower temperature to ignite than other substances. Two self-powered and orange-lit lanterns should be installed on the lorry. Information tables about the risk of ignition are placed vertically on the bumper and behind the lorry, without obscuring the license plate and lighting devices.

Class 4 "Flammable solids". This class includes self-reactive substances, as well as substances that react with water and produce flammable gases.

Class 5 "Oxidizing agents and organic peroxides". These substances react with other flammable materials, as a result it is difficult to extinguish them.

Classes 6-9 "Toxic and infectious substances", "Radioactive material", "Corrosives", "Miscellaneous dangerous goods". All of these goods must be handled, packed and labelled according to the special requirements to prevent devastating damage to human health and infrastructure [1].

All participants of a transport chain involved in the carriage of dangerous goods by road have a mutual responsibility and include a consignor, a carrier, a consignee, a driver, a loader, a packer, etc. The participants must take all necessary actions to reduce the risk of an incident involving dangerous goods.

The transport of dangerous goods by road is a process that requires special competence, attention and responsibility.

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EXPLORING THE JAPANESE DOMESTIC MARKET

students Kotenko V.V. and Yurlov D.S.

scientific supervisor - senior lecturer Ladutska N. F.

Belarusian National University of Technology
Minsk, Belarus

JDM that stands for Japanese Domestic Market refers to cars and spare parts that are manufactured or sold only in the Japanese market. These cars are popular among car enthusiasts because of their unique design, distinct design and high performance. Initially, this term meant a product that was intended only for Japan, but now it is attributed to any high-performance new or used Japanese model sold in Japan and in several world markets, such as the USA and Canada. The beginning dates back to 1980-1990. In the 1980s, the first significant changes took place, which began to make the Japanese market noticeable for the American market. At that time, two-door coupes, such as the Nissan 240sx, Mazda Rx-7, Toyota Supra and others began to be sold by the US car dealerships. But a huge leap occurred in the nineties, when magazines such as "Sport Compact Car" and "Super Street focused" began to write about tuning of Japanese cars such as the Honda Civic, Nissan 240 sx, Mitsubishi Eclipse and Acura Integra - these were some of the most popular Japanese cars and are now firmly entrenched like JDM legends.

The great popularity of the magazines perfectly coincided with the new deliveries of Japanese cars to the American market. The old cars were upgraded and brought along with the new ones to the exhibition halls. In the early 2000s all new cars are imported to the USA, such as Subaru Impreza WRX STI, Mitsubishi Lancer Evolution, Honda s2000 and others.

At the same time, the first part of the no less legendary film "Fast and Furious" was released. The film is devoted much to automobiles, their technical specifications and their tuning. In the film, you could see Japanese cars with a

large amount of tuning, an unusual appearance such as large spoilers, etc. Thanks to the film, new words from tuning appeared in people's life, for example: supercharger, twin turbo, nitrous oxide. Moreover, this film has a further promotion of JDM and it has made the cars popular across the globe.

It is impossible not to mention Kunimitsu Takahashi. This man has greatly influenced Japanese automotive culture. His peak of popularity was in 1970 and before the beginning of the two thousandth. It all started with high prizes at any competitions, but after a serious injury in 1962, he finished with competitions and took up drifting as a sport. Thanks to his highest skill in drifting on JDM cars, such a car as the Hakosuka GTR, or more simply, the Nissan Skyline 2000 GT-R has established itself as a legend of the Japanese market and has interested many people to plunge into the Japanese market. It is worth mentioning that JDM is not allowed everywhere. For example, in the USA, JDM cars are not allowed due to safety and environmental issues, but this does not apply to all models - models older than 25 years are prohibited. Besides, all JDM cars are right-hand drives, because Japan drives on the left and is a right-hand drive country. The price for these cars in Japan depends on the make and model of a car.

The more people, the more opinions. Not everyone is impressed by the Japanese market and they do not even want to put Japanese cars next to the European ones, but this does not prevent the Japanese from gathering their fans around the world. It is worth noting that the JDM culture, as it gained popularity, was divided into different subcultures: drifting, high-speed driving techniques, street racing, tuning, stance and others. Now it is a full-fledged global community with a huge market of goods and products around the world. Accessories such as key chains, stickers, caps, T-shirts are part of the JDM movement, as are the cars themselves. JDM is not just a car, JDM is a way of life.

**ELECTRONIC DATA INTERCHANGE
FOR A LOGISTICS COMPANY**

student Krupkevich N. N.

scientific supervisor –senior lecturer Ladutska N. F.

Belarusian National University of Technology
Minsk, Belarus

In the modern world, electronic data interchange is replacing paper. Now you can sign primary documents with a couple of mouse clicks. The speed of obtaining documents in logistics also affects the speed of delivery of goods. To increase the security of transferred files, they are signed with an enhanced qualified signature, which is the legal equivalent of a handwritten signature.

The electronic version of the data interchange is designed to cope with the same tasks as its paper counterpart. The activity of a logistics company is associated with the processing of a huge amount of various documentation. The optimization of many operations becomes possible with the introduction of a modern EDI system. EDI stands for Electronic Data Interchange, which means a commercial and logistics document management system. Such documents do not have to be signed with a qualified electronic signature [1].

EDI technology has penetrated the transportation sector highly. All participants of a supply chain need to exchange information and documents like bills of lading and invoices as fast as possible. There are some common types of messages that make it possible to use EDI in the transportation sector: INSDDES (instruction to despatch); HANMOV (cargo/goods handling and movement); OSTRPT (order status report); IFTMIN (transport instruction) – instruction to the carrier; etc. [2].

EDI in logistics helps to manage supply chains through the timely exchange of reliable information. For convenience, two types of messages are

combined on one platform: trade and logistics. For example, when a pallet label is sent along with a shipping notice. It improves the quality of the warehouse and reduces the time for receiving goods.

There are some positive aspects of electronic document management for a logistics company:

- reduction of time spent on the passage of all documents up to 75%;
- increase in the speed of making managerial decisions;
- saving material resources (there is no need to purchase paper, maintain archival premises);
- it is easier to correct errors and inaccuracies;
- growth of labor productivity by 20-25% due to the establishment of clear relationships between performers;
- minimal risk of loss of documentation.

Logistics companies using EDI are developing more intensively. Their activities in the market are more efficient.

All processes of EDI work without any failures and are constantly updated with the elimination of errors that occur. Installing EDI in a transport company does not require large financial investments, but it greatly facilitates the work of administration, accounting and secretaries.

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CARGO TRANSPORTATION MODES

student Kukankova D. N.

scientific supervisor - senior lecturer Ladutska N. F.

Belarusian National University of Technology
Minsk, Belarus

Nowadays, the transportation of goods is a crucial aspect of any country's economy. Without it, the proper functioning of many industries would be impossible. The means of transportation used for delivering goods include road, rail, sea, and air.

In ancient times, goods were transported by animals or ships, and the delivery was slow and inefficient. However, the advancements in technology have made the transportation of goods faster and safer. Nowadays, there are modern vehicles specifically designed for transporting goods, ensuring their safety during transit.

One of the most commonly used forms of goods transportation is road transport. It is the most flexible mode and can deliver goods almost anywhere in the world. Road transport is also ideal for delivering goods over short distances. However, it has its downsides, such as limited load capacity and higher transportation costs, making it less efficient than other modes of transportation.

Rail transport, on the other hand, is ideal for delivering large volumes of goods due to its high load-carrying capacity. It is also an environmentally friendly mode of transportation. However, rail transport has issues, such as limited routes, long transit times, and overloading.

Sea freight transportation is the most effective when it relates to the international delivery of goods. It is an excellent solution for delivering goods worldwide, but may also have some drawbacks. It has a high load-carrying capacity and lower transportation costs. However, there are long transit times and a higher risk of cargo damage during transportation.

Finally, air freight transportation is the fastest and most efficient method of transporting goods. Although it is more expensive, it comes with many advantages, such as fast delivery times and guaranteed cargo safety.

Choosing the right vehicle for delivering goods is crucial. The choice depends on the specific situation, cargo features, and destination. Furthermore, companies worldwide are placing an increasing focus on logistics and supply chain management practices that can optimize transportation modes, reduce costs, and streamline operations.

The emergence of intermodal transportation is an example of this trend. It combines two or more modes of transportation, such as road, rail, sea, and air, for delivering goods efficiently to their final destination. Intermodal transportation offers benefits such as cost reduction, improved shipping efficiency, and reduced carbon footprint. Additionally, it offers a greater flexibility and faster delivery times while providing shippers more control over their products movement.

However, intermodal transportation requires planning, expertise, and management to ensure the smooth delivery of goods. By considering intermodal transportation as a cost-effective alternative to traditional methods, companies can improve their logistics operations and gain a competitive advantage in the market.

In summary, the transportation of goods is a vital component of any country's economy, and choosing the right mode of transportation is crucial. Each transportation mode has various advantages and disadvantages. However, intermodal transportation offers an efficient and cost-effective solution, meeting the diverse needs of today's global supply chains. By adopting intermodal transportation practices, companies can improve their logistics operations and gain an edge in the marketplace.

SMART CALCULATOR AS A WAY OF ECONOMIC AND LOGISTICS OPTIMIZATION

student Derkach A.A

scientific supervisor – Levitskaya M.S.

Belarusian National University of Technology

Minsk, Belarus

The main thing in the work of a freight forwarder is the accuracy with which he draws up orders and interacts with contractors. But accuracy cannot be achieved at the expense of speed - it is necessary to calculate rates and make decisions about transportation as quickly as possible. How do we understand if transportation is profitable?

A smart calculator helps you instantly calculate the benefit from each specific transportation. It takes into account all the main costs - taxes, the salary of a logistics manager, inflation and fixed costs of the company. This allows you to find out the real and not hypothetical profit from transportation and avoid deals that seem profitable only on paper. Each of these parameters is configured individually and enables you to make the profit calculation as accurate and relevant as possible for your business. Special attention should be paid to the setting - the calculator does not invent anything itself, but only works with the information that is given to it [1].

For a logistician, a calculator is a truly indispensable tool that helps to make decisions about transportation much faster and negotiate only guaranteed profitable rates with customers and carriers. And for the manager - a simple means to significantly reduce the load when coordinating applications. It includes smart scheduling, scalability, improved vehicle loading, and convenient geocoding.

From creating requests to managing mutual settlements with counterparties. Make only profitable deals: "Smart Calculator" quickly and

correctly calculates the profitability of cargo transportation, taking into account all hidden costs.

Expand your list of customers or carriers and earn even more with the help of auctions and tenders: get orders for transportation from direct and verified cargo owners or play auctions and tenders among reliable transport companies.

Smart Logistics allows you to participate in auctions for transportation and place bids directly on your smartphone. The logistician can receive orders from cargo owners, create applications, sign and send from the customer.

Smart Logistics helps you to find new direct customers, pass their accreditation and conclude long-term contracts with them; to secure your transportation by checking the reliability of drivers, vehicles and studying companies rating.

The main tools of the work of logisticians - Smart Calculators of the Forwarder and the Carrier - help to arrange only profitable transportation. The calculators themselves calculate the real profit from transportation, taking into account all expenses (including fuel, taxes, salaries and even office expenses). All the logistician needs to do is fill in the data and in one click find out if the transportation will be profitable, this can be done even during a conversation with a client and instantly give him the final cost.

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INCOTERMS: ESSENCE AND SIGNIFICANCE

student Ermakovich E. A.

scientific supervisor – senior lecturer Levitskaja M. S.

Belarusian National University of Technology

Minsk, Belarus

The buyer and the supplier have to agree on the terms of goods delivery — who will be in charge of transporting, loading and unloading, and who will be responsible for breakage or loss of the goods. However, it is not necessary to describe everything in the contract, for this purpose a system of designations has been developed which are internationally recognized and can be equally understood in different countries. Incoterms rules (International Commercial Terms) have been employed in international trade since 1936. They are a collection of trade term definitions designed and implemented by the International Chamber of Commerce (ICC). They describe the contract responsibilities and liabilities of the buyer and the seller, as well as differentiate their risks and expenses. In respect of responsibilities, they can imply which party will organize the transportation or insurance of goods, or which party will deal with export or import formalities and pay customs duties. As for the risks, they might imply cases in which the responsibility for the safety of the goods is devolved from the supplier to the buyer. On the subject of expenses, these refer to distribution of the costs on transportation, packaging, loading or unloading, as well as the costs on inspection and security.

A number of items are not concerned by International Incoterms rules such as transfer of goods ownership; consequences of delay and other violations in the performance of obligations under the contract; characteristics of goods; time, place, method or currency of payment for the goods; force majeure;

intellectual property rights and controversial resolution in case of their violation. The above-mentioned items are to be stipulated in the sales agreement [1].

The chosen delivery terms influence on the final price of the goods, because the transportation and procurement costs depend on Incoterms. The rules are revised every ten years and each upcoming revision cannot disable the former one which means that although any rules can be used, the International Chamber of Commerce provides recommendations to still apply the recent ones – Incoterms 2020 (Fig. 1).

Incoterms rules consist of eleven three-letter trade terms defining basic delivery terms. The bases of delivery are divided into 4 groups — E, F, C, D, depending on the participation of the seller and the buyer in the main delivery.

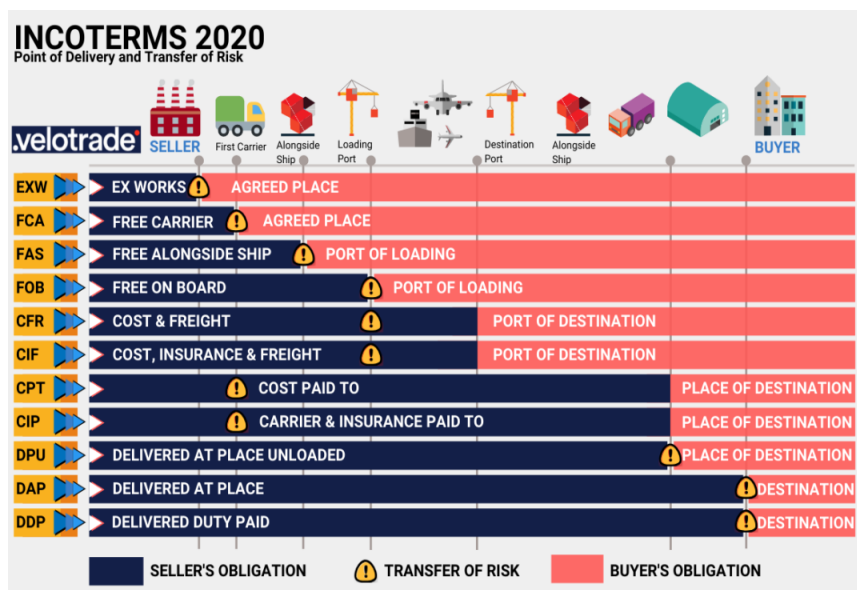


Figure 1 – Incoterms Rules 2020

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**OPERATION OF THE TRANSPORT COMPLEX IN THE REPUBLIC
OF BELARUS UNDER SANCTIONS 2021-2022**

student Zaitseva E.I., student Gritskova Y.S.
supervisor – senior lecturer Levitskaja M.S.,
Belarusian National University of Technology
Minsk, Belarus

The logistics sector has had a tough three-year period due to economic pressure including losses from the pandemic and changes in the transport funds. This caused significant damage to the aviation, road, and sea transport industries. There were troubles with money transaction which required additional documentation. This has led to the need for urgent measures to restore the ability to transport goods and money since the transport industry is a natural conductor of foreign trade operations through which about 45% of the funds are brought to the Republic of Belarus.

The Republic of Belarus has demonstrated the ability to respond quickly to crisis situations in the context of sanctions in connection with the current situation. It is formation of alternative supply chains for the implementation of exports that is a priority today. Logistics companies are forced to closely monitor all changes in the field of logistics in order to be able to respond promptly to emerging issues [1].

Goods can pile up at transit warehouses, borders and transport terminals due to disruptions in the supply chain which can lead to an increase in theft. To prevent this in order to avoid sanctions and conflicts, the cargo moves quickly along alternative routes. According to the statistics of the International Automobile Exchange ATI.SU, the number of traffic on the Russia-Belarus route in March 2022 increased significantly. In January and February 2022, transportation increased by 30% compared to the same period in 2021.

Transportation between the EU and the Republic of Belarus, which was in high demand in January and February 2022, made it possible to achieve the following results:

- the supply of gas silicate blocks increased in 5.5 times;
- the supply of cosmetics and tobacco products increased in 4.5 times;
- the supply of flour, peat, and cereals also increased significantly;
- there were fewer imports of fiberboard, stationery, vegetables, plastic, vehicles, fruits, and textiles [2].

Cargo delivery from Europe to Belarus increased by 130% compared to the same period in 2021, but it decreased after sanctions were imposed. Transport companies needed to break even and keep their staff. Vehicles registered in the EU were banned from crossing the border to Belarus, except for specific checkpoints for cargo operations and vehicles carrying mail or live animals.

As soon as the industry has recovered, companies will review their supply chain organization. They should create plans to offer different services, bring back production from non-CIS (Common Wealth of Independent States) countries, and consider outsourcing nearby. It is important to ensure sustainable supplies and automation of labor processes to overcome the current crisis.

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KAIZEN SYSTEM PHYLOSOPHY IN ENTERPRISE MANAGEMENT

student Klopova V.S.

scientific supervisor – senior lecturer Levitskaja M.S.

Belarusian National University of Technology

Minsk, Belarus

In the modern world, there are many ways to optimize production, but almost all of them require significant monetary or labor investments.

The principles of Kaizen philosophy originated in Japan can be applied in almost all fields. Consistent application of simple rules leads to tangible results for Japanese companies such as Honda, Toyota or Sony, so European companies are increasingly choosing this philosophy.

The name «Kaizen» consists of two words: “kai” - *change* and “zen” which can be translated as «for the better». Collectively, this term means a continuous process of improvement. This method is comprehensive and easy to set up [1].

The concept is aimed at increasing the company's productivity by making small changes in everyday life. Thus, it is a soft and gradual approach that contradicts strategies that require drastic changes without any coordination in order to achieve the desired results in a short period of time. To be efficient, it requires the participation and acceptance of all employees of the company.

The Kaizen method has several advantages for business: it allows employees to be satisfied as their participation in the project makes it possible to optimize the working conditions of employees, team morale increases, employees feel useful and valuable, and they become much more motivated.

The use of this tool also contributes to increasing the level of customer satisfaction and loyalty by improving the quality of products and services. Thus, image enhancement is one of the main results of using the Kaizen method.

Another advantage of the approach is increased productivity and reduced production time. The revision of processes helps to avoid wasting time and energy and increase efficiency which leads to optimization of production. The method leads to a reduction in the execution time of all services by minimizing downtime: equipment that is not currently used by one employee will be used by another one. Continuous improvement ensures a healthy working climate: safety is improved, and there is a decrease in the number of accidents.

The Kaizen approach has appositive effect on communication between employees and significantly improves teamwork. It contributes to increased profitability, number of flows and simplified task management. Its influence extends to many functions of the company, such as logistics, supply chain, etc.

The Kaizen method is also based on two fundamental principles:

- it denies a conventional assumption that money is a remedy for everything. According to this philosophy, it is more important to act creatively and intelligently;

- the word «problem» can be considered as a kind of key term: it is the main driving force and, thus, creates new opportunities.

Kaizen philosophy suggests that any process is infinite and when something has been improved it does not mean the improvement process is complete.

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DEVELOPMENT OF ROBOTICS IN LOGISTICS

students Kulakova M.O., Lukashevich P.A.

scientific supervisor – senior lecturer Levitskaja M.S.

Belarusian National University of Technology

Minsk, Belarus

Digital technologies are rapidly taking over one of the most difficult areas of the economy – logistics. It is expected that in a couple of years the bill of robots for processing goods will go to hundreds of thousands.

Classical commerce began to rapidly turn into electronic commerce which changed the logistics sector beyond recognition. Consumers have also changed. Formerly, they used to shop on the Internet for "little things" – fast food, books, gadgets. Today, almost everything can be purchased through the Network – from hairpins to a car and wholesale batches of production equipment. Traditional retail offered the buyer what was on display. In the era of e-commerce, consumers choose goods on a variety of storefronts comparing prices, quality of service, and, of course, terms and delivery time [1].

The latter factor is often pivotal, so the final word belongs to the retailer with the fastest logistics, that is, with robotic warehouses. Amazon is the most vivid example of how the correct organization of storage and delivery of goods can turn a small online bookstore into a multibillion-dollar multi-profile enterprise on a global scale.

Robotization of warehouses has a number of significant advantages. This means reducing personnel costs, increasing the efficiency and speed of tasks performed by robots, and the ability to optimize storage space. Enterprises that already use warehouse robotics were able to duly appreciate the advantages of automated warehouse processes during the coronavirus epidemic. It was at this

time that the ability to solve many tasks with minimal use of human resources came to the fore.

So far, fully robotic operation of warehouses is impossible without the participation of an operator. The process of robotization is gaining momentum, and the management of all warehouse processes without human intervention in the future is a real prospect.

The relevance of the topic of robotic warehouses arose long before the pandemic. Their advantage is to increase business efficiency, including minimizing the impact of annual fluctuations in the volume of product processing in warehouses, which increases operational efficiency. It is also worth noting the exclusion of the "human factor", which, in turn, has a positive effect on the quality of operations. Among the disadvantages one can mention the high cost of new systems, though any novel technology becomes more affordable and more reliable over time [2].

According to the study conducted by Markets and Markets research in 2023, it is expected that the warehouse robotics market will grow by 12% annually, and by 2028 it will reach a volume of \$8.88 billion. Such rapid growth is due to the transition of large companies, online retail, to the robotic organization of warehouses.

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INNOVATIVE WAYS OF CARGO INDICATION IN TRANSPORT LOGISTICS

student Muraveiko D.D.

scientific supervisor – senior lecturer Levitskaja M.S.

Belarusian National University of Technology

Minsk, Belarus

From the world practice of managing logistics processes, it is known that operational and unmistakable information about the material flow is the key to efficient and profitable logistics. That is why, today transportation logistics uses many innovative ways to deliver cargo:

1. Radio Frequency Identification (RFID). The technology enables instant detection of goods location using radio frequency tags on packaging. This can enhance the precision of tracking cargo in real time.

2. Temperature Monitoring. Innovative real-time technology contributes to avoiding product damage and delivers goods on time.

3. Self-driving vehicles and drones are employed to deliver goods in places where the use of transport is difficult or impossible.

4. Blockchain. The technology is applied to improve transparency and security in the logistics industry. It provides means of collecting data at all stages of transportation.

5. Internet of Things (IoT) is used to connect packages and vehicles with the Internet, providing maximum information about the state of goods and transport [1].

In total, the use of innovative methods in transport logistics optimizes the transportation process and enhances control. Moreover, the above mentioned technologies not only sustain logistics cost saving and reduction of the delivery time, but also improve the quality and efficiency of cargo delivery.

Innovative methods of cargo indication are used in various countries of the world. The USA is the leading country in the use of RFID and IoT technologies in transport logistics. Various companies in the US are using these technologies to optimize their logistics operations and improve delivery efficiency. China is one of the leaders in the integration of blockchain in transport logistics. For example, Alibaba Group Holding Limited, a multinational technology company also known as Alibaba, which specializes in technology, Internet, e-commerce and retail, uses blockchain technology to provide a more transparent supply chain to have more information about placement of goods. Germany is the country where IoT technologies and drones are often used for fast and efficient delivery of goods [2].

To conclude, only a few examples of countries, that are using innovative ways to indicate cargo in logistics, have been referred to although their number is growing rapidly around the world. This is due to the fact that innovative ways of cargo indication help improve, simplify and speed up the delivery of goods from their production to destination with less money spending.

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PASSENGER TRAFFIC STATISTICS

students Pototskaya A.O., Ropot N.V.

scientific supervisor – senior lecturer Levitskaja M.S.

Belarusian National University of Technology

Minsk, Belarus

Passenger transport has become an important part of the life in a modern city. Its main task is to cater for the needs of people in transportation and at the same time to improve standards and quality of passenger service.

It goes without saying that with the overall growth of the population and the urban area, transport mobility of city residents increases all the time. Also, the distance per trip keeps growing. So, further development and improvement of the quality of passenger transportation service is the goal for transportation providers and can be implemented largely by means of passenger traffic statistics and its tools.

Let's consider the description of passenger transport system of the Republic of Belarus and its dynamics for the period from 2019 to 2021 based on statistical data of the National Statistical Committee of the Republic of Belarus.

The volume of passenger traffic in 2020 was 1,639,172.5 thousand people, which is 17.83% less than in 2019. In 2021 it decreased by another 2.9%. The most popular mode of transportation is automobile. The share of automobile transportation in 2019 was 59.5% of all modes of transportation, in 2020 – 60.5%, in 2021 – 59%. The least popular are inland waterway and air transport.

Passenger turnover index figure is an indicator of the volume of passenger transportation in passenger-kilometers and is calculated as the multiplication of the number of passengers by the distance of transportation for each kind of transport. The passenger turnover in 2020 decreased by 32.76% compared to

2019 and increased by 12.45% in 2021. Over long distances, road, rail, and air are the most used modes of transportation. For short distances, subway is preferred.

Passenger transportation and passenger turnover indices are relative statistical figures that characterize the change in the volume of passenger transportation and passenger turnover in the course of time respectively. The passenger volume index in 2019 is 100.8% by 2018. In 2020, the passenger volume index decreased by 17.8%. In 2019, the passenger volume index was 39.8% higher than in 2020. [1]

Passenger transport enterprises engaged in socially important transportation are now in a difficult financial and economic situation due to the lack of their own funds, limited subsidies allocated from the national budget. The efficiency of passenger transport was reduced significantly by 2020. The decrease in the volume of transportation and passenger turnover in 2020 was caused by the peak of the COVID-19 pandemic. Efficiency was partially restored in 2021, but never returned to the level of 2019. Transportation sector was the most unprofitable in 2020.

Over the past 30 years, there has been a steady decline in the volume of passenger transportation and passenger turnover performed by public transport. One of the reasons for this tendency is the rapid increase in the number of passenger cars in private ownership of citizens.

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APPLICATION OF ECO-TECHNOLOGIES IN LOGISTICS

student Sotvaldieva A.S.

scientific supervisor – senior lecturer Levitskaja M. S.

Belarusian National University of Technology

Minsk, Belarus

Processes in the logistics sector occupy the main place in the activities of every enterprise operating in the global economy. At present, a set of problems of improving environmental protection measures is a rather urgent issue, as the processes of globalization of the world economy are deepening. Every year, buyers become better aware of the impact on the environment, thereby increasing their knowledge in the field of environmental literacy and awareness. This is what causes interest in the introduction of environmental processes in logistics operations by companies. As a result, eco-logistics is one of the promising areas for improving the supply chain management industry.

Eco-logistics is an activity that uses the application of new principles and technologies in logistics, and is also a more ecofriendly transport system. The impact of transport emissions adversely affects the environment, so the main mission of "green logistics" is to reduce the wastes of transport activities. "Green" technologies include progressive solutions for the processing and recycling of materials, wastewater treatment, energy saving and environmental protection. However, the problem is that many people do not care about environmental protection and rational use of natural resources, and also the government does not have sufficient incentives for the population to use environmental strategies. Environmental technologies mostly increase the cost of logistics services, so this is not very common [1].

One of the examples of companies actively involved in using "green" technologies is DHL, an express delivery company. They use a program

GoGreen that counts the amount of carbon dioxide emitted during cargo transportation. A certain percent of the client's payment goes to climate protection worldwide

In Germany, the Eco Plus project is used. Within the framework of this project, a method of transporting goods without carbon dioxide emissions was introduced by rail. According to him, the company uses electricity for its trains, which is obtained from renewable energy sources due to additional charges from customers whose cars are transported, for example, by the automaker Audi.

Hundreds of cars with a hybrid engine, which are available in the range of the UPS express delivery Company, consume much fewer gallons of fuel compared to cars with internal combustion engines. This means that environmental pollution is reduced.

Numerous regulations that aim to limit the carbon emissions of transport have been applied around the world. Carbon standards and the promotion of "carbon transparency" will be one of the main areas of activity in any industry.

Introduction and active application of eco-logistics strategies and principles can definitely have good results on improving the environmental situation locally and around the world. Thus, they need to become important requirements for maintaining competitiveness.

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BIONIC HAND THAT SENSES TOUCH

students Nikolaeva J.G., Karolik M.S.

scientific supervisor – senior lecturer Lichevskaya S.P.

Belarusian National University of Technology

Minsk, Belarus

Many disabled people, having lost a limb, stop feeling touch or feel the temperature of an object, as the nerve channels are damaged. But to date, a bionic hand has been developed that can enable a disabled person to feel touch again.

In the design of such artificial limb «the sensor data is connected to sensitive nerve endings in the patient's forearm, creating its own interface between organic tissue and the artificial arm. An implantable electrode, known as a cuff microelectrode array, or, more simply, a cuff electrode, is the main component in a bionic arm. The development of such an electrode continued for many decades. The main function of the cuff electrode, which is a plate of flexible material with several electrodes on the surface, is aimed at electrical stimulation of muscles and receiving signals from nerve fibers. In this case, undesirable effects on the nerve endings of the ‘foreign’ device are minimized. New cuff electrodes can now interact with individual groups of axons (an integral part of the neuron), avoiding penetration into their protective sheaths» [1].

The process of adapting the electrodes was very complicated. However, the real problem was to maintain stimulation of different types of axons for a long time. The forearm has three types of nerve endings – medial, radial and ulnar, which connect motor sensory nerves to various bundles. Currently, scientists are using one end of one nerve, connecting this nerve with 20 sensory sensors. The use of several electrodes on one nerve allows you to create many

neural connections. The signals that the prosthesis transmits to the user's nerve endings are as close as possible to the tactile sensations of a real hand [2].

However, conventional prostheses can reproduce such smooth movements only in manual mode, i.e. when the disabled person accurately repeats each movement. In a study published in the journal Science Robotics [3], two volunteers were fitted with bionic arms and their movements were tested. Both volunteers performed basic daily tasks such as picking up and using cups, bottles, and ballpoint pens. One of them could even use a smartphone. According to the researchers, they performed these tasks as intuitively as they did before losing their limbs.

While the bionic prosthetic hand looks great, it does not yet have sensory functionality, such as being unable to convey the temperature or softness of the object it touches. However, this problem has already begun to be addressed. A team of South Korean scientists has created artificial leather gloves with built-in S-sensors (there are currently 400 of them) that can send signals to the brain [4].

The development of bionic prostheses will continue in future.

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HAND PROSTHESES

students Polyakov V.D., Kazhdan I.K
scientific supervisor – senior lecturer Lichevskaya S.P.
Belarusian National University of Technology
Minsk, Belarus

Bionic and biotechnological prostheses have long allowed people to replace their lost limbs with new ones. Modern developments of bionic prostheses combine robotics and prosthesis osteosynthesis. The essence of this direction lies in the fact that the supporting part of the titanium prosthesis fuses with the bone base of the stump, and the sensors are implanted and connected directly to the nerve endings. This will make it possible to use the prosthesis permanently without removing it. Direct attachment of sensors to the nerve endings of the stump will make it possible to control movements in the prosthesis more subtly and accurately, and will make it possible to transmit tactile sensations, which will significantly improve the quality of life of people with an amputated limb [1].

At the moment, bionic prostheses are divided into two types: 1) Single-grip: an artificial replacement for an amputated or damaged body part, controlled by various mechanisms and designed to perform special actions and / or recreate the appearance of the user's limb, equipped with at least one motor, which in its operation provides a grip. 2) Multi-grip: a bioelectric prosthesis with several types of grip, as well as a motor for each finger. Due to this, the prosthesis is able to perform many grips or gestures, and also has several types of closing and opening of the fingers. The number of gestures is programmable according to the user's wishes.

All modern hand prostheses, with the exception of mechanical prostheses, implement an open-loop control principle. Mechanical prostheses in the active

loading mode implement the principle of feedback control both in position and in force, which makes such a prosthesis actually sensible.

Recently, research has been actively conducted on the use of muscle amplifiers of the bioelectrical signal. The method requires special surgical intervention to isolate groups of muscle fibers and attach to them the nerve endings that previously controlled the muscles of the large joints of the hand. To control the actuators of the prosthesis with the help of overhead electrodes, bioelectric signals are taken. In fact, it is supposed to form a complex movement of a prosthetic hand on the basis of the stereotype of movement of a natural limb that has already developed in the centers of the brain. This system differs not only in the complexity of the surgical intervention, the complexity of the technical implementation, but also in the complexity of teaching a disabled person. The control principle here remains open, and the problem of implementing feedback with the bioelectric control method has no fundamental solution. The preferred and most realistic at present is the formation of a system for simultaneous control of the movement of the links of a multifunctional prosthesis of the arm, which does not require surgical intervention, using the copying method and organizing feedback with the control body on position and force [2].

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LOBSTER'S HELP IN CREATING AN X-RAY MACHINE

student Andrushkevich I.V.

scientific supervisor – lecturer Lukashevich K.K.

Belarusian National University of Technology

Minsk, Belarus

Do you think that someone, except the man, can boast of creating such a wide range of technical devices? But are people really brilliant inventors? After all, no matter what problem we solve, what device or mechanism we develop, an existing comparable creation will certainly be found in the universal workshop - nature. Wildlife is an unsurpassed technologist, designer, engineer and, of course, a builder.

Undoubtedly, no one is going to dispute the great achievements of Wilhelm Conrad Roentgen. In 1895, he discovered X-rays, which entered the history of science and society under the name "X-rays".

On the contrary, in wildlife, lobsters have the ability to “shine through” objects. The unique visual system allows the animal to see reflected light rather than refracted light. Their eyes are covered with almost perfectly square "mirrors" that do not refract and scatter light like human eyes. They reflect it at a certain angle. Thanks to this, these creatures can see perfectly in turbid water and in the dark. It is interesting that not all crustaceans possess such a system of vision, only those who belong to the family of long-bodied decapod crustaceans. This family includes lobsters and shrimp. All other crustaceans have completely ordinary eyes with a system of light refraction. Based on the lobster's unique vision system, scientists of the Physical Optics Corporation have invented the Lobster-Eye X-ray Inspection Device (LEXID). The US Department of Homeland Security has already invested \$1 million in the project.

The device encompasses a low-power X-ray generator and an optical system made up of thousands of metals, highly polished squares that reflect and

align the X-rays as they are directed to the object of interest. The parallel emission of the beams allows them to hit a much smaller area at the same time, which contributes to a deeper penetration of the X-rays.

Instead of detecting the X-rays passing through an object, LEXID detects rays that scatter back into the device. The optical system collects and focuses these backscattered rays, collecting all the reflected rays into one focal point, instead of analyzing diverging rays at different points in the system. The ability to focus all the reflected light onto a smaller area provides a more accurate sensory experience. This scanning system is really efficient.

LEXID can easily see through concrete, wood and steel up to 3 inches (75 mm) thick. Actually, X-rays are harmless to human's vision. It means that using the scanner while working with people is much safer than using contemporary systems, since the radiation exposure is less.

There is only one example of modern equipment in the creation of which an invaluable knowledge about wildlife was used. But in fact, there is a large number of such technologies that have appeared a long time ago. And every day we come across them, for example: GPS, Velcro, zippers and even a piston syringe.

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PAVEGEN PLATES AS AN ALTERNATIVE ENERGY SOURCE

students Barbarich E. V., Medvedeva A. N.

scientific supervisor – lecturer Lukashevich K. K.

Belarusian National University of Technology

Minsk, Belarus

In our fast-moving world modern high-tech solutions can assistance to receive useful electricity from kinetic energy. The kind of energy thus obtained can be used to meet the different needs of humankind: autonomous lighting, gaining access to the global network using Wi-Fi, and using the simplest robotic devices. This seemingly specific method of obtaining a power source in an urban environment can become the basis for the creation of autonomous areas of local use of electricity for public needs. Consider, for example, a method for converting a simple movement of a material body into an alternative source of energy. And with the right technological equipment, it can be collected, transformed and used for reasonable purposes: with a single step of thousands of people, you can accumulate enough electricity to light up the same section of a public place [1].

This principle is well demonstrated by the paving slabs of the Pavegen Systems – a UK technology company that developed interactive floor tiles to convert footsteps into small amounts of electricity, data insights, and engagement points for businesses, global brands, and governments. The 60 cm by 45 cm plates can be installed on any horizontal surface: ground, pavement, etc. These plates work by absorbing kinetic energy and converting it into electrical energy. The flexible water-resistant stuff of the plates bends by 5 mm when pressed, the pitch kinetic energy is redeployed to the electromagnetic lithium generators, which are placed directly under the plate. They are capable of producing from 4 to 7 watts of autonomous energy in one step of a person.

Five Pavegen panels are capable of supplying night-time public lighting. The tile can also transmit data wirelessly, through the power of the steps, and hence can be integrated into smart city systems. Designed for maximum power return and data collection, durable and easy to install. It can be built into any place as a decentralized source for the purpose of power supply [2].

The surface consists of composite tiles and electromagnetic generators. When a person steps on it, their weight causes a vertical displacement of the upper surface by 5 to 10 mm, which creates pressure on the generators below, causing the electromagnetic mechanisms to rotate to produce current and data.

Pavegen system tiles have a built-in API wireless detector that transmits data on-line, providing insight into peak hours at the installation site, predicting people's movement trends and creating heat maps of the most visited locations (in case of laying large areas), track the location of people and the number of steps they took.

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RENEWABLE RESOURCES

students Gurinov T.I., Krivovyaz M.M.
scientific supervisor – lecturer Lukashevich K.K.
Belarusian National University of Technology
Minsk, Belarus

Renewable energy resources are a vital part of the global energy mix and play a crucial role in mitigating climate change. This abstract provides an overview of renewable energy resources, including solar, wind, hydro, geothermal, and bioenergy.

Solar energy is the most abundant and widely available renewable energy resource, and its harnessing technologies have advanced significantly over the years. Photovoltaic (PV) and concentrated solar power (CSP) systems are the most commonly used solar technologies that convert sunlight into electricity. Additionally, passive solar technologies, such as passive heating and cooling, can significantly reduce energy consumption in buildings [1].

Wind energy is another abundant and increasingly competitive renewable energy resource. Wind turbines are designed in that way they can use the wind kinetic energy and use the converting mechanism to create electricity from air. Offshore wind energy has enormous potential and is rapidly expanding, with larger and more efficient turbines being developed.

Hydro energy is a well-established renewable energy resource, with hydroelectric power plants providing large amounts of electricity globally. Hydropower is a flexible and reliable source of energy, and pumped storage systems can help balance the grid during periods of high demand.

Geothermal energy harnesses the natural heat of the earth to generate electricity or heat buildings. Geothermal power plants are usually located in areas with high geothermal activity, such as volcanic regions. Ground-source

heat pumps are also commonly used to heat and cool buildings, providing energy-efficient heating and cooling solutions [2].

Bioenergy is derived from biomass, which is organic matter, such as crops, wood, and waste. Bioenergy can be used to produce electricity, heat, and transportation fuels. However, it is essential to ensure that bioenergy is sustainably sourced and does not compete with food production or lead to deforestation.

In conclusion, the usage of renewable resources energy sources in wide perspective can be very economical effective and nature saving. Such problems as climate change, desertification, death of many marine species, pollution of reservoirs, global warming, mass deforestation can be avoided by using alternative and renewable sources of energy. Our planet is a very fragile structure under human feet, so humanity should seriously think about the consequences that can happen if nothing is done.

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NEURAL NETWORK

students Ignatovich E.O., Moysak N.R.
scientific supervisor –lecturer Lukashevich K. K.
Belarusian National University of Technology
Minsk, Belarus

A neural network is a type of artificial intelligence that consists of connected bumps, or "neurons" that are organized into layers and trained on large datasets to learn patterns and make prognostications. Neural networks have come as a necessary tool in ultramodern society, revolutionizing fields such as healthcare, finance, and transportation. One of the most significant benefits of neural networks is their capability to dissect large quantities of data snappily and directly. In healthcare, for illustration, neural networks can be trained on large datasets of medical records to identify patterns that may indicate a particular complaint or condition. This can lead to earlier opinion and treatment, potentially saving lives and perfecting patient issues. Also neural networks can be used to dissect fiscal data, such as stock prices and request trends, to make prognostications [1].

Another area where neural networks have shown tremendous eventuality is transportation. Tone-driving buses, for instance, calculate on neural networks to reuse data from detectors and make opinions about how to navigate the road. This technology has the implication to reduce business accidents and losses, as well as to make transportation more accessible to individuals who cannot drive. From healthcare and finance to transportation and communication, neural networks have the eventuality to revise the way we live and work. As we continue to develop and upgrade this technology, it is essential to fete its eventuality and influence it for the betterment of society.

Neural networks have revolutionized the field of artificial intelligence, allowing computers to learn from large data sets and make prognostications grounded on this training. Still, despite their numerous advantages, the use of neural networks has implicit downsides, especially in the area of security. Neural networks are trained on large datasets that frequently include sensitive particular information, similar as medical records or fiscal data [2].

However, it could be used for unrighteous purposes, similar as identity theft or fraud, in case this information falls into the wrong hands. Also, the use of neural networks can produce security vulnerabilities as well. For case, neural networks are susceptible to inimical attacks, in which a bushwhacker designedly manipulates input data to wisecrack the network into making incorrect prognostications. These attacks can have serious consequences, particularly in high-stake areas like healthcare or finance. As with any technology, it is pivotal to strike a balance between the benefits and pitfalls of using neural networks to ensure that they are used responsibly and immorally.

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TRANSPORT AND LOGISTICS SYSTEMS OF ENTERPRISES

students Korneva A.A., Kolodenko E.A.
scientific supervisor – lecturer Lukashevich K.K.
Belarusian National University of Technology
Minsk, Belarus

The logistics system can be considered as a self-regulating system that performs certain functions and various processes in logistics, quickly responding to the flow of information about the movement of goods and includes many subsystems with inextricable management processes and well-organized communication with elements located outside the organization in which it works this system. Ties within the system should always be stronger and stronger than with external sources. The logistics system is the most important component of any transport business, it must be able to adapt to changing impacts, for example, to sanctions, that is, it must be adaptive [1].

As a characteristic of logistics systems, we can single out the presence of technological flows and a certain sovereignty of the system. Knowing what a logistics system is, it is easy to determine its main goal: the delivery of goods from the supplier to the consumer's destination at a certain level of consumption costs and in the required quantity. The elements of the logistics system, with certain economic links between them, include raw equipment, warehouses, materials, transport, information, personnel, sales, and more. In fact, a logistics system can be called any company where there is any product that is moved, purchased, stored, sold and so on.

The formation of a logistics system should be based on the basic provisions of management theory. These provisions are unique for the logistics system, and among them are: continuous coordination of information, energy, resources and other aspects of the supply chain, flexibility in the sequence of

logistics design, the principle of combining each subsystem. The logistics system has such integrity that no single element has, that is, the system can be considered as a whole while dividing it into separate components. Any logistics system must fulfill the property of integrativity, that is, in general, the system performs a function, but each of the elements cannot perform it by itself. An important stage in the formation of the transport and logistics system is the development of international relations with potential partners, among which there are competitors [2]. Often, logistics operations are considered important elements of the transport and logistics system, that is, it is something that can be measured financially and in time and that is performed at one workplace. From several such works, a logistic function is compiled - several logistic operations, united in terms of goals, but different from another set. This function can be considered as the receipt of goods at the warehouse, and so on.

Through innovative production technologies, the management effect of logistics, information flow and capital flow can be maximized to help enterprises achieve their set goals. Thus, we can conclude that logistics systems make it possible to optimize the movement of goods from suppliers to consumers as much as possible.

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WORK OF PHYSICISTS

student Matusevich M.V.

scientific supervisor – lecturer Lukashevich K.K.

Belarusian National University of Technology

Minsk, Belarus

Physical science studies everything around us and raises the questions connected with objects, their reactions, properties and structures. For example: Why are compact discs multicolored? What is the source of gravitation? How is kinetic energy converted into electricity? Physicists look for explanations of natural phenomena, and as a result it helps us to understand better ‘strange’ things we observe [1]. The world we live is very rapidly becoming more complicated. Newly invented materials that are much stronger than concrete or steel are being used to construct buildings. These materials result from advances that have been made in physical science. Each person, namely physicist, is trying to find solutions how any things happen. Wondering is the beginning of all science. The inventions of new devices, the investigations of different phenomena, the discoveries of unknown substances result from it.

Scientists build on what other scientists in the past have reported. In the 1800s scientists like Ampère and Ohm reported on how electricity travelled through objects. In 1879 Thomas Edison, an American, discovered how to use electricity to produce light. He used the work of Ampère and Ohm to invent the light bulb. Today, scientists are still adding to the knowledge obtained by others.

Observing and Discovering: An Example. The story of how people invented the airplane illustrates how science works. Since ancient times people have been curious about how birds fly. They wondered whether they, too, could learn to fly. Many people tried to fly by building wings that they could flap to stay in the air. Many of their attempts failed.

The Shapes of Wings. In the 1800s several European scientists studied the shapes of birds' wings. They wondered why birds can often glide in the air for a long time without flapping their wings. They discovered that flapping was not what kept birds in the air. The shape of the wing was the key to flying. People used this information to make gliders.

The First Airplane. Two Americans, Wilbur and Orville Wright, used the results of the Europeans. They built several successful gliders. Then they designed a glider with an engine and propellers. They tested their designs carefully. Their work produced an airplane that could take off and fly under its own power. This famous flight took place at Kitty Hawk, North Carolina, on December 17, 1903 [2].

Using Scientists' Discoveries in New Ways. The Wright brothers learned from the work of others. Later scientists learned from the Wrights. The Wright brothers built a machine called a wind tunnel to test their designs. Improvements in the Wright brothers' wind tunnel have made it possible for people to build bigger and faster airplanes. Wind tunnels have also been put to uses that the Wrights did not foresee. People who design bridges often test models of them in wind tunnels before construction begins. These tests may show what effect strong winds will have. They may even help prevent disasters.

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A REVOLUTIONARY METHOD OF DNA MANIPULATION USING THE CRISPR MECHANISM

students Mihalyonok S.A., Karankevich V.S.
scientific supervisor – lecturer Lukashevich K.K.
Belarusian National University of Technology
Minsk, Belarus

CRISPR is a unique prokaryotic immune system whose structure was first described about 35 years ago, but whose function has long remained a mystery.

Molecular scissors were first discovered in 1987 in the genome of *E. coli*, an important model organism for microbiology and molecular biology. Japanese researchers studying *E. coli* have discovered an unusual repeating sequence in DNA. Subsequently, similar structures were found in many other prokaryotes. Similar structures have also been found in archaea and bacteria. However, nothing like this has been found in the genomes of eukaryotes and viruses [1].

The CRISPR system consists of a genomic cassette in which information about an invading virus or plasmid is recorded, and the Cas protein, which is responsible for the molecular mechanisms of immunity. When an infection invades, cells use CRISPR to cut out small fragments from the alien genome and insert them into a cassette.

The highly efficient DNA recognition underlying CRISPR is attractive for practical applications, and CRISPR systems are currently being developed for the precise manipulation of various genomes, including the human genome.

Cas9 is an RNA-regulated endonuclease that is associated with CRISPR-adaptive immune systems in many bacteria. For example, *Streptococcus pyogenes* uses Cas9 to store and subsequently inspect and remove foreign DNA, such as bacteriophage and plasmid DNA.

By unwrapping the foreign DNA and determining its complementarity with a 20-pair spacer of control RNA bases, Cas9 checks it; Cas9 will cut the foreign DNA strand only if the substrate is complementary to the control RNA [2].

The idea of genetic recombination is not new, and various methods of its application have been around for a long time. However, CRISPR surpasses all currently known technologies due to its accessibility and accuracy: its cost is only \$ 75, and editing a single gene takes only a few hours. The technology has virtually unlimited applications. First, CRISPR allows scientists to investigate the functions of various genes - by simply cutting out the corresponding gene from DNA, they can see which body functions have been affected.

CRISPR is one of the most popular technologies used today. Many scientists and entrepreneurs dream of using CRISPR in scientific research. In order to prevent unwanted mutations and congenital anomalies and make CRISPR safe for everyone to use in the future, the technology needs to be improved.

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INFLATION AS A DEMONSTRATION OF MACROECONOMIC INSTABILITY

students Otchik E.R., Seluk P.V.

scientific supervisor – lecturer Lukashevich K.K.

Belarusian National University of Technology
Minsk, Belarus

Inflation is an increase in the general price of goods and services. It is when, over a period of time, a single amount of money is enough to cover a smaller and smaller number of purchases.

Official inflation in our state is calculated by Belstat, the state service for the collection of statistical information. By comparing current values with previous values, Belstat calculates the rate of growth and assigns an inflation rate. The consumer price index is a weighted average that reflects the adjustment in consumer prices at a given date relative to the period taken as a basis.

The coefficient is calculated separately for different categories of goods and services and a variety of regions. Price statistics are taken from 31 cities in our country. These are Minsk, regional centers, including small and medium-sized cities in our country. In each of them there are several different traders' points, where prices will be monitored.

Then, after collecting and counting the statistics in all cities and each group of goods, everything is added up and Belstat calculates the average inflation rate in Belarus [1].

High inflation is, of course, unhealthy for society. Depreciation of profits reduces the standard of living and discourages financial savings. When the price of goods is not rising or falling, consumers are tempted to postpone their purchases, hoping to buy the product even cheaper with the passage of time. As

a result, production does not make enough money and development is stagnant, and companies are not hiring new employees. Since people are unemployed, they have no money, and so they have to economize even more, which affects the whole economy.

There are many different factors that contribute to rising inflation: excess money supply, falling foreign trade profits, rising production costs, monopoly, heavy taxes, huge demand for goods and negative consumer expectations. A distinction is made between creeping inflation, discontinuous inflation and hyperinflation.

There is also balanced inflation and unbalanced inflation. One must also distinguish between expected and unexpected inflation [2].

Everyone understands that inflation is bad for a country's economy. But if you look on the bright side, this is not always the case. Inflation affects everyone differently. If it is expected, it is within our expected range and does no harm. For example, banks change their interest rates and companies adjust their contract prices in line with the expected rate of inflation. In that case, there are huge problems if inflation is not expected.

It turns out that it is not so easy to determine which inflation causes more harm or benefit. It all depends on the general state of the economy and your personal situation.

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CURRENT ENERGY TRENDS

students Tibezh Y.V, Sidorchuk A.S.

scientific supervisor – lecturer Lukashevich K.K.

Belarusian National University of Technology
Minsk, Belarus

Today there are many problems that stand in the front of power engineering. The main of them is a fast growing population on our planet. More people require more energy, so modern systems have to be as effective as they can be. The most popular type of power plants in our country is a thermal power plant. They are reliable and comparably effective. Thermal stations have an important benefit: they can be used everywhere. Unlike solar panels and wind farms, thermal power plants do not have to be situated in some special places. This fact makes thermal power plants the only way to produce energy for some countries. Unfortunately, using thermal power plants forever is impossible because of their several flaws. To start with, a lot of thermal power plants must be supplied with oil, which is a limited resource. Oil consumption is going to grow every year. Also, there is a problem with air pollution [1].

That means our country has to find an alternative to thermal power plants. In my opinion, the best way to produce energy in our situation is using nuclear power plants instead of thermal. There are a lot of issues but I can see some obvious benefits, too.

Nuclear power plants are much more effective than thermal stations. Also, it is much cheaper to use nuclear power plants than thermal ones. Nuclear power plants are much less harmful for air, too.

However, some people reasonably consider that nuclear power plants will not be our main source of energy in the future. And there are some serious

reasons for this. The main of them is a risk of an accident. Intrinsicly, risks are not really big, but consequences are serious. An impact caused by the Chernobyl disaster appears on people and nature even today.

There are many theories of how this happened. The most popular one says about imperfection of nuclear plant's construction and human factor. Also, there exists another popular theory of reasons of the Chernobyl disaster. It says about an unsuccessful experiment on the nuclear power plant [2].

Anyway, today we can say that modern safety systems and precautions are advanced. All Chernobyl power plant's flaws were considered, so modern nuclear power plants are much safer. Building a new Belarussian nuclear power plant that would be relevant to modern requirements would be a good solution to some of our problems.

Nuclear power plant can work anywhere as well as thermal power plant. Additionally, it does not consume lots of fuel. This makes a nuclear power plant prepositioned future for Belarus. Also, the problem of air pollution will be partially solved.

However, there are some problems that the nuclear power plant will cause. The main is an amount of nuclear waste. It is dangerous for people and this waste cannot be destroyed, recycled and decomposes for thousands of years or longer.

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THE IMPACT OF NATURAL DISASTERS ON THE GLOBAL ECONOMY

students Natalevich M. V., Falchenko A. D.
scientific supervisor - Lukashevich K. K.
Belarusian National University of technology
Minsk, Belarus

A decline in the global financial concept can occur in the event of a natural disaster, as well as their results. Among the distinctive features of tragic accidents as a condition of the international economy is "unbalanced", the key ones are as follows: an increase in the number of victims; an increase in damage as well as costs; a connection together with the task of atmospheric climate change; connection of natural as well as technogenic accidents.

Hurricane Katrina and the resulting flooding. The hurricane devastated regional administrative infrastructure. According to official figures, 1,836 people were victims of the disaster, and significant damage was done to the cities of New Orleans and Louisiana. The economic damage was estimated at more than \$108 billion in 2007. Numerous devastation and casualties are a serious financial blow to insurance companies.

Earthquakes in Turkey and Syria. This earthquake occurred on February 6 with an interval of about 9 hours and the magnitude reached 7.8. The disaster killed over 49,000 people in Turkey and about 10,000 people in Syria. The economies of these countries suffered a huge loss of \$100 billion. The consequences of the earthquakes will also lead to a \$12 billion decrease in the country's budget revenues and labor losses will cost the Turkish economy \$3.6 billion. Damage to the country's transportation, energy and social infrastructure could lead to a budget deficit of 5.4% of GDP or more.

Tsunami in the Indian Ocean. Tsunami in the Indian Ocean. A submarine earthquake in the Indian Ocean on Sunday, December 26, 2004,

triggered a tsunami that became one of the most devastating in recent history. The earthquake's magnitude by all accounts ranged from 9,1 to 9.3. This earthquake is one of the three most powerful earthquakes on record. According to all kinds of estimates, about 300,000 people died. The total losses of economies would be about \$20 billion. According to the Asian Development Bank, it lost no more than 0.5% of GDP, and in 2006 its economy would grow by 5.9%.

These environmental crises and disasters are not the last. The brief study of the statistics of natural disasters and their impact on the economies of countries and regions presented here has shown that the economic damage from natural disasters increases in proportion to their number and scale. The consequences of earthquakes will also lead to a reduction in the country's budget revenues by \$12 billion and labor losses will cost the Turkish economy \$3.6 billion. Damage to the country's transport, energy and social infrastructure could lead to a budget deficit of 5.4% of GDP and more.

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RENEWABLE ENERGY SOURCES

students Elyashevich A.P., Cherkashin D.E.
scientific supervisor – lecturer Lukashevich K.K.
Belarusian National University of Technology
Minsk, Belarus

As the earth's population grew, the economy needed more and more fuel, and the fuel on which conventional energy was based was not infinite. The rising cost of fuel is exacerbated by the fact that the use of hydrocarbons, which have reached enormous proportions, is damaging nature, which affects people's quality of life. This means that in the need for energy, and therefore new ways of procuring it, will only increase in the future. New ways of acquiring it will only increase in the future. After the era of hydrocarbons comes the era of alternative, clean energy. However, interest in them has recently increased dramatically. From an environmental perspective, developing new sources of electricity is seen as way to reduce the use of traditional fuels and the associated emissions of greenhouse gases and other health hazards. In some countries, growing consumption of renewable energy sources is seen as a strategic way to reduce dependence on imported fuel and energy resources. At this point, the following main factors influence the importance of an early transition to alternative energy sources: global, environmental, economic, social, political ones [1].

We can also distinguish the most basic types of renewable energy sources. Wind power. The use of wind as a propulsion force is a long tradition. Windmills have been used to grind flour, mill lumber and as a pumping or water pumping station. Wind power is one of the fastest growing renewable energy technologies. Tall wind turbines can be used to generate electricity. About 83% of all installed capacity is in just 5 countries: Denmark, Germany, Italy, Spain,

and the United States. Geothermal energy uses heat from the earth to produce electricity. The temperature of the subsurface allows the upper layers of the earth and underground water reservoirs to be heated. Earth and underground water reservoirs. Geothermal energy is extracted from the ground with shallow wells - it is not costly. Bioenergy: It specializes in the production of energy from biological raw materials. One of the largest renewable energy programmes in the world, involving the production of fuel ethanol from sugar cane. Biomass is the oldest of the energy sources. It is represented by three final energy products: heat, electricity and various types of liquid fuels for transportation. Countries around the world have set ambitious targets for switching to renewable energy sources. For now, the leaders China, the US, Japan and the UK are the largest investor in renewable energy. Belarus does not have significant energy resources, with the exception of renewables. Most of the renewable energy sources in Belarus are biofuels. Belarus accounts for biofuels and there is great potential for the development of biomass, biogas, solar and wind energy and their integration in all end-use sectors. The most important advantages of renewable energy sources are: the inexhaustibility of energy the most important advantages of renewable energies are the inexhaustibility of energy resources, their environmental friendliness, the absence of a fuel component in the cost of the most important advantages of renewable energy sources are: inexhaustible energy resources, environmental friendliness , a lack of a fuel component in the cost of produced energy, generally higher reliability, service life, and lower costs of energy lower energy costs of operating equipment.

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THE ESSENCE AND CAUSES OF TAXATION

student Yakubova V.A.

scientific supervisor – lecturer Lukashevich K.K.

Belarusian National University of Technology

Minsk, Belarus

Taxes are one of the main elements that determine the activity of the socio-economic structure of modern society. Taxes allow the state to provide for all the needs of the population and social needs, such as the salaries of the administration and law enforcement agencies, scholarships for military personnel, and so on., and exercises targeted control over the production and economic activities of enterprises and individuals. In modern states, from 30 to 50 percent of GDP is mobilized into the treasury and redistributed through taxes [1].

The need to cover the state's needs for resources forces the establishment of a number of tax penalties. They must necessarily be charged according to the same rules and on equal principles. Adam Smith, author of "Inquiries into the Nature and Causes of the Wealth of Nations" published in 1776, spoke in detail about these principles and their essence. From the main one from there, I can highlight several main principles of taxation:

1. The principle of equality and justice. It lies in the fact that taxes are levied on everyone based on their income. No more will be taken from one person than he can give.

2. The principle of certainty. This principle says that all information regarding the tax and its collection should be specified. The essence of the tax, its size, the time for which it must be covered, the options for its repayment – this should be known and understandable to everyone who is somehow concerned with this.

3. The principle of economy. Of course, the withdrawn taxes should be used as efficiently as possible. All resources used to maintain the tax system should be reduced to the lowest possible level.

4. The principle of convenience: when withdrawing a tax, first of all, it is important to take care of the right conditions for the taxpayer, especially the time and method of withdrawing the tax. It is necessary to simplify this process for people as much as possible. The main task of taxes is to form the state's monetary fund in order to improve the financial situation of people and the country through the withdrawal of part of the income of organizations and businesses. Only thanks to the fiscal function of taxes, there are opportunities for intervention in economic relations by the state, and it is the fiscal function that determines other tax functions. If tax rates exceed a certain level, business activity and motivation are reduced, due to the occurrence of a strong tax burden, further business becomes unprofitable, and some businesses lead to losses. While the relatively low tax rate motivates people to work, save, invest, take risks, and look for ways to increase their profits. As a result, the tax base expands, thereby keeping and increasing revenues at a high level, even taking into account the small amount of taxes imposed. According to the theory of the American economist A. Laffer, in order to maintain the optimal level of tax withdrawal, it is necessary not to go beyond 30-50% of the taxpayer's income.

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MATTER

students Chernushevich A.V., Sanko V.N.
scientific supervisor – senior lecturer Matusevich O.A.
Belarusian National University of Technology
Minsk, Belarus

Scientists seek knowledge of the world around them. Some scientists are most interested in studying living things, such as plants, humans, animals, insects, birds, reptiles, microorganisms, etc. They are able to perform the vital functions needed for the survival like, growth, respiration, reproduction, sensitivity, movement, metabolism. Others investigate nonliving things, such as metals or sound.

Each of these interests is the focus of a different area of science. Biology, or life science, is concerned with living things. The area of science concerned mostly with nonliving things is physical science. It studies the materials that make up the world. It also explores the changes that occur in these materials.

All objects have certain properties. Part of the work of a scientist is to describe these properties. They make such descriptions by making measurements and one of them is mass. The mass of an object is the amount of material it contains [1]. For example, a mountain has a large mass. A grain of sand has a small mass. In general, an object with more mass feels heavier than an object with less mass.

How do we measure the mass of an object? We can use a balance. The latter is an instrument that compares the masses of two different objects. The mass of one object is known. One object is placed on each pan of the balance. If their masses are not equal, one pan falls while the other rises. If the masses are equal, the two pans balance each other out.

Scientists also measure the volume of an object. Volume is the amount of space an object takes up. A basketball has a greater volume than a baseball. The basketball takes up more space. How do we measure the volume of an object? A graduated cylinder (also called a graduate) is used most often to measure the volume of liquids. This instrument is marked with graduations, or lines, to show volume. It is used just as a kitchen measuring cup is. The two properties of mass and volume define what all objects are made of: matter. The latter is anything that has mass and volume. A cube of ice, a glass of water, and the moisture in the air are all made of the same kind of matter: water. Yet each has a different form, or phase. Most matter exists in one of three phases: solid, liquid, or gas. We can identify the phase of matter by its shape and volume. A solid has a definite shape and volume. An ice cube keeps its shape and volume as long as it does not melt. A liquid has no definite shape but has a definite volume. A gas has no definite shape or volume. It spreads out to fill the entire space of its container. It can change both its shape and its volume [2].

There are two types of matter properties: physical and chemical. A physical property is a property that can be observed without changing the identity of a substance. Properties that describe the ability of a substance to be changed into new substances are chemical ones.

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METALLOIDS AND THEIR PROPERTIES

students Murenaya V.D., Silkina A.S.

scientific supervisor – senior lecturer Matusevich O.A.

Belarusian National University of Technology

Minsk, Belarus

In the Periodic Table there is a red stair-step line dividing the table into metals and nonmetals. Some elements on either side of the red line are in green blocks. These elements are "borderline" between metals and nonmetals. They are called metalloids. These are elements that have properties in between metals and nonmetals. The word metalloid means "metallike."

As for physical properties, all of the metalloids are solids having the appearance of metals. Most of them are white or gray like metals, but are not as shiny. The metalloids are not as malleable and ductile as the metals.

Metals are good conductors of electricity. Nonmetals do not conduct electricity. Metalloids conduct electricity, but not as well as metals. This property makes metalloids very useful.

As for chemical properties, metalloids have properties that are common to metals. They also have properties that nonmetals have. Metalloids, however, do not follow patterns the way members of a group do. They are too individual in nature. In order to study the properties of the metalloids, you would have to study each element. In fact, the differences in chemical properties from element to element are what make metalloids so useful [1].

Because of their different chemical properties, the metalloids are very valuable. There are six of them in the Periodic Table: arsenic, antimony, boron, silicon, germanium, tellurium. Boron and silicon are two important metalloids.

Boron has a dull luster like metals, but it is very brittle like many nonmetals. It has three electrons in its outermost energy level. It is brownish-

black in color. Boron also has a high melting point (2,079°C) and a high boiling point (2,550°C). Boron is a poor conductor of electricity at low temperatures. However, as the temperature of the solid is increased, boron becomes a good conductor. Boron and other elements with this property are called semiconductors. Metals, by comparison, become poor conductors as the temperature rises. This property of boron makes it useful to industry. It can be used in electrical devices that have to function at temperatures too high for metals [2].

Silicon is a dark-gray solid, hard and brittle. It has four electrons in its outer energy level. Almost all of the compounds of silicon contain oxygen. Silicon is the second most abundant element in the earth's crust. It is present in many rocks and minerals. Sand is made of a compound of silicon, silicon dioxide. Silicon has many uses in industry. It, too, is a semiconductor. It is also used in making glass and in the production of cement.

As the aerospace industry grew, it needed a way to obtain electricity from the sun. Scientists produced extremely pure crystals of silicon. They then added tiny amounts of other substances to the pure silicon. These substances, called impurities, make silicon crystals better conductors. When the crystals are exposed to sunlight, electricity is produced.

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SPEED AND ENERGY OF REACTIONS

students Novikova V.A., Snapkova A.I.
scientific supervisor – senior lecturer Matusevich O.A.
Belarusian National University of Technology
Minsk, Belarus

Some chemical reactions occur slowly. Others happen very quickly. All chemical reactions involve energy changes. When fireworks explode, a chemical reaction takes place. Chemists can control factors that can make reactions speed up or slow down. In a reaction model, the particles of the reacting substances collide with each other. Collisions allow energy to be transferred from particle to particle. This energy is used in breaking and forming bonds. If collisions take place more often, the reaction will occur faster. Factors that increase the numbers of collisions will speed up the reaction. Concentration is the number of particles present in a given volume of space. In general, the greater the concentration, the faster a reaction will occur [1].

Hard boiling an egg is a chemical reaction. It might take 10 minutes to hard cook an egg using water that is hot but not boiling. But it might take as little as 3 minutes to hard cook the egg if boiling water is used.

Most reactions go faster when the temperature is raised. As the temperature increases, the particles of substances move about more rapidly. Particles that move faster collide more often.

Some chemical reactions take place very slowly. For example, the exhaust gases from an automobile engine contain poisonous carbon monoxide (CO) and unburned gasoline. These substances will react and change into carbon dioxide (CO₂) and water. But the reaction is normally very slow. In some cases, a catalytic converter helps the reaction along. It contains small beads of a substance that causes the change to be very rapid. A substance that speeds up a

chemical reaction is called a catalyst. The latter itself is not changed during a reaction. It can be used over and over.

Scientists are trying to understand how catalysts speed up a reaction. It is believed that catalysts make it easier for collisions to occur.

Some catalysts play an important role in food processing. The production of margarine involves the use of a catalyst. Margarine is made by adding hydrogen to liquid oils, such as soybean oil. The hydrogen and the oil react and yield solid margarine. This chemical change takes place in the presence of a catalyst, finely divided nickel.

Have you ever warmed your hands at a fire? The burning wood supplies the heat you need to warm yourself. Burning is an example of an exothermic reaction. The heat and light produced in a fireworks display result from an exothermic reaction.

Many chemical reactions absorb heat. Baking powder contains chemical compounds that react in dough to make it rise. But the chemical reaction does not take place until you put the dough into a hot oven. Then the dough absorbs heat, and tiny bubbles of carbon dioxide gas form. The gas causes the dough to rise. This is an endothermic reaction [2].

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CHANGING MATTER PROPERTIES

students Kinchak B.V., Yurchenko V.I.

scientific supervisor – senior lecturer Matusevich O.A.

Belarusian National University of Technology

Minsk, Belarus

Objects, of course, are made of matter. Scientists study many different kinds of matter. They begin with their senses. Then they do tests and perform experiments to learn more. Matter is changing all around us all the time. For example, ice melts, toast burns, glass breaks, milk sours. Each change gives the substance new properties. Not all changes result in the formation of a new substance, however.

A change occurs when glass breaks or water freezes. But the substance does not change into another substance. The broken glass is still glass. And ice is still water. Glass breaking and water freezing are examples of physical changes. A physical change is a change that does not produce a new substance.

What happens when milk is left out in the open too long? The milk curdles and has a terrible odor! What happens when bread is left in a toaster too long? The bread becomes a black, brittle substance. Milk souring and bread burning are examples of chemical changes. A chemical change is any change of a substance into one or more other substances. In chemical changes, the chemical properties as well as the physical properties of a substance change. A chemical change is also called a chemical reaction. Chemical changes are often harder to reverse than physical changes. For example, you can easily melt ice into liquid water. Melting reverses the physical change of freezing. But you cannot easily reverse many chemical changes. You cannot “unspoil” milk or “unburn” toast [1].

Density is a very important physical property. For example, we have a plastic cube and a lead one. Both of them have the same volume. Each one takes up the same number of cubic centimeters. A cubic centimeter is a standard unit of volume. The plastic cube floats in the water. The lead cube sinks to the bottom. The two cubes behave differently because of their difference in density. The latter is the mass of a substance contained per unit of volume. If the density of an object is less than the density of a liquid, the object will float in that liquid. If the object is more dense than the liquid, it will sink in the liquid. To find the density of an object, you must first measure its mass and its volume. And then divide the mass by the volume.

There is an old story about how density was used to catch a dishonest jeweler. A king had given a jeweler enough gold to make a crown. The jeweler decided to keep some of the gold. He melted the rest of the gold together with copper, a cheaper metal. Then he used the mixture of metals to make the crown. The latter looked like a pure gold. But a wise man in the king's court suspected the trick. He knew that if the gold was mixed with another metal, the crown would not have the same density as pure gold. First, he found the mass and volume of the crown. And he found the volume of an equal mass of pure gold. Then he calculated their densities. He discovered that the crown's density was less than that of pure gold. Density proved that the crown was not pure gold!

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SOLAR ENERGY IN BELARUS

Student Pilkovskaya M.R, Melkova A.S.

Scientific supervisor – lecturer Pinchuk I.V.

Belarusian National University of Technology

Minsk, Belarus

To consider such a topic as “solar energy” in Belarus, it is necessary to give a general definition of solar energy.

Solar energy is a branch of science and technology that develops the scientific foundations, methods and technical means for using the energy of solar radiation on the Earth and in the space to produce electrical, thermal or other types of energy and determines the areas and scales of the efficient use of solar energy in the country's economy.

This environmentally friendly solar energy, like most other renewable sources, is called "green". This means that it is friendly to nature, does not affect the environment negatively. Photovoltaics means no waste, saving fossil fuels and no emissions of harmful substances into the atmosphere. As for the disadvantages of solar energy, we can say that it depends on weather conditions - the less sun, the less efficiency, how much energy can be obtained from the sun is also affected by daily and seasonal cycles. Installation is also very expensive, which can scare investors.

The Republic of Belarus has the necessary conditions for the development of solar energy. And above all, sufficient insolation of the territory (the amount of light energy incident on a unit surface) despite the presence of only 30–35 sunny days a year. At first glance, it seems that the prospects for the development of solar energy in our country are as unlikely as sunshine on a chilly November day. However, in reality the situation is different. Even in cloudy conditions, solar panels are able to capture the scattered light needed to

generate electricity. The batteries also function during the full moon: about 2-3% of the power is reached. For large industrial enterprises, it is advisable to switch to partial replacement of traditional solar energy sources. In good sunny weather, batteries can provide lighting throughout the enterprise, and in bad weather, emergency lighting. Belarus has 95 commercial solar installations with a total capacity of 154.81 MW, most of which are located in the Grodno, Mogilev and Brest regions. One of the first solar photovoltaic installations in Belarus was created in 1996 to supply power to the Masana research station named after V.N. Fedorov in the Polesky State Radiation and Ecological Reserve. Commissioned in September 2021, the photoelectric power plant in the Cherikov region, located in the resettled area in the Rechitsa village council, is the most powerful in Belarus. Solar panels are located here on the area of 220 hectares: between the forests and the small river Volchas in the area of the evicted village of Blizhnyaya Rechitsa. "Green" energy is generated by 388,090 photovoltaic modules. The resulting alternative electricity is purchased by the Belenergo state association and supplied to the energy system of Belarus.

Also, a large solar power plant in Belarus is located in the Gomel region (Bragin). A1 built a solar power plant which has the size of 60 football fields. Each hour of the park's operation will allow Belarus to refuse 7,000 cubic meters of natural gas. The power plant occupies an area of more than 41 hectares, and its nominal capacity reaches a record 18.48 MW for Belarusian solar plants.

A1 also built a 4.5 km high-voltage transmission line with 22 towers and a transformer. This made it possible to connect the solar power plant with the Bragin substation. The state policy of Belarus ensures the active development of solar energy, which has a positive effect on the environment. It is expected that this will contribute to saving foreign exchange resources due to some reduction in oil and gas imports. The facilities will also serve the use of territories exposed to radiation in a result of the Chernobyl disaster.

HR MANAGEMENT

Melkova A.S, Silvanovich M.A.

Scientific supervisor – lecturer Pinchuk I.V.
Belarusian National University of Technology
Minsk, Belarus

We can often hear about the profession of HR manager; it is widely heard today. This profession is in demand and relevant, but there are many myths around it. What are the responsibilities of an HR manager? Many people have only a superficial understanding of these issues, which leads to a lot of myths around this specialty. If we decipher HR, we get human resources. Therefore, an HR manager is a person who works with human resources. The duties of the HR manager are the following:

1. Recruitment (Recruitment mentioned above).

To find the best candidates with the right competencies, a specialist must understand the nature of people, determine their strengths and weaknesses. Personnel search can be carried out in different ways.

Classic headhunting. An HR manager posts vacancies on career portals and analyzes uploaded resumes.

Aggressive headhunting. This is a way to find the right specialist by poaching him from another business [1].

HR branding. Company positioning. For example, through the use of social networks and advertising.

Remote recruitment. Search for employees for remote work.

Recruitment automation. The personnel manager can make his work easier by transferring part of the tasks to ATS (Applicant tracking system) programs. Also, HR must guess the salary expectations of the candidate.

2. Adaptation of personnel. A new employee must quickly adapt to processes.

3. Financial compensation and benefits. HR managers maintain a salary database in order to find the optimal salary for employees, with minimal overpayments to the company, prepare staffing plans, manage the system of compensation and increase in income.

4. Non-material motivation. It can be free lunches, a comfortable office space, flexible hours, and so on.

5. Training and development. When specialists are hired, they are trained, but after a few years their skills become obsolete. Very often, hiring new employees is not profitable, so there are various professional courses, seminars, conferences, trainings, lectures, for training existing staff.

6. Evaluation and development. With the help of personnel evaluation, you can understand whether the employee fits the position he holds and whether he should be promoted to the head. An internal personnel reserve is being created to develop the interchangeability of employees.

In conclusion, we can say that the goals of HR depend on the stage of development of the organization. As companies grow, HR management has more and more responsibilities. The structure of the HR service depends on the size and specifics of the company. Large companies have many departments for each function, and a small business can work with one HR manager, and other specialists perform some of his functions. The effectiveness of a specialist depends not only on his professionalism, but also on the charisma of the employee. An HR manager is a sociable person who can manage his work in stressful conditions, impartial and attentive to the interlocutor.

GPS MONITORING OF ROAD TRANSPORT

students Dovnar L.A., Skovoroda D.A.

scientific supervisor – lecturer Pinchuk I.V.

Belarusian National University of Technology

Minsk, Belarus

GPS monitoring is a way to always understand where the car is at the moment, what its technical condition is, whether it is in motion or not. The operation of the system prevents a false increase in mileage by drivers, unreasonable downtime of the fleet, the use of transport without destination. Modern sensors monitor the fuel level in the tank with an accuracy of up to 1 percent. All gas stations and fuel drains are linked to places on the map, taking into account time. GPS monitoring solves the following problems:

1. Inappropriate use of transport; control of location, speed and route.
2. Theft of transported cargo or fuel.
3. Control of refrigerator modes and temperature telematics of transportation.
4. Monitoring of compliance with the work and rest regime of drivers (AETR)

The main functions of GPS monitoring of transport:

1. Location of the road transport stop;
2. The speed of the driver;
3. Actual distance;
4. Fuel consumption;
5. Which of the couriers is closer to the base;
6. Fulfill the tasks assigned to GPS monitoring, or usage of working time and fuel resources to solve personal issues.

This system monitors the exact location of the transport, its mode of operation, speed and accurate mileage by GPS. All the analytics of its condition for any period of time will also be available. You can instruct the system to automatically generate the necessary reports on the operation of transport, and send them in any format. The principle of operation of the system is the operation of some elements:

1. GPS tracker. This device determines the coordinates of the object. In order to be able to view the location on the map, special software is needed.
2. Tracker data processing service.
3. Event sensor. It reports on events that occur in transport.

The GPS monitoring system can be used not only in transport logistics, but also in other areas, such as:

1. Agriculture.
2. Construction and special equipment.
3. Public transport.
4. Courier delivery.

GPS monitoring of motor transport makes it possible to increase the efficiency of using the fleet, control costs based on the analytical data obtained, determine actual costs, reduce the cost of maintaining the fleet, optimize logistics and obtain the necessary data for making management decisions quickly.

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VR AND AR TECHNOLOGY IN ECONOMY

student Alenishko P. S.

scientific superior – lecturer Samusevich A.S.

Belarusian National university of Technology

Minsk, Belarus

VR (Virtual Reality) and AR (Augmented Reality) technologies have great potential in the economy. They can be used to improve productivity, train staff, enhance marketing and sales, as well as create new business models.

One of the most promising areas of VR and AR application is staff training. With these technologies, interactive training programs can be created that allow employees to acquire practical skills without the need for real presence at the workplace. Such programs can be useful for both new employees and experienced workers.

VR and AR can also be used to improve marketing and sales. For example, VR technologies can be used to create interactive virtual tours of real estate properties, hotels, museums, etc. This allows potential customers to get a more complete idea of the product or service, which can increase the likelihood of purchase.

In the manufacturing industry, VR and AR can be used to create virtual prototypes of products. This reduces the time and costs associated with designing and testing new products.

Thus, VR and AR technologies have great potential in the economy and can become an important tool for increasing efficiency and competitiveness of companies.

The impact of VR and AR technology on the economy is significant. These technologies have the potential to transform various industries, making them more efficient, productive, and profitable. By improving training, marketing, sales, and product development, VR and AR can help businesses stay

competitive in a rapidly changing market. In marketing and sales, VR and AR can provide a unique and engaging way to showcase products and services. Virtual tours and demonstrations can help customers make more informed purchasing decisions, leading to increased sales and revenue. In manufacturing, VR and AR can streamline the product development process by allowing designers to create virtual prototypes.

Finally, VR and AR can create new business models by providing virtual stores and other online experiences that allow customers to interact with products and services. This can open up new markets and revenue streams for businesses. Overall, the impact of VR and AR on the economy is significant, with the potential to transform industries and create new opportunities for innovation.

Boeing uses VR to train pilots and technicians, reducing the time and costs associated with training. IKEA provides customers with the ability to use AR to preview furniture in their homes before making a purchase. Ford uses VR to create virtual prototypes of cars, reducing the time and costs associated with developing new models. Alibaba has created a virtual store where customers can purchase goods and services using VR.

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**MICROELECTRONICS: SUBJECTS FOR STUDY AT UNIVERSITY
AND ITS ROLE IN MODERN SOCIETY**

student Baihanov D.S.

scientific supervisor – lecturer Samusevich A.S

Belarusian National Technical University

Minsk, Belarus

Microelectronics is a crucial field of study in modern universities, particularly in the realm of information technology and robotics. With its rapid advancements and wide-ranging applications, microelectronics has become an indispensable part of various aspects of human life. This article aims to explore the significance of microelectronics as a subject of study in universities, its applications in different areas, and how it benefits individuals and society at large.

Microelectronics is a fundamental subject of study in university programs related to information technology, robotics, automation, and manufacturing. Students studying in fields like automation of technological processes and production are introduced to the principles, theories, and practical aspects of microelectronics. They learn about the design, fabrication, and characterization of microelectronic devices such as transistors, integrated circuits and sensors.

Microelectronics finds widespread applications in various sectors of modern society, revolutionizing healthcare, communications, transportation, and many other areas. Some notable applications of microelectronics include:

1. **Electronics:** Microelectronics is at the heart of modern electronic devices such as smartphones, tablets, laptops, televisions, and wearable devices. It enables the design of smaller, more powerful, and energy-efficient devices, providing users with advanced features.
2. **Healthcare:** Microelectronics plays a critical role in medical devices such as pacemakers, hearing aids, insulin pumps, and diagnostic equipment. It

enables real-time monitoring of health conditions, accurate diagnosis of diseases, and precise treatment delivery.

3. Communications: Microelectronics powers modern communication systems such as smartphones, satellite communication, and internet of things (IoT) devices. It enables high-speed data transmission, wireless connectivity, and advanced networking capabilities.

The widespread use of microelectronics in various applications brings numerous benefits to individuals and society. First of all, it improves quality of life. Microelectronics enables the design of smaller, more powerful, and energy-efficient devices that enhance people's daily lives. From smartphones and wearable devices that provide convenient access to information and services to medical devices that improve health outcomes, microelectronics has a significant positive impact on people's quality of life. What's more, microelectronics drives automation and optimization of processes in industries, leading to increased efficiency, reduced costs, and improved productivity. Microelectronics also plays a vital role in promoting environmental sustainability through energy-efficient designs, smart grid systems, and sensor-based technologies.

In conclusion, microelectronics is a critical subject of study in modern technical universities, with wide-ranging applications in various sectors of society. It has revolutionized industries, healthcare, communications, transportation, and many other areas, benefiting individuals and society.

DIGITAL PRODUCTION IN THE WORLD OF MEDIA CONTENT

student Bobrovich A.V.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology
Minsk, Belarus

Digital production refers to the process of creating or producing various types of media content digitally. With the advancement of technology, digital production has taken over traditional production methods in several industries, including film, music, publishing, graphic design, and advertising. Digital production technologies have revolutionized the way we create, distribute, and consume media content, making it faster and more efficient than ever before. In this essay, we will examine the impact of digital production on various industries and the advantages they offer.

One of the primary benefits of digital production is that it allows for greater flexibility and adaptability in creating media content. Digital production technologies offer several advantages, such as sophisticated digital software tools that provide creators with more control over their work. They can quickly adjust and iterate on their work, experimenting with different designs, materials, and specifications with ease.

In the film and television industry, digital production has revolutionized the way movies and television shows are made. Digital cameras replaced traditional film cameras, offering sharper images, better color accuracy, and more extended recording times. Digital editing tools have enabled creators to create seamless cuts, add special effects, and manipulate footage in ways that were previously impossible. Digital production has also had a significant impact on the music industry, from the production of music videos to the creation of the music itself. Digital software tools have made it possible to create music from

various locations, reducing the need for in-person collaboration. The use of digital platforms such as YouTube allows musicians to upload their content independently, making it accessible to a more extensive range of audiences. As a result, many independent artists are gaining recognition and success, even without the support of traditional record labels.

Publishing has also undergone significant changes due to digital production technologies. Digital printing has made it possible to produce small print runs for books, magazines, and other publications that were previously too costly to produce. E-books have revolutionized the publishing industry by making reading more accessible and convenient, with readers able to access their favorite books on their mobile devices. In conclusion, digital production has transformed the way we create, distribute, and consume media content, providing significant advantages over traditional production methods. The film, music, publishing, graphic design, and advertising industries have all benefited from digital production's flexibility, ease of collaboration, cost-effectiveness, and creative capabilities. As digital production technologies continue to evolve and advance, we can only expect further changes and improvements in media production.

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CHANGES IN ART-MARKET DUE TO THE IT DEVELOPMENT

student Bondar. D. A

scientific superior – lecturer Samusevich A.S.

Belarusian National university of Technology

Minsk, Belarus

“Ars longa, vita brevis” – these are the words of Ancient Greek physician and naturalist Hippocrates. These words can be translated as “Art is eternal, life is short”. This quote means that humans can’t witness every art piece in the world, but they still should pursue it. Despite the obstacle of human lifetime, humankind makes it easier to enjoy art today. One of the most important changers of this is the IT-sphere. And it also influences the art-market.

Due to the IT development, it’s became easier to be an artist. The large number of different programs and applications simulating such crucial art genres as sculpture, painting, architecture and etc. helps artists to create. Such programs bear a large set of instruments that are easier than real-life analogs and help to avoid application of different real-life materials. It’s much easier to work in a digital workspace with digital materials than with, for example, a large mass of clay or buckets of paint. Such factor led to growth of number of artists (or subject of art-market) in the world. There were 1.4 million working artist in America in 2014 (200,000 of whom have art degrees) [1]. It means that more and more people today are trying themselves in art and selling their art. A lot of people create their own social media accounts, where they are position themselves as creators and sell their own works. It’s common to see a so-called “commission artist” (an artist who draws something that their customer asked for) somewhere in Twitter or more specialized place like Patreon or Artstation.

Speaking about more classical art of well-known masters of past we can say that “their” segment of market is also changed. Due to development of means of communications and of Internet in particular it’s become possible to

sell art online. There are three types of Internet platforms for the sale of works of art: online auctions, online galleries and online marketplaces. Such practice made it easier to buy art for everyone, because it can be bought anywhere. For example, one of the most famous auction houses Sotheby's earned \$6 billion in 2021. 92 % of their bids were made online on their website [2].

Despite all the pluses of online development there are some questionable and problematic points. One of the most obvious is the problem of fake art, but one is connected straight to IT: NFTs and Neural Networks. The market of NFTs is growing really fast. NFT is a technology that allows to create a token proofing the ownership. But this technology is rather unreliable, because the copies of some NFT have no differences with properties of the original.

In conclusion we can say that technological progress can influence art-market in two ways: in the way of how art is created and of how art sells. But regardless of the form of art and method of acquiring it, it's essential to enjoy witnessing (or buying) it.

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INTERNET SECURITY: HOW TO PROTECT YOUR DATA FROM CYBERCRIMINALS

student Brel E.A.

scientific supervisor –lecturer Samusevich A.S.

Belarusian National University of Technology
Minsk, Belarus

In today's digital age, our daily lives have become inseparable from the internet. With the convenience of online banking, shopping, and communication, comes the risk of cybercrime. Cybercriminals are constantly finding new ways to steal our personal and financial information, and it's crucial that we implement measures to safeguard ourselves. This article will cover some of the best practices for internet security and provide sources to help you stay informed [1].

One simple method to safeguard your data is to use strong and unique passwords for each online account. A robust password ought to consist of a minimum of 12 characters, comprising a combination of uppercase and lowercase letters, numbers, and special characters. Avoid using easily guessable information, such as your name, birthdate, or favorite sports team.

In addition to strong passwords, enable two-factor authentication (2FA) wherever possible. 2FA requires a second form of authentication, such as a code sent to your phone or fingerprint recognition, in addition to your password. This provides an extra layer of security that can make it more difficult for cybercriminals to gain access to your accounts [2].

Another crucial step in internet security is to protect your personal information. Exercise caution when disclosing sensitive details, like your address and phone number, or social security number, online or in public. This information can be exploited by cybercriminals to commit identity theft or gain unauthorized entry into your financial accounts.

Software updates often contain security patches that can fix vulnerabilities and protect against cyberattacks. Be sure to regularly update your operating system, applications, and antivirus software to ensure that you have the latest protection against threats.

Finally, it is important to stay informed about the latest threats and best practices for internet security. Follow reputable sources, such as government agencies or cybersecurity experts, to remain current with the most recent developments in the field [3].

In conclusion, internet security is essential in today's digital age. Through the utilization of robust passwords, safeguarding personal information, ensuring software is up-to-date, exercising caution with public Wi-Fi networks, and keeping abreast of cybersecurity developments, you can reduce your risk of falling victim to cybercrime. Remember, the internet is a powerful tool that can enhance our lives in countless ways, but it also requires us to take responsibility for our own security.

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ERP SYSTEMS

students Bystrimovich A.D. and Lysy P.V.
scientific supervisor – lecturer Samusevich A.S.
Belarusian National University of Technology
Minsk, Belarus

An Enterprise Resource Planning (ERP) – system is software that helps enterprises automate and manage core business processes to achieve optimal performance. The ERP system coordinates the data flow between corporate business processes, provides a single source of reliable data and optimizes business processes throughout the enterprise.

When implementing ready-made ERP systems, 53% of companies experience serious difficulties that require changes in business processes and organizational approaches, and 44% of companies face significant technical problems.

The concept of an ERP system came from the USA and literally translates as Enterprise Resource Planning. Academically, it looks like this: "ERP is an organizational strategy for integrating production and operations, human resources management, financial management and asset management, focused on continuous balancing and optimization of enterprise resources through a specialized integrated application software package that provides a common data and process model for all areas of activity."

Each supplier can understand the system developed by him in his own way, based on its orientation and the tasks to be solved. For example, one ERP system is more suitable for retail, but not suitable for an oil refinery.

An ERP system is a product that a company purchases at its own expense. Its implementation is considered as an investment that should bring profit. No ERP system manufacturer guarantees that it will bring revenue growth to the company. And this applies not only to ERP systems, but also to any IT

solutions. However, all the advantages of the implementation indirectly affect the profit:

1. Instead of spending resources on several disparate systems, each of which needs specialized support, infrastructure, licenses, you can focus all costs on one ERP platform.

2. If an ERP system is developed from scratch for the needs of a specific company, it can include third-party systems and services that will be convenient for business partners, suppliers, customers and other counterparties to work with.

3. ERP provides management with full access to every business process of any department 24/7. For example, you can track inventory on a daily basis, which makes it possible to control working capital more accurately.

However, in practice, the company has to make a difficult choice: either it takes a long and expensive time to configure and refine the ERP system to the standards of the enterprise, or painfully configure its own business processes to the standards of the ERP system.

Regardless of whether you are expanding your customer base, entering new markets, introducing new processes, or scaling your business, with the right choice of supplier, the ERP platform adapts to changes.

Since the ERP system is implemented in all company processes, the list of advantages may increase depending on the specifics. Dozens and hundreds of ready-made solutions have been developed on the market that drive buyers into the framework of subscriptions, the speed of updates and support, closed functionality and architecture - into the framework of a single supplier. Only the development of our own ERP system gives maximum opportunities without any restrictions.

**AUTOMATING PROCESSES IN THE ENERGY SECTOR:
CHALLENGES AND PROSPECTS**

student Verenev P.A.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology
Minsk, Belarus

In the modern world, the energy sector is one of the most important and promising sectors of the economy. With each passing year, the amount of consumed energy grows, which requires increased efforts to optimize production processes. One of the most effective methods of optimization is process automation.

First and foremost, the challenge of process automation in the energy sector is the high cost of implementing new technologies. Automating processes requires the use of new, expensive technologies that may not be accessible to many enterprises. In addition, the use of new technologies also requires additional costs for employee training, which can also be associated with certain difficulties.

Another challenge of process automation is the lack of standards and rules for exchanging information between different systems. It is necessary to ensure compatibility between different systems so that they can work together and exchange necessary information [1].

However, despite some difficulties, process automation in the energy sector has great prospects. It allows significantly improving the efficiency of production processes, reducing production costs, and improving product quality.

In addition, process automation allows reducing the number of errors related to human factors, improving the safety of equipment operation and enhancing production quality. In case of implementing automation in the energy

system, it becomes possible to exercise complete control over resource consumption and save costs on energy carriers.

One of the prospects of process automation in the energy sector is the development of "smart" grids, which will allow for the most efficient use of produced energy, taking into account changes in demand and supply on the energy market.

However, when implementing automation in the energy sector, certain difficulties should be taken into account. For example, many processes in the energy industry require a large amount of data for effective automation, which may require additional costs for infrastructure and equipment. In addition, when automating processes, it is necessary to ensure the security of the system to prevent possible cyber attacks or other threats.

In conclusion, it can be said that process automation in the energy sector has great prospects, but it is also associated with certain difficulties that need to be taken into account when implementing it. However, thanks to modern technologies and innovations, these difficulties can be overcome, allowing for more efficient and safe work in the energy sector.

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VIRTUAL REALITY AND ITS DEVELOPMENT PROSPECTS

student Voytovich S.D.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National Technical University,
Minsk, Belarus

Virtual reality or VR is a computer technology that creates a virtual environment for immersion in a new world. With the help of VR, the user can be moved to another place, interact with objects, people and the environment. This technology is used in many areas, such as education, business, entertainment and science. In this paper, we will look at the prospects for the development of virtual reality and its prospects for development.

Virtual reality technology was developed in the 1960s for the use of technical means for military and medical purposes. In the course of further development, VR technologies began to be used in various industrial entertainment and scientific areas.

With the development of GPUs and the increased power of computers in the 1990s, VR became available for use in the gaming industry and entertainment. Now VR is used in medicine to train the skills of surgeons, to develop new technologies in architecture, automotive chemical and military industries.

Now on the market we can find many devices that support the technology. The following types of technology are most common: HTC Vive, Google Daydream View, Samsung Gear VR, PlayStation VR.

VR is becoming more popular in education. With VR, students can learn more interactively effective and exciting. VR helps to create training and simulation environments that provide a realistic experience, while the use of paper books and boring lectures minimizes participation in active knowledge

acquisition. VR also helps students visualize and understand complex concepts, as it is much easier than reading about it in a textbook.

Business: VR can help create more realistic simulations for internships of new employees, as well as help with the development and design of new products. Medicine: VR can be used to train medical professionals, diagnose diseases and psychotherapy. Entertainment: VR can create a whole new gaming experience and entertainment for users.

Virtual Reality is a technology that is changes our lives. Every year it becomes more frequently used in various fields and corporations. Not many people want to change their habits, but there are more and more people who want to experience new experiences. This can help to declare the uniqueness of your company. In the future, VR will become more and more accessible and useful for users around the world.

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SUPERCOMPUTERS AND THEIR APPLICATIONS

student Voronyuk E.P.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology

Minsk, Belarus

Nowadays, we can't imagine life without gadgets. Computers, smartphones, smart watches, tablets and so on. They are all needed to make our lives easier, so that a person can focus on other, more important tasks. But computers aren't only used for work or everyday activities. Many institutions and states have so-called supercomputers. Their purpose is complex calculations, processing of huge amounts of data, simulation of phenomena or events.

A supercomputer is a computer with a high level of performance in comparison to a general-purpose computer. A supercomputer performs all tasks simultaneously, while a normal computer performs them sequentially. The performance of a supercomputer is typically tracked through its floating-point operations per second (FLOPS) [1].

The Frontier HPE Cray EX235a is a new computer system that topped the TOP500 ranking. HPE Cray EX - the first system in the US with peak performance exceeding one exaflop per second. At present, the most powerful supercomputer is Frontier, which is located in ORNL (Oak Ridge National Laboratory) in Tennessee. This supercomputer reached 1,102 exaflop per second, using 8,730,112 cores.

The main task of supercomputers is to perform the maximum number of calculations in the minimum amount of time. This is useful for many areas, from drug development to the development of new products and technologies. There are supercomputers that work with a single application that uses all the memory. For example, for predicting weather and climate changes or nuclear test models.

Supercomputers don't just calculate, they simulate reality. That is, they calculate all possible scenarios and make predictions. Therefore, astronomers and astrophysicists use them to reproduce a variety of events and processes in the universe [2].

Obviously, the performance of supercomputers in the future will increase to cosmic numbers, their size will decrease, and their energy consumption will decrease. Experts believe that in 15 years, simulations will be a thing of the past, and machine learning will allow supercomputers to perform deep data analytics. As a result, they will be used everywhere, from the development of endless batteries to a cure for cancer [3].

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PROGRAMMERS IN THE MODERN WORLD

student Zheleznyak M.R.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology
Minsk, Belarus

In today's world, programming has become an essential skill for anyone who wants to succeed in the digital age. A programmer is someone who creates software, applications, and websites that make our lives easier and more efficient [1]. They write code in various programming languages, such as Java, Python, and C++, to name a few.

In the modern world, programmers play an important role in the development of technology and computer systems. They create software for all areas of life, from medicine and science to banking and trading systems.

Programmers are key figures in the high-tech industry, which is one of the fastest-growing sectors of the economy. Their work includes creating and maintaining software used in many areas, such as the automotive industry, energy, telecommunications, and much more [2].

However, despite the fact that the profession of a programmer is considered highly paid and prestigious, it also requires high qualifications and constant learning. Programmers must be aware of the latest technological trends and be able to apply them in practice. In this regard, many programmers attend training courses and participate in seminars and conferences [3].

In addition, programmers must possess not only technical skills but also be able to work in a team and communicate with customers. They must understand the needs of clients and be able to create software that will meet their requirements.

Learning to program can be challenging, but it is also incredibly rewarding. Not only does it allow you to create new things and solve complex problems, but it also opens up many career opportunities [4]. In fact, programming is one of the fastest-growing professions in the world today.

Overall, the profession of a programmer is one of the most promising in the modern world. Thanks to their work, we can use a lot of convenient and necessary applications and programs. However, to become a successful programmer, it is necessary to constantly develop and improve, keep up with new technologies, and be able to work in a team [5].

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CRYPTOCURRENCY: A REVOLUTIONARY NEW FORM OF CURRENCY

student Zinkevich D. A.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology
Minsk, Belarus

Cryptocurrency has gained a lot of attention in the financial world in recent years and is considered by many to be a groundbreaking new form of currency. However, there are still many skeptics who doubt its validity and practicality. In this article, we will explore the advantages and disadvantages of cryptocurrency and its potential for the future of finance.

One of the main advantages of cryptocurrency is its decentralized nature. Unlike traditional currency, which is controlled by governments and financial institutions, cryptocurrency operates on a peer-to-peer network. This means that transactions are carried out directly between individuals, without the need for intermediaries. This not only eliminates the need to charge bulk transaction fees, but also provides users with greater security and privacy.

Another benefit of cryptocurrency is its advanced security features. Transactions are verified and recorded on a public ledger called a blockchain, which is almost impossible to hack or manipulate. This gives users more confidence in their financial transactions and reduces the risk of fraud and theft.

Cryptocurrency can also increase financial inclusion by providing access to financial services to those who have no or insufficient banking services. With cryptocurrency, people can transact without the need for a traditional bank account, which can be difficult to obtain in some parts of the world. This can help reduce poverty and boost economic growth in developing countries [1].

However, cryptocurrencies also have some disadvantages. One of the biggest problems is the lack of universal acceptance. Although more and more companies are starting to accept cryptocurrency as a payment method, it is still not widely adopted. This can make it difficult to use the cryptocurrency for everyday transactions, limiting its practicality. Another disadvantage is the complexity of cryptocurrency technology. The process of investing in cryptocurrency or using it as a form of payment can be complex for the average person who may not understand the intricacies of blockchain technology.

The issue of energy consumption is also related to cryptocurrency mining. The process of verifying transactions and delivering them to the blockchain requires significant computing power, which consumes a lot of energy. This has raised concerns about the impact of cryptocurrencies on the environment. Despite these issues, the potential benefits of cryptocurrency cannot be ignored. Its decentralized nature and advanced security features make it an attractive choice for both individuals and companies. As technology continues to evolve and more people embrace it, cryptocurrencies have the potential to revolutionize our understanding of money and financial transactions.

In conclusion, cryptocurrency is a groundbreaking new form of currency that has the potential to change the financial world. While it comes with risks, its potential for growth and development is enormous.

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ARTIFICIAL INTELLIGENCE AND ART

student Karkota A.S.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology

Minsk, Belarus

Artificial intelligence (AI) is gradually becoming a part of our being. It turns from a mythical subject into a scientific and technical reality and increasingly enters into various aspects of human life, including art. With the development of technology, AI systems are improving and becoming able to perform tasks that were previously available only to humans.

This is of interest to many artists who want to implement AI systems in their work. But what are the consequences of this on the objectivity of the artistic process and the future of art in general?

Artificial intelligence (AI) is a technical process that allows computer programs to develop and learn from large amounts of data. It allows machines to take into account a large amount of information and, based on it, predict and make decisions. Today, many artists use similar systems in their projects to create unique and more accurate works of art [1].

Various technologies, such as generative systems and algorithmic mechanisms, can serve as examples of the use of AI in art. Generative systems allow an artist to create works by changing the parameters and conditions of a certain template. Algorithmic mechanisms are based on the study of data, which is then used to create images.

One of the main advantages of using AI in art is the ability to create works that would be impossible without this technology. For example, an art robot created by the American company "Artmatr" could create unique paintings that would be physically impossible for a person. Thanks to AI, the art robot could

place on the canvas and adjust the thickness, shape and color of the paint used in the work. As a result, this tool made it possible to create unique and interesting works that would otherwise have been impossible.

However, not all the consequences of using AI in art are positive. It is known that the artistic process implies interaction between the creator and the work. This allows the artist to express his intentions, emotions and feelings through his work. AI interference in this process may raise concerns about the loss of originality and quality of creative work [2].

The use of AI can also lead to a reduction in demand for professional artists. Since AI can create works similar to those created by humans, in the long run it can destroy the market for creative professions, including artists, designers, etc.

There are many ways to use AI in art. Intelligent systems can help artists create unique works that would be impossible without such technologies. But at the same time, the use of AI may raise concerns about the reduction of the quality of art and its originality, as well as lead to a reduction in demand for professional artists. Therefore, it is necessary to understand that AI can be a useful tool for an artist, but should not replace or destroy human creativity.

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**INTERNET SALES. THEIR PECULIARITIES, ADVANTAGES AND
DISADVANTAGES**

student Kiselyov M.A.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology

Minsk, Belarus

Internet sales is a modern and efficient way of selling goods and services via the internet. This method is becoming more and more popular every day, as it reduces advertising and customer acquisition costs, and increases turnover and profits. In this paper we'll look at the features of online sales, their advantages and disadvantages, and consider some strategies for successful online shops.

Internet sales have a number of features that differentiate them from traditional sales methods. One of the main features is the ability to reach a wider audience, as the internet is an accessible and popular means of communication. In addition, online shopping allows consumers to purchase goods and services 24 hours a day, 7 days a week, making the buying process more convenient and accessible.

Another feature of online shopping is the ability to fine-tune advertising and attract a targeted audience. This allows for lower advertising costs and more effective sales.

One of the main advantages of online sales is the opportunity to reduce the cost of renting premises, paying utilities and salesperson salaries. In addition, internet shops are able to set lower prices for goods and services, which makes them more attractive to consumers.

However, online sales also have disadvantages. One of them is the lack of physical contact with the product or service, which can lead to distrust on the part of the buyer. For example, you ordered a piece of clothing on Wildberries

(popular in Belarus online shop), the photos and description you need, but here comes the goods. You take it and put it on at home. But it doesn't fit or doesn't look like in the picture. Credit card fraud is not uncommon either. In addition, online shops often face the problem of low-quality goods, delays in delivery and high competition in the market.

There are a number of strategies that allow online shops to improve sales and increase their profits. One of them is to differentiate products and services, i.e. to provide unique and quality products that are not offered on competing websites.

It is also not unimportant to have a very good user interface. You should ensure that your website is simple and easy to use. Also, don't forget about mobile adaptability - in this era, a significant number of potential customers use their mobile devices to make purchases.

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ESPOTS AND BASIC CONCEPTS

student Kudryavets D.E.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology
Minsk, Belarus

In the modern world a lot of people, especially students-programmers, are fond of computer games and of course they are interested in the professional side of this kind of hobby – esports (or cybersport). Let's start with a question: what is esports? Esports is a competition between teams in computer games. There are teams that participate in tournaments with the time of the creation of games and they are popular because there are ardent fans of their fellow citizen.

The most popular annual tournaments are international and Major for such games as DOTA 2, CS GO. The total prize fund is approximately 2 000 000 \$, which is divided between the teams. The long-awaited BLAST.tv Paris Major 2023 tournament will be held soon in May.

How does the major tournament go? Each team-participant in the tournament has its own status and title. It very much depends on what stage the team went to in the previous tournament. This new format was announced in 2018 starting with ELEAGUE Major: Boston 2018.

The new format increased the number of participants in the final part to 24 teams (there were 16). And divided the entire final part into 3 stages:

The first one is The New Challengers Stage (The stage of new applicants with old ones). There is a struggle of 16 teams for 8 open places of the title "New Legends". 8 teams advance to the next stage "The Stage of new Legends". The second stage is The New Legends Stage (The stage of new contenders against "Legends"). In this stage, the 8 best teams of the previous Major (current Legends) are fighting with new contenders (winners of the first stage). The third

one - The New Champions Stage (The stage of new "Legends"). Playoffs from the grid for 8 teams. All teams are "Legends" of the Major, and for the next Major they have the right to participate immediately from the second stage – The New Legends Stage (top 16) without passing the qualifiers and qualifications.

The teams play according to the Swiss grading system. The system consists of games with each other depending on the number of wins and losses. The choice of the first opponent will be random – based on the draw. Further, if the team win the first game, then it has a 1-0 statistic. And so up to 3 points (defeat or victory). Teams with 3 points advance to the playoff stage. And those who have 3 defeats obviously lose and cannot participate in this tournament.

So, we described above how the major actually takes place, the changes between the international and the major are in the post-qualifying stage – the group stage, in which 20 teams participate, divided into two groups. Here the competitions are held in a round-robin system: all teams in the group will play against each other in the best-of-two format – two games to a draw or a complete victory.

A lot of emotions from watching such dynamic games are guaranteed, as the atmosphere of such global tournaments is skillfully transferred to the viewer. And summing up, it should be noted that all esports are tied to players who strive for more, revealing their potential by 100 percent, the results of which are seen by the whole world.

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CONSTANTS AND VARIABLES

Student Lozichniy A.S.

scientific supervisor –lecturer Samusevich A.S.

Belarusian National University of Technology

Minsk, Belarus

A constant is an integral part of a program; an object of value.

Variables usually store various types of data: it can be either char, int, bool and etc. Almost all have some kind of designation to be later called in the program. When we give them some name, we unconsciously send signals to the program to reserve this memory area with some specific name.

Variables should always be given specific names. You can not shy away from using different characters, long or short names, as well as variables where the main thing is that they do not appear before the names, otherwise the program simply will not read them. In modern versions of compilers, the length of a name is practically unlimited. The variable name cannot be the same as reserved keywords.

When you make any project, the first thing you do is declare arguments and functions to make them global. Without this, you simply cannot use them.

If you decide to turn on the debugger while compiling the program, you will see that the program writes different variables to different memory areas, where each element will have its own name and will have its own specific type. Standard AVR GCC works with data types char (character type) and int (integer type).

When declaring a variable, you can initialize it, that is, assign it an initial value. This can be done in the following way.

```
int var_x = 5000;
```

It is better to avoid mixing initialized variables in one declaration statement, that is, it is better to declare initialized variables in separate lines.

We can use the type constant for our arguments and thus designate them as not changing. The types of a constant don't end up changing and will always have the same value. If there is no type next to the constant type that would determine the value of the variable, then it will automatically determine what type we need. For example:

```
const autom_x = 100; // Const will automatically mark this value as int.
```

The "=" sign is used for assignment in C. The expression to the right of the assignment sign is evaluated, and the resulting value is assigned to the variable to the left of the assignment sign. In this case, the previous value stored in the variable is erased and replaced with a new one.

```
x=3;
```

The "=" operator should not be understood as equality. For example, the expression `a = 5;` should be read as "set variable a to 5".

In addition to the simple assignment operator "=", there are several more combined assignment operators in C: "+=", "-=", "*=", "/=", "%=".

```
x = 5 + 3;
```

If it is necessary to change the value of a variable to 1, then increment (`x++`) or decrement (`x--`) is used.

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УДК 811.111:004.318

AUTOMATION OF TECHNOLOGICAL PROCESSES IN MANUFACTURING

student Lonski D.B.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology

Minsk, Belarus

The automation of technological processes in manufacturing is becoming increasingly important as industries strive to improve efficiency and productivity. Instrumentation engineering is a key aspect of this process, involving the design, development, and implementation of sensors, control systems, and software to automate production processes. This report provides an overview of instrumentation engineering and its role in the automation of technological processes in manufacturing.

Instrumentation engineering is a branch of engineering that focuses on the design, development, and implementation of sensors and control systems. This field encompasses a wide range of technologies, including electronics, mechanics, and computer science. Instrumentation engineers design and develop sensors that can measure physical parameters such as temperature, pressure, and flow rate. They also design control systems that can use this data to automate production processes.

The automation of technological processes involves the use of sensors, control systems, and software to automate production processes. The goal of automation is to improve efficiency and productivity while reducing costs and increasing quality. Automation can be used in a variety of industries, including manufacturing, transportation, and healthcare.

Instrumentation engineering plays a key role in the automation of technological processes. Sensors designed by instrumentation engineers can be used to collect data about the production process, while control systems can use this data to make decisions about how to optimize production. Software developed by instrumentation engineers can be used to monitor and control the production process, providing real-time feedback that can help improve efficiency and reduce waste.

As a student of automation of technological processes in manufacturing, you will learn about the fundamental principles of instrumentation engineering and their application in the automation of various manufacturing processes. You will study topics such as sensor design, control system development, software programming, and data analysis. You will also learn about the various types of sensors and control systems used in industrial automation, and their advantages and disadvantages in different applications.

In addition to theoretical knowledge, you will gain practical experience through laboratory exercises and projects that simulate real-world applications of instrumentation engineering. You will have the opportunity to work with various sensors and control systems, and learn how to integrate them into a complete automation solution.

Upon completion of your studies, you will be well-prepared to enter the workforce as an instrumentation engineer or pursue further studies in this field. You will have the skills and knowledge needed to design and develop instrumentation systems for a variety of applications.

In conclusion, studying automation of technological processes in manufacturing is an excellent choice for those interested in technology, innovation, and making a positive impact on the world. This field offers a range of career paths, from instrumentation engineering to research and development, and provides a strong foundation in mathematics, physics, and computer

science. By pursuing a career in this field, you can contribute to the ongoing automation of manufacturing processes and help create a more sustainable future.

УДК 811.111:004.318

THE PRINCIPLE OF OPERATION OF THE CRYPTOCURRENCY

student – Matskevich N.N.

scientific supervisor – lecturer Samusevich A.S.
Belarusian National University of Technology
Minsk, Belarus

Cryptocurrencies are a peer-to-peer tool (a peer-to-peer network is a network based on the equality of participants). This means that its individual participants can perform transactions without the participation of a third party or an intermediary.

Upon careful inspection, it can be found that all cryptocurrencies are based on an identical set of technologies and principles, the basic of which is Blockchain technology. Blockchain is an open cryptographically secure distributed transaction registry ("Block Chain"). This is a chain of interconnected blocks, each of which has a single identifier and contains transaction records. Records are protected using cryptography (cryptography is the science of privacy methods). Such a device does not allow you to make changes to a block without losing data with associated blocks, which signals to other users that there was a completely third-party intervention. This makes it possible to reject the transaction. If the majority of participants are rejected, the network continues to work with the original branch. This system requires a lot of computing power to create new blocks in it and process transactions. To do this, some users participate in the mining process. "Miners" use the computing power of their equipment in order to "prove the performance of the work." Proof-of-

work is a form of economic regulation of Blockchain, which serves as the main protection against cyberattacks, spam, etc.

Cryptocurrencies are stored on hardware and/or software wallets, which are accessed through a unique cryptographic key. The funds that are stored on such wallets are within the public Blockchain-a. Software wallets are divided into two types: "cold" and "hot". The "hot" ones are hosted on the servers of online services. Access to the "cold" can be obtained without a network connection. In fact, a "cold" wallet is a file on some medium. The loss of this medium or file will mean the complete loss of the wallet and all its contents.

Summarize, cryptocurrency has three main principles: decentralization (there is no single control center), anonymity (there is no way to find the owner of the crypto wallet) and openness (every blockchain user can view any transaction).

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УДК 811.111:004.49

INTERNET VIRUSES

student Miskevich I.V.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology

Minsk, Belarus

Internet viruses are a growing threat to the security and stability of computer systems and networks. They can cause a wide range of damage, including data theft, system disruption, and financial loss. This paper provides an overview of internet viruses, including their types, modes of transmission, and mitigation strategies.

The advent of the internet has brought about a profound transformation in our lifestyle and work culture. However, along with its numerous benefits, it has also brought in new security threats, one of which is internet viruses. Malicious software programs are designed to infect computer systems and networks via the internet. They can cause significant damage, including data breaches, system outages, and financial losses. As a result, it's essential to understand the various types of internet viruses, how they are transmitted, and the methods used to minimize their risks.

Internet viruses come in different types, including worms, Trojan horses, and ransomware. Worms are self-replicating programs that spread across networks and computers without user intervention. Trojan horses are programs that appear to be legitimate software but contain hidden malicious code. Ransomware is a malicious software that encrypts a user's files and demands payment of a ransom in exchange for restoring access to them.

Internet viruses can be transmitted via email attachments, malicious websites, and infected downloads. They can also spread through social engineering techniques, such as phishing scams, which trick users into downloading and installing infected software.

To counter the menace of internet viruses, there are several mitigation strategies that can be employed. These include the use of antivirus software, firewalls, and user education. Antivirus software can effectively detect and eliminate viruses from a computer system, whereas firewalls can block unauthorized access to a network or computer system. Providing users with education is crucial since it can help them acquire the knowledge needed to recognize and steer clear of typical internet virus threats.

Recognizing the severity of internet viruses as a threat to computer system and network security and stability is crucial. Therefore, it's essential to understand the various types of internet viruses, how they are transmitted, and the strategies used to mitigate their risks to maintain the security of computer systems and networks.

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УДК 811.111:004.318

ARDUINO PLATFORM. ROBOTS BASED ON ARDUINO

student Nichiporuk A.V.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology
Minsk, Belarus

As technology continues to advance at an unprecedented rate, robotics is becoming an increasingly popular field of study at universities around the world. Robotics is a field that includes the design, construction, and operation of robots. These robots can be used for a wide range of applications, from manufacturing to healthcare. Arduino, a popular open source electronic platform, is often used to control and program these robots. In this post, we will take a closer look at Arduino-based robots and explore their capabilities.

Arduino is an open source electronic platform for creating digital devices and interactive objects. The platform consists of a microcontroller, which is a

small computer that can be programmed to control various components such as sensors, motors, and lights. The Arduino is used by hobbyists and professionals alike and is an affordable and affordable way to experiment with electronics and robotics.

Building an Arduino-based robot can be a challenging but rewarding experience. To build a robot, you need to have basic knowledge of electronics, programming, and mechanics. You will also need various components such as motors, sensors and controllers. There are many online resources available that can help you get started building your Arduino-based robots.

Once you've built your Arduino-based robot, you'll need to program it to perform the tasks you want. Arduino programming is done using a programming language similar to C++.

Arduino-based robots have a wide range of applications in various fields. Some of the more common uses for these robots include:

1. **Production.** Arduino-based robots are used in manufacturing to perform tasks such as welding, assembly, and painting. They can complete these tasks faster and more accurately than humans, which can help improve efficiency and reduce costs.

2. **Health care.** Arduino-based robots are used in healthcare for tasks such as surgery and patient monitoring. They can be used to perform operations with greater precision and accuracy than human surgeons, which can lead to better patient outcomes.

3. **Research.** Arduino-based robots are used in space and deep seas exploration to explore environments that are inaccessible or dangerous to humans. They can collect data and perform tasks in these environments without putting human lives at risk.

Arduino-based robots are an exciting and fast-growing area of study for tech students. They offer a wide range of applications and have the potential to

transform many industries. However, building and programming these robots requires a deep understanding of electronics, programming, and mechanics. With the right skills and knowledge, engineering students can play an important role in the development of these exciting new technologies.

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УДК 811.111:004.318

QUANTUM COMPUTERS AND THEIR POSSIBILITIES

student Peshko D.A.

scientific supervisor – lecturer Samusevich A. S.

Belarusian National University of Technology
Minsk, Belarus

The first quantum computer was created by a research team led by physicist David Deutsch at the University of Oxford in 1985. Deutsch's proposal for a quantum computer was based on the theory of quantum mechanics, which describes the behavior of particles at the atomic and subatomic level.

Quantum computers represent a significant breakthrough in the field of computing. Unlike classical computers, quantum computers operate on the principles of quantum mechanics, which allows them to perform certain computations much faster and more efficiently.

A quantum computer is a device that uses the principles of quantum mechanics to perform computations. It uses quantum bits or qubits, which can

exist in multiple states simultaneously. This allows a quantum computer to perform certain computations much faster than classical computers.

7 companies are currently developing quantum computers. The most famous of them are Google, Microsoft and IBM. IBM has created a 53-qubit quantum computer that is accessible through their cloud platform and provides a quantum software development kit. In 2019, Google accomplished "quantum supremacy" with their own quantum computer. Microsoft - Developing a scalable quantum computer and has created its own quantum programming language, Q#.

Quantum computers have the potential to revolutionize many fields. Quantum computers, for instance, can be utilized for tackling intricate optimization problems, such as finding the shortest route between multiple points. This has applications in logistics and transportation.

Quantum computers can also be used for cryptography. Quantum cryptography is more secure than classical cryptography because it is based on the principles of quantum mechanics.

Another potential application of quantum computers is in drug discovery. Quantum computers can simulate the behavior of molecules, which can be used to identify potential drug candidates.

Although quantum computers hold great potential, there are still numerous challenges that must be addressed. Decoherence is the term used to describe this phenomenon, and it poses a significant challenge in the development of quantum computers. One of the most pressing challenges in quantum computing is constructing a computer with sufficient qubits to enable practical computations. Currently, the most powerful quantum computers have only a few hundred qubits, which is not enough for many applications.

Another challenge is maintaining the coherence of the qubits. Quantum systems are very fragile, and any interaction with the environment can cause the

qubits to lose their coherence. The process of decoherence, which presents a significant hurdle in the development of quantum computers, is well-recognized.

Quantum computers represent a significant breakthrough in the field of computing. They have the potential to revolutionize many fields, including optimization, cryptography, and drug discovery. Despite the potential of quantum computers, numerous challenges must be addressed before they can achieve widespread use. Despite these challenges, the possibilities and potential of quantum computers are truly remarkable.

УДК 811.111:004.318

STUDYING FOR A SOFTWARE ENGINEER AT BNTU

student Stalbovskiy E.V.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology

Minsk, Belarus

Belarusian National Technical University (BNTU) is a prestigious institution that offers a comprehensive curriculum for aspiring software engineers. The university's program is designed to provide students with a strong foundation in computer science and programming, making them well-equipped to enter the workforce upon graduation.

One of the unique aspects of studying programming at BNTU is the university's practical approach to education. The program includes numerous practical assignments and projects, allowing students to gain hands-on experience in software development and apply their knowledge in real-life situations. This approach enables students to develop a practical understanding

of programming and prepares them for the challenges they may face in the workplace.

In addition to its practical approach to education, BNTU employs a team of experienced professors and industry professionals. These faculty members have deep knowledge of programming and can provide students with valuable insights into the field. They also offer mentorship to students and help them develop their skills and knowledge.

Furthermore, BNTU has a strong partnership with leading tech companies, providing students with opportunities for internships and employment after graduation. These collaborations allow students to gain practical experience and develop their skills in a real-world setting, giving them a competitive advantage in the job market.

Another unique aspect of BNTU's program is the university's commitment to innovation. The program regularly updates its curriculum to stay up-to-date with the latest trends and developments in the field of programming. This ensures that students are learning the most relevant skills and technologies and are well-prepared to meet the demands of the modern tech industry.

In conclusion, studying programming at BNTU is an excellent choice for students who want to pursue a career in software engineering. The university's practical approach to education, experienced faculty, industry partnerships, and commitment to innovation make it a unique and valuable learning experience for aspiring programmers. Graduates of the program are well-prepared to enter the workforce and make significant contributions to the tech industry.

THE ESSENCE OF E-LEARNING

student Stashinskaya M. S.

scientific supervisor – lecturer Samusevich A.S.

Belarusian National University of Technology

Minsk, Belarus

Electronic learning, also known as e-learning, is a modern and innovative approach to education that utilizes electronic technology to deliver educational content to students. It has become increasingly popular in recent years due to its many benefits, such as flexibility, convenience and cost-effectiveness.

Programming is closely linked to e-learning, as many e-learning courses and platforms rely on programming languages and software to create and deliver educational content. Programming skills are also essential for developing and maintaining e-learning systems. Moreover, programming skills are increasingly in demand in the job market, with many industries requiring employees who can develop and maintain software systems.

One of the significant benefits of e-learning is its flexibility. It gives you opportunity for getting different materials and complete assignments at their own pace and schedule and allows students to learn from any location worldwide, provided they have internet access. The introduction of e-learning technologies into the educational process creates additional conditions for improving the quality of education by:

- using the latest technologies and teaching methods;
- collective educational activities in various fields;
- expansion of electronic space and expansion of free access to information and educational resources;
- using a research approach;
- using various tools to assess educational progress.

Considering the topic of e-learning, the question may arise about the types of information resources that we can use in online learning. These can be: e-mail, video conferences, training platforms, electronic textbooks, articles, methodological, virtual, reference materials such as dictionaries, encyclopedias.

But what about the positive and negative aspects of e-learning? This type of training allows you to search for the necessary information yourself, to understand the material without the help of persons competent in this field, contributes to your cultural and humanitarian development, the ability to form your thoughts. Moreover, e-learning is cost-effective, making education accessible to a broader range of students. In addition, there are also negative aspects of this type of training. For example, the need for high self-discipline, technical equipment. It can be some challenges, such as the lack of face-to-face interaction between students and teachers. You are deprived of the opportunity to ask questions in real time.

E-learning today is an educational process in which interactive means of information transmission are used: compact disks, the Internet, corporate networks. However, addressing the challenges associated with e-learning is necessary to ensure that students receive a high-quality education. With continued advancements in technology and pedagogy, e-learning has the potential to revolutionize education for future generations.

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THE IMPORTANCE OF INVESTMENT IN THE ECONOMY

student Khainouski D.I.

scientific superior – lecturer Samusevich A.S.

Belarusian National university of Technology

Minsk, Belarus

Investments are a critical component of any economy. They play a crucial role in generating economic growth, creating jobs, and driving innovation. In this essay, we will explore the importance of investments in the economy and their impact on businesses, individuals, and governments.

First and foremost, investments are essential for economic growth. When businesses invest in new technologies, equipment, or infrastructure, they can increase their productivity and efficiency, which in turn leads to increased output and profits. This increased output creates new jobs and spurs economic activity, driving growth throughout the economy. Similarly, investments in education and research and development can lead to new innovations and technologies that further fuel economic growth.

Secondly, investments are critical for creating jobs. When businesses invest in new projects, they often need to hire additional employees to help execute those projects. This can create job opportunities and reduce unemployment rates, which in turn boosts consumer spending and drives further economic growth.

Investments can also have a positive impact on individuals. By investing in assets such as stocks, bonds, or real estate, individuals can build wealth over time and secure their financial future. Moreover, investments can provide a source of income through dividends, interest payments, or rental income, which can help to supplement or replace traditional sources of income such as employment

Finally, investment is crucial for governments. Governments can use investments to fund infrastructure projects such as roads, bridges, and airports, which can improve transportation and communication networks and make it easier for businesses to operate. Governments can also invest in education and healthcare, which can improve human capital and promote economic growth in the long run. Additionally, investments can help governments to finance public services such as police and fire departments, which are critical for maintaining public safety and promoting social stability.

Lastly, investments are crucial for governments. Governments can use investments to fund infrastructure projects such as roads, bridges, and airports, which can improve transportation and communication networks and make it easier for businesses to operate. Governments can also invest in education and healthcare, which can improve human capital and promote economic growth.

In conclusion, investments are a vital component of any economy. They play a critical role in driving economic growth and promoting innovation. Investments benefit businesses, individuals, and governments alike, and are essential for building a prosperous future. As such, it is important for individuals and organizations to prioritize investments and to work towards creating an environment that encourages investment and promotes economic growth.

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DESIGN THINKING

students Yasuikovich A.D. Beleychik E.A.
scientific supervisor – lecturer Samusevich A.S.
Belarusian National University of Technology
Minsk, Belarus

In the 21st century, an important place is occupied by your creative thinking, both for any organization and for solving problems. The way you think decides the principle of how your company develops products, services, processes and strategies.

Design thinking is a way of researching products, services and services aimed at the customer. It combines desirability from the client's point of view with the technologically feasible and economically feasible. It also provides various opportunities for people who are not trained as designers to use creative tools so that they can solve a wide range of problems/tasks.

It includes six stages:

1. Empathy is meaningful empathy. It is necessary to understand what society is doing, why they are doing it, what values, necessities and painful places they have.

2. Focus – here it is necessary to express a question related to the problem. Process the data acquired during the study: divide into clusters, separate the person-model, write out more important clear quotes from users. Formulate a point of view, for example: how can you help a certain person to do something with the help of service?

3. Generation of ideas – you need to accumulate as many ideas as possible, eliminate criticism, organize a comfortable atmosphere, select diverse investors, use the "yes and ..." rule.

4. Prototyping – iterative formation of layouts that can help in finding the right solutions.

5. Testing – can help you get to know the client better, immerse yourself in the task you are working on.

Design thinking is both an art and a science. It combines the study of the controversial components of the problem with optimal and analytical study, in other words, with the scientific side. This magical blend reveals previously unexplored characteristics, and can also help discover other strategies leading to truly innovative solutions.

Scientific activity explores how users interact with products, as well as studies the requirements in which they function.

As soon as you find several possible solutions, the selection procedure will be based on rationality. For a person, as a designer, it is recommended to investigate and forge these solutions in order to find the optimal acceptable option for any problem or obstacle found at the stages of the design process.

With this in mind, it would be more correct to note that design thinking is not thinking outside the box, but thinking on its edge, in its corner and under its barcode – this is how Clint Runge formulated the concept of design thinking.

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THE LEGALIZATION OF PARALLEL IMPORTS IN BELARUS

student Alenskaya A.V.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

The sanctions imposed in the Republic of Belarus have played a role in restricting the supply of some foreign goods. In recent months, many foreign brands have stopped their work in the countries of Belarus and Russia, significant restrictions were imposed on imports and exports. Foreign products simply cannot be imported to Belarus through the former distribution and dealer channels, although they are still in demand. Some of the well-known products left the market for a while, but then they appeared at the store shelves legally.

In order to create conditions for increasing the internal stability of the economy, preventing or reducing a critical shortage in the domestic market of food and other goods, parallel imports have been legalized in Belarus. This is provided by the Belarusian No. 241-Z of January 3, 2023 “On the restriction of exclusive rights to intellectual Property objects”. According to the document, Belarus allows to import goods where intellectual property objects are used, without copyright holders from some foreign countries. Such objects are computer programs, audiovisual and musical works, broadcasts of broadcasting organizations. The use of these objects is not considered a violation of exclusive rights [1]. Parallel imports are products that are imported and sold outside of the original producer’s distribution channels, so they weren’t intended for sale in this country. These goods aren’t counterfeit, so the sale of them under someone else's brand without the permission of the copyright holder. Unfair manufacturers completely or partially copy other people's trademarks and designations, confusing potential consumers. The goods of a parallel import are

not contraband also: they are original, have a license and quality certificates and officially go through customs. So parallel imports are imports of the gray market. Gray market's products are sold outside the distribution channel that was agreed upon by the brand and official resellers. This can happen with electronics, books, software, cars and much more [2]. So now, for example famous brand IKEA we can see in some Belarusian supermarkets and shops, although there are no official representatives of this brand.

How to recognize a parallel import?

There are some features: an importer means any person who imports original products, and he is not a dealer of official distributor; imported products have a unique marking; there is no permission from the trademark owner to import products, it means the importer and the copyright holder are not in a contractual relationship.

Consequently the parallel import is a good and legal way for the Belarusian market to prevent a shortage of particular products while sanctions from abroad. It has to be said that until recently, parallel imports were banned, as the market of the Republic of Belarus was interested in investments by foreign companies. However, in the new conditions, the country has become interested in legalization parallel imports.

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ORGANIZATION OF LOGISTICS AT A TRADING ENTERPRISE

students Asabova E. V., Lavrinovich A. A.

scientific supervisor – senior lecturer Slesaryonok E. V.

Belarusian National University of Technology

Minsk, Belarus

Nowadays it is difficult to imagine a company (except for a small one) that would not be related to logistics. This is a whole department in production, ensuring compliance with the activities of the organization. Trade logistics refers to the management process that includes the entire flow of goods and information between suppliers and companies and between customers and companies. Trade logistics also includes the internal flow of goods. It can also be described as an activity related to the management of the physical movement of flows of goods, services, information, financing and property rights in the field of commodity movement based on the integration of material, technical and information resources. For trade logistics to be as efficient as possible, the use of computer-based merchandise management systems is indispensable, as they enable item-specific inventory tracking and disposition.

The goal of commercial logistics is to create highly efficient commodity distribution systems that ensure the availability of the necessary goods in the right place, at the right time, in the right volume, with minimal costs and at an affordable price. The scheme of logistics organization in trade: planning the purchase of goods for subsequent resale (for this you need to know the real demand of buyers and have the necessary resources to meet the identified demand). The choice of forms of procurement organization (the effectiveness of commercial logistics is largely determined by the availability of alternatives when planning procurement organization). Organization of purchases of goods for resale (it is advisable to adhere to the adopted plan and optimal forms of

procurement organization, rapid response to changes in commercial logistics). The choice of forms of inventory management (various brokerage options for inventory management are possible, but the policy that ensures maximum delivery of goods to customers with minimal inventory is considered effective). The choice of forms of organization of supply (the main activity of resellers is the sale of goods to buyers). Planning and organization of deliveries of goods to consumers (the delivery plan must be coordinated on financial and labor resources, on the technology of movement of goods and other elements). The choice of forms of customer service: commercial logistics acquires excellent forms when it includes not only procurement and supply activities, but also the maximum possible set of services related to the physical movement of goods and their preparation for consumption. Organization of customer service (after making a decision on the service, the technology of its provision should be developed and the necessary organizational and economic conditions created). World and national experience show that the use of logistics can significantly improve the efficiency of trade [1].

So, in conclusion it is important to underline that the main indicators of the effectiveness of the use of logistics in trade are: reduction of stocks in commodity distribution chains, maximum use of the areas and volumes of wholesale and retail trade enterprises, acceleration of capital turnover, reduction of transport costs, reduction of costs associated with cargo handling, including manual labor costs.

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THE ROLE OF BELARUS IN INTERNATIONAL COOPERATION

graduate student Yao Jinshui, student Averkova M.V.
scientific supervisor – PhD in Philology, associate professor Khomenko S.A.
Belarusian National University of Technology
Minsk, Republic of Belarus

“Alone we can do so little. Together we can do so much.”

This powerful quote will stand the test of time, because when we work together on a common goal, we can achieve things beyond our greatest imagination. That is why I consider that in modern world cooperation between countries is a key to successful solutions to the problems worldwide. Moreover, today we live in the era of globalization. It is the process of interaction and integration among people, countries, companies and governments. 2 main pillars of globalization is total reliance on digital appliances and dominance of English. Actually, globalization does not mean that we culturally become closer, we only share experiences and technologies, that is why, we should cooperate effectively to get as much benefits as we can.

Talking about Belarus, according to foreign policy of our country we are participants of many international organisations and integration groups. First of all, Belarus became a cofounder of the United Nations, when it was a part of USSR. Also we are members of such organisations as UNESCO, UNICEF, UNEP and so on. Furthermore some our historic sites are on world heritage list of UNESCO. It includes the Belovezhskaya Pushcha National Park, the Mir Castle Complex, the Residence Radziwil in Nesvizh and some other. I believe it can also be named a part of international dialog, because countries get acquainted with each other’s culture and history. What is more staying under UNESCO protection guarantees them self-keeping, it is also likely to attract tourist to Belarus.

Geographical position is also really important for cooperation with other countries. Belarus is located in the center of Europe between Russia, Poland, Latvia, Lithuania and Ukraine. Our republic has developed strong cross-cultural links with not only neighboring countries but also worldwide. Geographically, historically and culturally Belarus is an integral part of Europe, situated at the crossroads of major transportation routes that link various regions of the European continent. That is why our country contributes significantly to security in Europe fighting against drug trafficking, illegal arms trade, illegal migration and trafficking in human beings. Belarus ensures safe transit of the energy resources delivered from Russia to a large part of European consumers.

Since our country gained its independence it has established diplomatic relations with many countries worldwide. Among them countries in Africa, Latin America and Asia. This cooperation has proved to be effective and profitable. However China remains the key partner in the east, as the country shares Belarus' positions on many issues. For example, in 2018 an agreement on a trade economic union has been signed between Eurasian economic union and China. It brings investments, new technologies and employment for citizens, which is very beneficial for both countries.

International cooperation in the trade area can play an important role in building economic resilience to shocks by supporting a more open, diversified, inclusive and predictable trade environment. Beneficial cooperation requires the international community to act together with unity and renewed multilateralism to create a global environment free of structural obstacles, wherein all individuals, peoples and nations have opportunities for inclusive, equitable and sustainable development.

Summing up, international communication is a very fluctuating issue that can give a country advantages as well as disadvantages, but it plays an integral part in economics of Belarus and partner countries.

THE USE OF WAREHOUSES IN THE SYSTEM OF LOGISTICS

student Bagaev E.S.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Warehouse management is one of the most important elements of the logistics system, which takes place at any stage of the material flow from the primary source of raw materials to the end consumer. The movement of flows in the logistics chain is impossible without the concentration of necessary stocks in certain places, for which warehouses are intended. The main reasons for using warehouses in the logistics system include: ensuring uninterrupted production process by creating stocks of resources, coordination and balancing of supply and demand in procurement and distribution through the creation of stocks, ensuring maximum satisfaction of consumer demand by forming a range of products, creating conditions for maintaining an active sales strategy.

When analyzing the role and place of warehouses, it is expedient to consider them at different levels of hierarchy: national, regional, local, and production.

Warehouses also play an important role at the production level. They affect the overall rhythm and organization of the main production processes at enterprises, the placement and operation of intra-factory and external transport, the cost of industrial products, and other indicators of production efficiency and enterprise activity.

The main reasons for using warehouses in the logistics system are: reducing logistics costs in transportation by organizing transportation with economical batches, coordination and alignment of supply and demand in supply and distribution through the creation of insurance and seasonal stocks,

ensuring uninterrupted production process by creating stocks of material and technical resources, ensuring maximum satisfaction of consumer demand by forming a range of products; creating conditions for maintaining an active sales strategy; ensuring flexible service policy [1].

The logistics process in the warehouse is complex as it requires full coordination of inventory supply functions, cargo processing, and physical order distribution. Practically, logistics in the warehouse covers all major functional areas considered at the micro level. Therefore, the logistics process in the warehouse is much broader than the technological process and includes: inventory supply, control over deliveries, receiving, placing, and storing goods, inventory management, preparation for shipment, information and document management, ensuring safety and security of the warehouse, etc.

The functioning of all components of the logistics process should be considered in interrelation and interdependence. Such an approach allows not only to coordinate the activities of the warehouse services but also serves as the basis for planning and controlling cargo movement in the warehouse with minimal costs. The main tasks of the warehouse can be outlined: supplying with stocks, control over deliveries, unloading and receiving goods, intra-warehouse transportation, storage and warehousing, order picking and shipping.

In conclusion, it should be noted that organizing warehouse management is an important link in the organization of enterprise work. It is necessary to store raw materials, materials, and finished products somewhere.

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PRIME COST MANAGEMENT OF TRANSPORT SERVICE

students Belash E.I., Solovei S.O.

scientific supervisor– senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Prime costs are all of the costs that are directly attributed to the production of each product. Transport companies are facing management problems of enhancing operation efficiency at limited resources. The cost structure is characterized by the composition and ratio of individual cost items and cost elements in the total cost of transportation.

Usually the cost structure of a particular product considered in two sections: by cost elements showing the economic nature of costs; by cost items characterizing the place of their origin and cost direction [1].

Grouping by cost elements is necessary to identify the needs of the enterprise in material, labor and financial resources. At transport enterprises, the costs that form the cost of transportation, in accordance with their economic content, are recommended to be grouped into the following elements: material costs, labor costs, and deductions for social needs, depreciation of fixed assets and other expenses.

The element “Material costs” reflects: the cost of fuel, heating of buildings and structures, the cost of car tire wear, the cost of consumables for maintenance. The element “Labor costs” reflects: payment of wages for actually performed work, payments in the form of various additional payments and allowances, payments under bonus systems for production results of work, payments of special types of bonuses. The element “Deductions for social needs” reflects mandatory contributions according to the norms established by law to the fund for social protection of the population. The element

“Depreciation of fixed assets” reflects the amount of depreciation deductions for full restoration, calculated on the basis of the book value of fixed production assets and the norms approved in the prescribed manner, including accelerated depreciation of their active part. The element “Other expenses” includes the following components that are of vital importance: land tax and other types of taxes, fees, payments; travel expenses in accordance with the norms established by law; rent; leasing payments; expenses for advertising and marketing activities [2]. When planning, accounting and calculating the cost of transportation, the costs associated with their implementation are grouped into the following cost items: basic and additional wages of personnel involved in transportation; deductions to the budget and off-budget funds from funds for wages; fuel; lubricants and other operating materials; repair of car tires; repair and maintenance of rolling stock; depreciation of rolling stock; general business (overhead) expenses.

In conclusion we can say that prime costs are direct costs, meaning they include the costs of direct materials and direct labor involved in manufacturing an item. For a correct and accurate calculation, it is necessary to take into account many factors, such as the cost of fuel, the cost of transport maintenance, the salaries of drivers, etc. This is the only way to get the real cost of transportation. Moreover, with high transportation costs, it is necessary to find ways to reduce costs in order to remain competitive in the market.

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MODERN PROBLEMS OF RENEWAL OF FIXED ASSETS

student Bozhko Y.I.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

The term “fixed assets” refers to a long-term tangible piece of property or equipment that a firm owns and uses in its operations to generate income. The general assumption about fixed assets is that they are expected to last, be consumed, or be converted into cash after at least one year. As such, companies are able to depreciate the value of these assets to account for natural wear and tear. Fixed assets most commonly appear on the balance sheet as property, plant, and equipment (PP&E). The need to update fixed assets is due to the natural processes of depreciation of fixed assets, their depreciation. In addition to physical wear and tear, the main means of production may become obsolete morally. Moral depreciation of fixed assets – aging and depreciation of fixed assets due to the fact that their technical and technological indicators are increasingly lagging behind the growing world level. High depreciation (physical) and moral wear of the main production equipment at enterprises leads not only to their low productivity and incompetiveness, but also causes a high level of accident rate of this equipment, low production safety. In addition, the low level of utilization of existing production capacities observed in recent years is also a destabilizing factor, as it overestimates the cost of production and diverts financial resources from the reproduction cycle.

Current problems of updating fixed assets include:

1) Financial constraints: the renewal of fixed assets requires significant financial costs, which cannot always be allocated from the company's budget.

This can lead to lagging of technological equipment and deterioration of product quality.

2) Technological changes: rapidly changing technologies and new production requirements may lead to the need to update fixed assets. However, it can be difficult and expensive, especially for small and medium-sized enterprises.

3) Lack of qualified specialists: modern equipment requires highly qualified operators and technicians. The lack of such specialists can become an obstacle to the renewal of fixed assets.

4) Environmental requirements: Modern environmental requirements may require replacing outdated equipment with more environmentally friendly. It can also be expensive and difficult.

5) Leasing problems: Many companies use leasing to purchase equipment. However, this may lead to problems with the renewal of fixed assets, as lessors may not want to change equipment before the term of the lease agreement.

6) Insufficient information support: Some companies do not have enough information about new technologies and equipment that can be useful for their business. This may lead to the loss of opportunities for updating fixed assets.

At first glance, underutilized capacities can be considered as backup. However, the moral and physical deterioration of a significant part of the production equipment, its resource waste and the outdated technologies used here are currently the main obstacle to the possible involvement of spare capacity for the production of competitive products.

**IMPROVING THE ORGANIZATION OF TRANSPORT
MANAGEMENT IN THE REPUBLIC OF BELARUS**

students Bukat E.S., Leonov A.A.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

In the Republic of Belarus, in recent years, there has been an active improvement in the organization of transport management. This is due to the introduction of new technologies, the creation of new management systems, as well as through constant work to improve the quality and efficiency of transport enterprises.

One of the main directions of improving the organization of transport management in the Republic of Belarus is the introduction of new technologies. In particular, today many transport enterprises in the country use special monitoring systems that allow them to monitor traffic and respond to possible problems in a timely manner.

In addition, the electronic ticketing system is actively developing in the Republic of Belarus. This allows not only speeding up the process of ticket sales, but also significantly reducing the number of fraudulent activities in this area.

One of the most successful projects in the field of improving the organization of transport management in the Republic of Belarus is the creation of a city transport management center in Minsk. This center allows real-time monitoring of the movement of buses, trams and trolleybuses, as well as timely response to possible problems.

An important aspect of improving the organization of transport management in the Republic of Belarus is also the work on improving the quality of services provided by transport enterprises. Today, new comfortable

buses are used on many routes in the country, as well as work is underway to modernize trams and trolleybuses.

In addition, the sphere of environmentally friendly transport is actively developing in the Republic of Belarus. In particular, electric buses and trolleybuses are increasingly used in the country's cities, which significantly reduce environmental pollution.

Thus, improving the organization of transport management in the Republic of Belarus is one of the most important areas of development of transport infrastructure in the country. Thanks to the active introduction of new technologies, the creation of new management systems and work on improving the quality of services provided by transport enterprises, it was possible to significantly increase the efficiency of the transport infrastructure in the Republic of Belarus.

So, in order to improve the HR management strategy, companies must constantly analyze the results of their actions. This can be achieved through employee surveys, analysis of performance and efficiency indicators, as well as monitoring changes in market conditions.

In general, improving the HR management strategy is a continuous process that requires constant attention and improvement. This is the only way companies can achieve success in the conditions of the modern market.

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**DEVELOPMENT OF INTERNATIONAL RELATIONS BETWEEN
BELARUS AND CHINA IN THE FIELDS OF ECONOMY AND
LOGISTICS**

graduate student Yao Jinshui, student Vasukova A.I.
scientific supervisor – PhD in Philology, associate professor Khomenko S.A.
Belarusian National University of Technology
Minsk, Belarus

The development of international logistics required the formation of international transport corridors, through which the main transit cargo flows are carried out. Construction and development of transport corridors at the present stage should meet the main global trends: stimulation of economic growth of the corridor countries, safety, reliability and environmental friendliness of transportation.

The most important impetus for the development of international transport corridors in Eurasia was given by the EAEU and China, which confirmed back in 2015 their desire to align Eurasian integration and the Silk Road Economic Belt.

This has led to the fact that at the moment about 83,500 containers exported to China between January and September 2022. Total for the nine months of this year sent to China 690 container trains, of which in September – 85 [1].

At present more than fifty projects are realized, new business-initiatives are developed in various spheres, connected with China direction: industry, agriculture, electronic commerce. In 2022, interaction between Belarusian regions and provinces of China is expanding, and plans are being implemented to deepen trade and economic cooperation with individual regions of China.

It should be noted that the trade with China has been rapidly developing over the last two years. The main points of export growth are potash fertilizers,

foodstuffs (meat, dairy products, rapeseed oil), and timber. Despite the uncertainties in the foreign economic situation, Belarusian transport and logistics companies are planning for 2023. The agreement on trade in services and investments between Belarus and China, which is expected to be signed in 2023, is being actively worked on.

On the 19th November, 2022, the first train of the China-European Railway Express between Xiamen in East China's Fujian Province and Belarus departed, as the two countries agreed to boost economic cooperation and trade exchange based on friendship and mutual benefit [2]. This was the first Sino-European railway express train to connect Xiamen and Belarus. The line is another sign of the growing economic and trade exchange between China and Belarus, which will stimulate demand from manufacturing companies in Xiamen and neighboring regions to deliver more goods to Belarus.

Despite considerable geographical distance and difficulty in working due to sanctions, China remains one of the most important strategic partners of Belarus and takes an active interest in the development of joint trade and economic relations. This kind of well-established economic relationship of two countries have an undoubtedly positive effect on further cooperation.

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THE ROLE OF MARKETING IN MANAGEMENT SYSTEM

students Greyner D.A., Kravchenko K.M.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

The term “marketing” comes from the English word “market” and means market orientation, market activities, sales. However, the most important element of marketing is not sales. There are a number of other components of marketing that constitute the essence of marketing – identification of consumer needs, development of goods, setting the appropriate price, formation of the distribution system and incentives.

Marketing is the process by which goods and services that provide a certain standard of living are developed and marketed, which involves and includes such activities as market research, product development, organization of distribution, pricing, and communication.

Marketing plays an important role in different spheres of society. The reorientation of production to the consumer, his interests and preferences is possible only if the market is saturated and competition is healthy. The task of marketing is to formulate the customers' requirements to the organization and to try to fit them into the organizational, financial, production and administrative possibilities. It should be understood that it is a system of actions and activities that manage the work of organizations.

Marketing in the enterprise can be demanded at the stages of forecasting, planning and control. The management process in the enterprise begins with the analysis of internal and external conditions of its functioning. Marketing plays a leading role in providing high quality products that meet the requirements of consumers.

Marketing activity as a whole is aimed at improving the competitiveness of products and production and ensuring effective sales activities. Integral spheres of marketing are also advertising, packaging, promotion of products on the market, service of its products, personal contacts with consumers, etc. Thus, planning of marketing activity is coordinated with the general system of internal planning of the enterprise.

In our opinion, the successful activity of any organization consequently intersects with marketing activities. After all, it is exactly the same model of “buyer and seller”, when it is necessary to manage subordinates in a friendly climate, satisfying their needs [1].

The role of marketing in the management of the organization can be understood as a function of the connecting type between the organization and the environment of its self-realization, performed in the process of activity of its subjects.

Being the first stage of the product life cycle, marketing also functions in all its other stages and, what is particularly important to emphasize, including the stages of this cycle relating to the circulation and consumption of products. Thus, already at the initial stage of preparation of production, the enterprise is obliged to focus only on such products which will find its solvent demand in the market. From the position of marketing when forming the management system it is necessary to go from the final goal to what should ensure its achievement. Marketing as a management concept in this case means the orientation of the organization as a whole and all decisions made.

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TINTING FILM AND ITS APPLICATIONS

students Hudyno I.V., Knyazev V. V.

scientific supervisor – senior lecturer Slesaryonok E. V.

Belarusian National University of Technology

Minsk, Belarus

In our paper we would like to touch upon such a thing as tinted glass. In our life, sometimes it seems that this thing is necessary. Those who live in a megalopolis or among high-rise buildings constantly see dark panoramic windows. Or, for example, in cars. Now we propose to plunge a little into the history of the creation of tinting film.

Despite the fact that almost all technologies and materials have a creator, it was not possible to find the one who came up with the tinting. It is known that initially the shading film was installed on the windows of buildings and this happened in the middle of the last century.

The appearance of tinting films was a real breakthrough. The application procedure was simplified at times, the prices for the procedure immediately decreased and car pasting became available to many categories of citizens.

The attitude to tinting also gradually changed - they began to appreciate the practical side of the issue, protecting their salon from burnout and extra eyes, and themselves from the risk of getting into an accident due to blinding sunlight. However, the first films were very different from modern ones. Some were so dark that they led to ridiculous collisions due to the fact that drivers simply saw the road very poorly [1].

It is not surprising that the first prohibitions on pasting cars with tinting film appeared quite quickly. However, over time, the view on the question changed, because the films protected the eyes from sunlight and oncoming headlights and, with moderate dimming, did not interfere, but helped drivers.

The legislative framework was adjusted and tinting was allowed with the condition that the light transmittance should be at least 70%.

Tinting protects the interior of the car from burnout. The main cause of burnout and damage to the upholstery of the car is ultraviolet radiation. Tinting of auto glass is a guarantee of the safety of items in the cabin. The panel, covers, and equipment receive excellent protection from overheating, burnout, and discoloration.

Moreover, the tinting protects the driver and passenger in the front seat during an accident. In the event of a collision, the glass on which the film is applied does not break into small pieces and does not cause bodily injury. Such glasses can easily withstand the impact of a brick thrown at close range.

What does the tinting film consist of? The first thing to pay attention to: its flexibility. The basis of the film is a layer of polyester with a thickness of 20 microns. It is a kind of polarizer. (Polarization is a physical phenomenon in which a natural ray of light is divided into ordinary and extraordinary.) Next comes a layer of 1-2 molecules of refractory metals, which serves as a kind of protection against rotting of the tinting film [2].

In conclusion, we would like to say that tinting is very useful and makes the driving by car more comfortable and safe that increase the driver's concentration and may also influence the driving process.

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MERCHANDISING IN MARKETING

students Iskenderova I.R., Kamenets E.A.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Merchandising in marketing is a system that ensures the delivery of goods to their points of sale at exactly the right time with the highest possible level of customer service. Merchandising is a potential tool for creating demand. By improving the product distribution system, it is possible to improve service or reduce prices, thus attracting additional customers. The main costs of goods transportation are the costs of transportation themselves, storage of goods, maintenance of inventories, receipt, shipment and packaging of goods, administrative costs and costs for processing orders.

The goals of goods movement are set on the basis of a compromise between the requirement of minimum costs and the creation of a system that provides maximum service to customers. To achieve the goals of merchandising, the following basic questions must be addressed: how to deal with customers, to process orders; where to store inventory; what should be the minimum size of inventories; how should goods be shipped and transported? [1].

Order processing. Merchandising begins with the receipt of an order from a customer. The order department prepares invoices and sends them to the various departments of the company. Shipped products are accompanied by shipping and payment documents. Computers and computer networks are used to speed up the cycle. A computer issues shipment documents, prepares an invoice for the customer, makes adjustments to inventory records, orders products for replenishment, and notifies the sales representative that his order has been fulfilled. All of this takes anywhere from a few seconds to a few minutes.

Warehousing. Organization of storage is necessary because the cycles of production and consumption do not coincide with each other. The most striking example is agricultural products, which are produced in season, although the demand for them is constant. Organization of warehouse storage helps eliminate these contradictions. The enterprise can either have its own warehouses or rent space from storage organizations.

Maintaining Inventory. The decision on the level of inventory is important in the area of merchandising, affecting customer satisfaction. On the one hand, it is in the firm's interest to have enough inventory to fill all customer orders immediately. On the other hand, it may not be cost-effective to maintain a large inventory. It is necessary to know whether sales and revenues will increase sufficiently to justify an increase in inventory.

Transportation. The price level, timeliness of delivery, and the condition of the goods when they arrive at their destinations depend on the choice of carrier. When shipping goods, a business can choose one mode of transportation or a combination of modes. Rail transport is the largest freight carrier in the country. Railroads are the most cost-effective mode of transport for transporting shipments in bulk over long distances. Road transport carries the bulk of freight traffic in cities. Trucks are able to transport goods door-to-door, eliminating the need for unnecessary transportation. Air transport is becoming increasingly important. Although air freight rates are highest, transportation by air is preferable when speed is of the essence or distances are very long.

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CANVASSING IN LOGISTICS

student Kalashnikova M.A.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Canvassing is a sales method that is actively used in various areas of business, including logistics. This method consists in the fact that a company representative directly addresses a potential client, offering him his services. Canvassing can be carried out on the streets of the city, as well as on the phone or by e-mail.

Cargo canvassing are the operations to solicit freight for transportation by intermediary firms. Activities associated with the opening of a new line and tonnage growth. Cargo canvassing operations are a practical expression of any transportation company's marketing efforts [1].

A canvasser may confirm an entire package of shipments to a customer and then transfer the unwanted cargo to another carrier for a commission, or accept door-to-door transportation so that, after loading his own transport on a certain section, he can transfer the complex execution of the operation to the operator with whom he cooperates. Depending on his employment, he may execute the transaction himself or delegate its conclusion to employees of operational departments or lawyers of the agency firm.

A well thought out plan of action is necessary for a successful logistics canvassing operation. First, you need to determine the target audience – businesses that may be interested in your company's services. Then you need to prepare a presentation that will include information about the company, its advantages and advantages over competitors. It is also necessary to prepare a list of questions which will help to find out customer's needs and offer him the most suitable variant of collaboration [2].

One of the main advantages of canvassing is the opportunity of direct communication with the potential client. It allows you to quickly find out his needs and expectations, as well as establish a relationship of trust.

It is also worth noting that the human factor plays an important role in canvassing. This applies to both managers and ordinary employees.

Accordingly, the number of employees in the canvassing department is different. It depends on the size of the territory controlled by the agent, the allocated allotment, and the degree of his activity on the market.

However, canvassing may be associated with certain difficulties. For example, not all potential customers may be ready to cooperate with your company, which can lead to rejections and time losses. In addition, canvassing requires a significant financial and time investment in preparation and delivery of presentations, as well as employee training.

In general, canvassing is an effective tool for promoting logistics services in the market. However, for it to be successful, it is necessary to have a well-thought-out plan of action and be prepared for possible difficulties. It is also important to remember the need to establish trust with potential customers and create a positive image of the company.

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AUTOMOBILE TRANSPORT AS A WAY OF ADVERTISING

students Kamenets E.A., Rodko D.D.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Advertising on transport (or transit advertising) refers to the text or graphic information and has enormous opportunities for creativity. It is applied to the sides of all types of transport: from cars to vans and public transport. Its main advantage is the coverage of a large number of potential customers at a relatively low price. Why is it so?

The fact that public transport runs on a particular route is of high importance. In one day, it carries several thousand people. During its movement, it is seen by drivers of passing cars, their passengers and a great number of pedestrians. So do corporate vehicles, vans and other means of transportation, on the sides of which you can put advertising and use it to increase sales and brand awareness. Why is transit advertising so widespread?

First, according to statistics, advertising on transportation attracts 5 times more attention than static. This is because advertising on transport is in constant motion it is seen in different parts of the city. Secondly, the cost of advertising on boards of transport is much lower than on billboards. Thirdly, advertising in transit gives the opportunity to choose the appropriate route, which will help you to influence the maximum number of interested users [1].

Finally yet importantly, public transport is a large area for the application of intelligent and original advertising messages that attract attention and are remembered by the potential consumer.

Despite the large number of advantages, it is worth noting some of the most important disadvantages of transit advertising:

- possible short-term durability. If the owner of the vehicle does not pay proper attention to the condition of the car, the advertising stickers can quickly lose their beautiful appearance;

- the lack of its own lighting. Because of this, the effectiveness of such advertising is sharply reduced after sunset;

- the potential consumer may simply not have time to read an advertisement. The solution to this problem is a clear and well-thought-out design that immediately gives the consumer all the information he or she needs [2].

It is worth noting that advertising on automobiles must not threaten the safety of traffic, overlap the exterior lights, registration plates, information inscriptions, symbols, as well as limit the visibility from the driver's seat and visibility in the direction of travel. It is also prohibited to have similarity in color and color scheme of coloring with special vehicles (operational vehicles) and coincide with the images of road signs or identifying marks of vehicles. It is not allowed to place advertising on the windows of the vehicle and use coatings and elements that have a light-reflecting effect. In addition, transit advertising must not be accompanied by sound, including inside the cabin of the automobile.

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HOW TO IMPROVE PICKING IN THE WAREHOUSE

students Karatkevich I.D., Volodko D.S.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Order picking is a multi-stage process that starts with the order processing operations of the account manager and ends with placing the order in the shipping area. The competitiveness of a company depends to a large extent on the speed and quality of order picking. The main types of order picking: discrete picking, batch picking, zone picking, wave picking [1]. The number of errors in order picking is reduced when information systems and bar coding are introduced to facilitate order picking. Nevertheless, errors are inevitable in the first phase of implementation, and a system of bonuses and penalties needs to be developed. This requires gathering statistics and defining criteria for evaluating staff performance. Several picking stages can be optimized at once. These include the first phase of order processing, the exchange of information between the warehouse and the sales department, and the transfer of the selected order to the control area and its subsequent checking and packaging. However, the most time-consuming part of the process is the picking process itself: many errors occur at this stage, which also accounts for the majority of the time.

There are several ways of reducing order picking times: introducing a goods-to-person system; separating the picking and reserve stock; the use of integrated picking. It is recommended to reserve goods for customer orders automatically when planning the picking operation, according to the algorithm laid down in the warehouse management system. The fundamental rule in this algorithm is a predetermined order of goods in stock by batch or series:

1. FIFO (first-in, first-out) – “first in, first out” - goods are dispatched from the batch that arrives in the warehouse first.

2. LIFO (last in, first out) - last in, first out - goods from the earliest-to-receive inventory are given priority for shipment.

3. FEFO (first-ended, first-out) – “first-in, first-out”. As a rule, shelf life is used as the criterion for determining shipment priority: goods with less remaining shelf life are shipped first.

4. LEFO (last-ended, first-out) – “last-end-first-out” - goods with the highest remaining shelf life are shipped first [2].

Consideration should also be given to developing algorithms for picking routing. This issue is specific to each warehouse and depends not only on the parameters of the premises, but also on the parameters of the material flow being handled, which change over time. The functioning of a warehouse complex designed according to the characteristics of the goods and the specifics of the company will require fewer resources for cargo handling, provided that the stable and safe operation of the warehouse personnel is maintained. Properly chosen warehouse management system will allow a timely exchange of accurate and complete information between divisions of the company.

However, regardless of whether these tasks are solved by the company's employees or by engaging consultants for the technological design and automation of warehouses, it is necessary to take into account that it is a comprehensive approach that will produce tangible results for the enterprise as a whole.

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THE ROLE OF MARKETING RESEARCH IN LOGISTICS

student Karpuk A. A.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Marketing is the organization of production and sales of products, based on the study of the market needs for goods and services. Marketing starts with the customers: they should be at the center of any business activity. Through marketing a company can identify and analyze the needs of its customers and then make the important decisions in order to satisfy these needs and make a profit.

Logistics is field of activity related to the supply, control and organization of cargo transportation. As in any other field of activity, logistics companies are interested in maximizing the profit from transportation and minimizing costs, as well as in expanding their customer base.

Companies must be engaged in marketing with the aim to achieve these goals. There are various methods in marketing with which certain results can be achieved, and the products or services of the company become more useful and recognizable. Market research is one of these methods. It means the collection of data from various sources in order to obtain information regarding the needs and wants of customers and the structure and dynamics of a particular market. It is an essential part of defining a market strategy. There are two types of data sources:

1. Primary data. This is research that is used for a specific objective and is collected the information through observation, some experiment, such as various face-to-face interviews and online questionnaires. This form of research provides particular data which is extremely important to the company.

2. Secondary data. Secondary data is existing information so it is a cheaper and quicker source than field research. However, it is important to check how up-to-date, accurate, reliable and relevant to the specific needs the information actually is. Secondary data can be inner to the company, such as sales records and customer reports, or external. Examples of secondary data include statistics from trade organisations or government reports, articles and market reports. The Internet is also an important source of this kind of data.

There is a huge variety of different types of market research. The most suitable method for logistics is questionnaire. A questionnaire is a cheap and fast method for gathering a large amount of data in a short period of time. The questions must be designed so that they are easy to understand and provide a clear outcome. Nowadays most questionnaires can be online and can check customer satisfaction with a purchased product. One disadvantage with questionnaires sent by post or email is that it is a passive method relying on people to complete and send back the form. Logistics companies can create a special questionnaire to survey their customers. This method will help the firm determine the demand for their products and prioritize cargo and shipping.

Marketing is a very important part of the development and promotion of any company, so you should use various methods of marketing research to achieve success in a particular field of activity.

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HONDA CIVIC GEN 11: THE EVOLUTION CONTINUES

student Kastsevich M.A.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Civic is a global model and keeps the same design across various regions. With every new generation, Honda has managed to improve upon the previous model, making it more stylish, efficient, and technologically advanced. Honda not only kept the best parts of that Civic but also incorporated design features from all the previous generations of the Civic. The latest iteration of the Civic, the Gen 11, is no exception. In this article, we would like to examine the features and specifications of the Honda Civic Gen 11. The Honda Civic Gen 11 boasts a sleek and sporty design. The car's exterior is characterized by sharp lines and aggressive angles that give it a bold and dynamic look. The front features a blacked-out grille with chrome accents, LED headlights as standard, and fog lights. The rear end of the car has a nice sporty spoiler and LED taillights that wrap around the sides of the car. Also, the car has problems in its design: fake diffuser and exhaust pipes [1].

The interior of the Honda Civic Gen 11 is equally impressive. So, it must be mentioned that Honda always did innovative things, and with every new generation of Civic, a complete overall of the interior. The dashboard features a digital instrument cluster and an infotainment system with a big touchscreen display. The seats are comfortable and supportive, with plenty of legroom and headroom for both front and rear passengers. The car also comes with a host of advanced safety features, including adaptive cruise control, lane departure warning, and automatic emergency braking.

The boot capacity is 410L and it's bigger than on KIA Ceed (395L) or Toyota Corolla (313L), Ford Focus (375L) and Volkswagen Golf (381L). The

boot has a few hooks, lamps and 12V socket. From the boot the driver can easily fall down the back seats. The Honda Civic Gen 11 is packed with advanced technology features that make driving more enjoyable and convenient. The car also comes with a premium audio system, satellite radio, and a wireless charging pad for your phone. Other notable features of the Honda Civic Gen 11 include a rearview camera, automatic climate control, keyless entry, and push-button start. The car also offers a variety of driver-assist features, such as blind-spot monitoring, rear cross-traffic alert, and a multi-angle rearview camera [2].

There are five disadvantages about the Honda Civic Gen 11: the rear window is big but the wiper for it is quite small; only Apple CarPlay is wireless; Honda gives only three-year warranty; the glove box is huge outside but small inside; the gear selector isn't easy to use while driving.

Five good things about the Honda Civic Gen 11: regime modes are operated from the steering wheel; the car has a customizable driving mode; the Honda has the smartest low cover: it's retractable and easy to remove; the location of the rear seat belt runner means that they never get snagged on the seats if fold them down – they are separate [3].

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LYING AND STEALING: HOW VOLKSWAGEN STARTED

students Kazak A.V., Ilchik K.V.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Everyone knows the name of Henry Ford. He was famous for his desire to make a cheap, affordable car for the masses, which he really achieved. But few people know that there was a man who also dreamed of creating a people's car. It was Adolf Hitler. There was a huge portrait of Ford in his office. And since Hitler idolized Ford, he also wanted to repeat his achievement: to create a people's car for the German nation. It must be said that a politician who promised the people that they would soon have their own personal car acquired a huge political success. In the 1920s and 1930s, a personal car was an impossible dream and it was a smart move from the point of view of establishing control over the population.

The development of the car was entrusted to Ferdinand Porsche. The task was as follows: it was necessary to create a car that could drive safely 90-100 km/h on the autobahn, so that 5 people (2 adults and 3 children - an average German family) could fit in it and that it cost 990 Reichsmarks. It is much more difficult to create a cheap car than an expensive one because you need to come up with a design that will be viable, but at the same time simple, reliable, maintainable. So that there is a minimum number of spare parts and that all this together is worthy of being called the dream of the German people. And Porsche completed the task. His car was produced from 1938 to 2003 with a total amount of 21 and a half million cars. But the Porsche Volkswagen Beetle was stolen, not entirely, but in parts. A year before the first prototypes appeared, Hans Ledwinka in Czechoslovakia had created a prototype Tatra V570. Porsche took the idea and design from Tatra. And when the Volkswagen Beetle was already preparing

for release in 1937, Tatra sued Porsche, who took away 10 patents and his car from them. But Hitler intervened in the case, who conquered Czechoslovakia in 1938 and the trial stopped.

But in the post-war years in 1967 Volkswagen had to pay 3 million marks as compensation. It is worth noting that before the Beetle became the most massive car in the history of people, it became the most massive military vehicle in Germany. Hitler needed the Volkswagen plant only for the production of military vehicles. As a result of the Second World War, the Volkswagen plant lay in ruins. There could be no question of any production of a people's car. The remains of the plant went to the British.

Thanks to a lucky coincidence, drawings and several prototypes remained at the factory. And the first order that arrived at the Volkswagen plant was for the British Army. It was necessary to release 20 thousand Beetles. The restoration of the plant has begun. And by 1947, orders from other countries began to arrive. But at that moment, the British and Americans made the biggest mistake in the history of the automotive industry. The head of Ford at that time said that the plant has no value. And in 1949, the British decided to give the plant back to the Germans.

We could now observe how the company that inspired Hitler to create a people's car would own the results of his activities. But history does not tolerate the subjunctive mood. In 1961, the plant produced its millionth car. And in 1972, 27 years after the end of the war, the release of the Volkswagen beetle will beat the Ford Model T in volumes.

The Volkswagen Beetle became the best-selling and most successful car at that time. This car certainly has one of the most interesting destinies among the other models of any automobile concerns. Volkswagen is the largest and most profitable concern in the world: a market share of about 15% and sales of 638,605 cars.

HOW DIGITAL TRANSFORMATION IS CHANGING TRANSPORT AND LOGISTICS

student Kliukovich Y.A.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technologies

Minsk, Belarus

Digital technologies can improve business models, strategic planning and interactivity between all participants in the transport process. The blockchain technology can provide transparency to supply chain operations, reduce risks, and benefit all participants.

By recording transactions and providing real-time information to all supply chain participants, blockchain platforms can increase the efficiency of transportation logistics. Furthermore, the technology can be used to administer static and dynamic registries, execute smart contracts, and act as a payment infrastructure.

It is expected that the use of these digital technologies increases efficiency and reduces environmental harm caused by logistics and transportation processes.

Digitalization of transportation and logistics was discussed at the IV Digital City Forum. There is potential for further optimization and transformation of traditional business models through full digitalization, even though some aspects of the industry have already adopted digital technologies, such as warehouse and transportation management systems [1].

Despite some problems, autonomous vehicles and unmanned aerial vehicles are regarded as the future of the industry. While data and automation are becoming increasingly important, the industry lacks IT specialists who can manage these changes. Furthermore, new services and analytical reports require expertise for effective interpretation and use. To meet the demands of the

industry, there is a need for professionals with a good understanding of technology and data analysis. Additionally, the industry needs to invest in the development of technology to ensure the safety of autonomous and unmanned vehicles.

As compared to other industries, agriculture is slow to implement digital solutions. In spite of the fact that this is one of the areas that should undergo digital transformation, the implementation is slow due to a lack of IT infrastructure, a lack of qualified personnel, and insufficient funding for new technologies. Agriculture, however, is increasingly implementing digital solutions to reduce risks and increase competitiveness.

According to the Russian government, the “Digital Agriculture” project was launched in 2019 with the aim of increasing the use of digital tools in agriculture by 50%. This project could potentially revolutionize the agricultural industry, leading to higher yields and improved efficiency. With the right strategies and investments, Russia could become a global leader in digital agriculture [2].

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ARTIFICIAL INTELLIGENCE IN SUPPLY CHAINS

student Kremez Y. Y.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Artificial intelligence is the ability of a computer to perform tasks usually associated with intelligent beings. As with other digital technologies, the introduction of artificial intelligence, according to experts, contributes to the improvement of the logistics industry and its development.

Artificial intelligence is widespread in transport logistics thanks to the introduction of such advanced technologies as Amazon automated warehouses, Einride autonomous trucks, Zipline unmanned vehicles, Starship “last mile” delivery robots. These types of technologies can potentially speed up the performance of some types of manual work. By combining human intelligence with artificial intelligence, transport and logistics companies can save time, reduce operational costs and eliminate manual errors, and employees can focus more on analytical and complex tasks.

The supply chain has experienced cardinal changes over the past few years. Today, technology is able to make decisions better than a person and provide better business results, which can take logistics to a new level.

The introduction of artificial intelligence into the supply chain has a number of advantages: it provides real-time collection of information from various contractors and suppliers and effective support for critical operations; uses big data sets to implement a reliable procurement strategy and forms strategic response models; organizes warehouse management.

Artificial intelligence also increases the efficiency of supplier deliveries and minimizes the risk of losses in logistics management.

Artificial intelligence helps to properly manage physical assets, and also reduces the damage and losses of these machines. This reduces the cost of maintenance and helps to better manage the production process.

Over the past few years, the Belarusian artificial intelligence market has grown several times. The reason was serious state support. Currently, artificial intelligence and other digital technologies in the Republic of Belarus are used in warehouse logistics for a comprehensive assessment of warehouses and enterprises; voice assistants analyze the receipt of goods to the warehouse and their shipment. Today, Belarusian service companies are more in demand in foreign markets than in domestic ones.

The use of artificial intelligence will eventually lead to the creation of an ecosystem in which various supply chains are connected to each other and allow creating a continuous material and information flow from the manufacturer to the consumer.

Artificial intelligence technology helps to anticipate the future needs of a particular product on the market, which greatly helps the manufacturer to manage production costs and reduce future losses and predicts future demand for specific products.

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IMPROVING THE METHODS OF PERSONAL MANAGEMENT

students Leonov A.A, Bukat E.S.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

In the conditions of modern business, where competition is growing every day, the personnel management strategy is becoming a key factor in the success of the company. The personnel of the organization are the most difficult object of management. Unlike tangible assets, people are able to make decisions independently and assess the requirements imposed on them. In addition, the staff is a team, each member of which has its own interests and is very sensitive to managerial influences, and the reaction to them is often difficult to predict.

Despite the fact that from the point of view of management, the main goal of the business is to make a profit, modern theory and practice of personnel management pays considerable attention to the need to meet not only the material, but also the social needs of employees.

Personnel management should be systemic in nature, that is, a coordinated approach is needed to all areas of the formation and regulation of the company's personnel: recruitment, placement of senior personnel, training and advanced training, selection and employment.

There are many existing HR management strategies, but how to improve these concepts?

1. Understanding the needs of the staff. The first step to improving HR management is to realize the needs and expectations of employees. This can be achieved through surveys, focus groups, or individual conversations. When a company understands what is important to its employees, it can adapt its management strategy to meet these needs.

2. Leadership development. Leadership is another important element of the HR management strategy. Companies should develop their managers and train them in effective management. Leaders must be able to motivate their employees so that they can successfully complete their tasks and adapt to market conditions.

3. Employee motivation. Motivation is a key factor in the personnel management strategy. Companies should create a motivation system that will encourage employees to achieve better results. This can be achieved through a system of rewards, recognition of achievements and career opportunities.

4. Development of flexible working conditions. Modern employees value flexibility in their working conditions. Companies can provide the possibility of remote work, flexible working hours or personal work for a while. This will help to improve the balance between work and personal life of employees, which in turn will increase their productivity and job satisfaction.

5. Analysis of the results. In order to improve the HR management strategy, companies must constantly analyze the results of their actions. This can be achieved through employee surveys, analysis of performance and efficiency indicators, as well as monitoring changes in market conditions.

In general, improving the HR management strategy is a continuous process that requires constant attention and improvement. This is the only way companies can achieve success in the conditions of the modern market and exist as the most attractive and profitable ones.

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CAR BODY PARTS

student Leshchevich Y.A, Shedko M.S.

scientific supervisor – senior lecturer Slesaryonok E. V.

Belarusian National University of Technology

Minsk, Belarus

A powerful and classic car is made up of several parts that function harmoniously to give you the right driving experience. If any of these vital parts get damaged, it will depreciate the performance of your vehicle, and make the car unsafe to use.

Purpose of the body. The car body is the most expensive part of the car. The car body can be either a carrier system or a separate element of it. The body of a modern passenger car consists of an engine compartment, passenger compartment and trunk.

The interior of the car is located in the body and the chassis, transmission, engine, control mechanisms, electrical and additional equipment are installed on the body. Basically, the car body is made of metal, but there are exceptions when used. The metal part of the body consists of the following body parts: the bottom of the body (treated with anti-corrosion materials to reduce corrosion); body roof; body wings (treated with anti-corrosion materials to reduce corrosion); body panels; body doors (attached to the body pillars by hinges, which are held by screws, with which the doors are adjusted vertically and horizontally); the locks on the doors (have a special design that prevents the door from opening even in case of an accident); body hood [1].

Bumpers are installed at the front and rear of the body. On modern cars, bumpers are made of plastic or other similar materials. In the event of an accident, it is the bumper of the car that first takes the blow.

Seats are installed in the passenger compartment to accommodate the driver and passengers. The car seats are installed on special sleds that allow you

to adjust the seat in the longitudinal direction. You can also adjust the seat tilt, which is provided by special handles on the sides of the seats. Seat tilt adjustment can be carried out up to the installation of a sleeping place.

Material and manufacturing technology

The body of a modern passenger car is made of high-strength steel, which goes through several stages of processing. The small thickness of the metal used makes it possible to significantly reduce the total weight of the machine, which has a positive effect on its dynamics and efficiency. Despite the small thickness of the steel, the body structure is designed in such a way that it is both lightweight and durable [2].

On most modern cars, body parts are bonded together by spot welding. This ensures the reliability of the connection of the elements and reduces the number of edges and sharp corners, which are most vulnerable to corrosion. In the future, the automotive industry will use laser welding of parts. This approach minimizes the presence of bulges and depressions at the seams, and the body structure will become simpler and more reliable.

Various types of steel are used in the manufacturing of elements of the load-bearing car body. Knowing the structural feature of the car, you can greatly simplify and speed up some bodywork

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WAYS TO MINIMIZE CARGO TRANSPORTATION RISK

student Lupach A. L.

scientific supervisor – senior lecturer Slesaryonok E. V.

Belarusian National University of Technology

Minsk, Belarus

Shipments are exposed to multiple risks from a wide range of human and natural forces. When importing or exporting, you must understand the various types of risks your cargo could face and how you can help protect the value of the goods shipped globally. An important role in the development of the economy is played by high-quality transportation of various goods. The active development of this industry determines the demand for transportation in the world market. And as a result, the number of companies providing cargo transportation services by various modes of transport is growing. Each company organizing the service is interested in creating the image of a reliable and responsible partner, as well as in expanding the customer base and retaining regular customers; so it is very important to arrange transportation correctly.

There are ways to reduce cargo transportation risk:

1. Choose the type of transport. Air transport is particularly useful for time-sensitive consignments or goods, minimizes the possibility of theft, damage to goods or loss of goods. However, air transport can sometimes be interrupted by weather factors and airspace closures. Road transport advantage lies in the provision of door-to-door services, and goods can be delivered to almost any place. It's a pity, but road transport often suffers from traffic jams, traffic accidents and other incidents that lead to delays and sometimes damage to goods and vehicles. Maybe you want to deliver the goods by one mode of transport (for example, by rail or only by ship) or by two or more different modes. Think over the way of transportation, in that terms you need to deliver the goods, what type of transport will be beneficial.

2. Know the partners you work with. Organization of transportation involves constant cooperation. It's important to build strong working relationships with all of your supply chain partners, because in this way you not only guarantee the fast and correct handling of your goods at every stage of the delivery process, but also increase the efficiency of transportation. Even if there are any problems, not only you, but also partners will be ready to solve them.

3. Cargo insurance. Natural disasters, vehicle breakdowns, legal restrictions, social factors can lead to cargo damage, loss or delay. Insurance helps to protect against such force majeure, but if any of this happens a certain amount of money will be paid in accordance with the insurance.

4. Cooperate only with proven and experienced logistics companies. Choosing a carrier, the following factors must be considered: experience in the field of transportation, the number of completed transactions, reviews, both positive and negative. Established companies can use their longstanding relationship with supply chain partners to help you find best partners, ensuring that you receive the best service possible at every stage of shipping.

It should be added that following the legal norms and timely prepared documentation minimize the risks during transportation.

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COMPETITIVENESS AND METHODS OF EVALUATION OF MOTOR TRANSPORT ENTERPRISES

student Makarenko E.A, Filuta E.N.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

The basis of market relations in road transport is the competition of enterprises for the transportation of goods, in order to obtain high profits.

To date, many definitions of competitiveness can be found in the economic literature. The term “competition” itself comes from the Latin word “concurrere” - "to collide" and is defined as a form of mutual clash of interests of all subjects of the market economy. In the most general sense, competitiveness is understood as the ability to outperform others, using their advantages in achieving their goals. S.I. Ozhegov interprets the term competitiveness as the ability to withstand competition, to resist competitors. R. A. Fatkhutdinov defines competitiveness as the ability of an object to withstand competition in comparison with similar objects in a given market. The study of the competitiveness of enterprises, proposed in the economic literature by the authors A. Voronov, A. Dementieva, I. Maksimov, M. Melnikova, A. Semenenko, S. Tsvetkova, etc., allows us to conclude that most often the concept of “enterprise competitiveness” is reduced to the ability of an enterprise to produce a competitive product. Currently, there are more than 30 definitions of the concept of company competitiveness [1].

The main signs of competition of road transport services: availability of competitive advantages of road transport services, categorical character, combination of diversity and openness of competitive road transport services, the transformation of rivalry between competing subjects of road transport into competition or integration. An objective assessment of the competitiveness of

the enterprise allows you to solve the following important tasks: determine the real position in a certain market, develop strategic and tactical measures of objective management, choose partners, attract the necessary investments, to draw up programs for the company's entry into new sales markets. However, this is possible only if there are suitable objective methods for assessing the level of competitiveness of enterprises.

The problem of assessing the competitiveness of an enterprise is complex, since it is necessary to take into account a wide variety of factors when determining it. Currently, despite the urgency of this problem, the methodology for assessing the competitiveness of an enterprise cannot be called sufficiently developed. The complexity of defining this category determines the variety of approaches to its assessment. There are four groups of methods for assessing the competitiveness of an enterprise: quantitative, quality, descriptive, mixed [2].

At the moment, there is no specific methodology for determining the competitiveness of an enterprise. There are many methods that assess competitiveness, but there is no single accepted methodology. Both foreign and domestic scientists have contributed to solving these problems.

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FORMS OF ORGANIZATIONS IN THE ECONOMY

student Medvedev N.M.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

When a person decides to create his own company, he faces many questions. Will the enterprise have one owner or several? And if there are several, how will the rights be distributed among them?

The first type is a business partnership. This is a form of business organization based on the combination of property of different owners. It is divided into two types - a general partnership and a limited partnership. In a general partnership all participants bear unlimited property liability. In a limited partnership, in addition to full participants, there are also limited partners. They do not have the right to participate in the management of the enterprise, but they are also responsible only within the limits of their contribution [1].

The next type is business companies. They are also based on the pooling of members' contributions. These include a limited liability company and two types of joint-stock companies - public and non-public. A limited liability company or abbreviated LLC is a type of business company where the founders are not liable for its obligations and bear the risk of losses associated with the activities of the company, within the value of their shares in the authorized capital of the company.

There are two more forms of business enterprise: State Unitary Enterprise (or SUE for short) and a production cooperative.

A state unitary enterprise is distinguished by the fact that the owner of the enterprise is not the owner of the property. The property is in federal, regional or municipal ownership, in other words, in state ownership. The owner has the right to manage and dispose of this property.

A production cooperative is an equally interesting, although not very common, form of business organization. The main distinguishing feature of this form is that the profit is distributed among the participants not according to how much money the participant contributed, but according to the participant's personal labor participation in the economic activities of the production cooperative. Such enterprises have at least five members and are created for the purpose of joint personal production. If you buy a share, then you are paid dividends - this is a part of the company's profit that the owner of the share receives. In addition, the acquisition of shares means that you have become the owner of a small piece of the company. The more shares you have, the more influence you can have over the firm. The number of shares in one person is called a block of shares. Allocate control, blocking and minority stakes. A majority stake means that the person owns the majority of the company's shares. Most often (especially when there are few shareholders) this means that he owns 50% of the shares + 1 share [2]. However, if there are a lot of shareholders, then the size of the controlling stake can be reduced to 15-20%. The next type is blocking. This is such a share in the authorized capital of the company, which can allow its owner to block most of the most important decisions of the general meeting of shareholders. Usually the size of such a package is 25% +1 share. And the last type is minority. This is a package that does not allow the owner to have a significant impact on the activities of the company.

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CHARACTERISTICS OF THE BELARUSIAN INDUSTRIAL SECTOR

students Morozov K.A., Kukolovich I.V.
scientific supervisor – senior lecturer Slesaryonok E.V.
Belarusian National University of Technology
Minsk, Belarus

The industrial sector is a branch of the economy that is associated with the production of any product, as well as similar characteristics, functions and goals. It is one of the key sectors of the economy of our state.

The industrial sector forms 27% of the gross domestic product of Belarus (as of 2021). In our country, the most developed industries are: mechanical engineering, woodworking, metalworking, food production, mining, pharmaceutical and petrochemical industries.

The leading sector of the economy of the Republic of Belarus is the manufacturing industry with a share of GDP of 22.5% (2015). Broken down by sectors of the manufacturing industry, the largest share falls on the food industry – 5.1%. In second place is chemical production with a share of GDP of 3.2%. The third place was taken by the production of machinery and equipment, which accounts for 3.0% of the share of GDP.

The most widely used indicator for determining the economic efficiency of individual industries is labor productivity, which is often defined as revenue (or output) per average employee. The production of petroleum products, being the second largest industry in terms of production and having a small number of employees, brings the largest revenue per employee – 481.2 thousand dollars per year. Also, high labor productivity is observed in the mining industry – 155 thousand dollars per employee [1].

The largest sector in terms of the number of employees is the food industry. The average number of employees in the food industry is 165.6 thousand people (5.5% of the total number of employees). 4.9% of the employed

work in the production of machinery and equipment. Quite a large number of workers are employed in textile production, including clothing production – 96 thousand. Their share is 10.5% of all employed in industry, while the volume of production of this industry is relatively small – only \$ 1.27 billion (3.2% of the volume of production of the industrial sector). Being the second largest industry in terms of output, the production of petroleum products employs the least number of employees compared to other industries – 17.6 thousand people (or 0.6% of the average number of employees in the economy).

At the moment, large enterprises are working successfully, their financial results are improving. Revenue continues to grow at a rate higher than cost. The return on sales is 8.6 percent at the highest in ten years. Largely due to this, the net profit that enterprises can direct to increase the “turnover” or to reserves continues to grow. The debt burden is decreasing — the debt—to-revenue ratio is slightly more than 50 percent - this is the best indicator in the last six years. In other words, improving the efficiency of work allows organizations to form a safety margin, which should become a springboard for an economic breakthrough in the remaining five months of the year.

We believe that it is also worth noting that in order to increase the welfare of the country and our citizens, it is also necessary to develop not only industry, but also the service sector, for example, logistics, since it is very important for the entire economy of the state. It develops cargo traffic between industries and passenger traffic between settlements and countries, which in turn contributes to the movement of funds and stimulates the economy to progress.

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OSMOSIS

student Plis K. D.

scientific supervisor – senior lecturer Slesaryonok E. V.

Belarusian National University of Technology

Minsk, Belarus

Osmosis is the process of diffusion of solute from a less concentrated solution into a more concentrated solution [1].

The phenomenon of osmosis is observed in those media where the mobility of the solvent is greater than the mobility of the dissolved substances. An important special case of osmosis is osmosis through a semi-permeable membrane. Semi-permeable membranes are membranes, which have a sufficiently high permeability not for all, but only for some substances, in particular, for the solvent. (The mobility of dissolved substances in the membrane tends to be zero.) If such a membrane separates a solution and a pure solvent, the concentration of the solvent in the solution is lower, because there a part of its molecules is replaced by molecules of the solute. As a consequence, the transition of solvent particles from the department containing the pure solvent to the solution will be more frequent than in the opposite direction. This means that the volume of the solution will increase (and the concentration will decrease), while the volume of the solvent will decrease accordingly.

For example, an egg shell has a semi-permeable membrane on the inside: it lets in water molecules and retains sugar molecules. If such a membrane separates sugar solutions with concentrations of 5% and 10% respectively, only water molecules will pass through it in both directions. As a result, the more diluted solution will have a higher sugar concentration, while the more concentrated solution will have a lower sugar concentration. When the concentration of sugar in both solutions is the same, there will be equilibrium. If you take a baggie with fine pores that allow only solvent molecules (such as

water) through, but do not allow sugar molecules through, the water molecules will diffuse into the baggie, increasing the volume of solution in the baggie. If the pouch is connected to a glass vertical tube, the solution begins to rise up the tube until the pressure produced by the water in the tube equals the osmotic pressure of the sugar solution.

It is osmotic pressure that explains the paradoxical facts of flowers and even brittle mushrooms sprouting from asphalt. Plant cells also use osmosis to increase the volume of the vacuole so that it expands the cell walls (turgor pressure). Plant cells do this by storing sucrose. By increasing or decreasing the sucrose concentration in the cytoplasm, they can regulate osmosis. This increases the elasticity of the plant as a whole. Many plant movements (e.g. movements of whiskers of peas and other climbing plants) are associated with changes in turgor pressure [2].

The world's first power plant using the osmosis process to generate electricity opened on 24 November 2009. Norway. Salted seawater and freshwater are separated in the plant by a membrane; as the salt concentration in seawater is higher, osmosis occurs between salted and freshwater, so that the salted water pressure rises spontaneously.

As the pressure of the osmosis saline water is greater than the atmospheric pressure, a powerful water flow is created, which drives a hydro-turbine to produce energy.

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**MODERN STRATEGIES AND MECHANISMS IN SOCIO-ECONOMIC
SYSTEM OF COUNTRY**

student Prusakova K.A.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

The main object of the economy is a socio-economic system which is understood as a set of resources and economic agents that form a coherent whole (social and economic structure), interconnected and interacting in the production, distribution, exchange and consumption of goods and services that are needed in the environment. Market environment functioning of SES dictates tough competition, survive and become a boss which can only be based on the timely implementation of development programs. Therefore, in the current economic conditions are more relevant to the issues of development of such systems, their skill to fairly quickly and with minimal cost required to reply to market needs and changes in the external and internal environment. For effective management of development of SES should solve a number of problems, one of which is the development of generalizing the classification of types of such systems. A clear specification development for the classification features allows further development, create appropriate methodological approaches. Particular attention is paid to improving economic theory and economic education in response to modern challenges, sustainable development of regions, technological drivers of socio-economic transformations, and introduction of new technologies into the production system. Improvement of modern strategies and mechanisms of anti-crisis management of economic systems and social processes is impossible without the use of scientific approaches and practical tools for optimizing the resource provision of economic entities, the formation

various models of public-private partnership, To ensure the effective development and implementation of new concepts, strategies and mechanisms for managing economic systems it is necessary to use modern information technologies and innovations, create competitive advantages by enhancing the resource potential of economic entities, and develop promising and export-oriented sectors of the economy. The key factors in the development of the modern economy are: a favorable macroeconomic structure, modern information infrastructure, human resources development and an effective innovation system. However, in order to attain the desired level of development, it's required to make better the institutional framework of the economy, promote transparency and develop competition. And here the role of the state isn't to directly regulate the economy, but to assimilate the development of market mechanisms and conditions for the introduction of new technologies by companies. Ecosystem approach is the dominant approach to building an innovative development model worldwide. The basis of this approach is to construct relationships between participants in the innovation process similar to the natural ecosystem, the development of which occurs through the interaction of its components. The socio-economic system has a certain potential. The economic development of the country as a whole, the well-being of its citizens, and the country's worthy place in the world community depend on its size and use. The solution of the strategic tasks of the development of complex socioeconomic systems requires the search for effective models and mechanisms of management that are adequate to modern economic conditions.

ADVANTAGES OF PARCEL TRANSPORTATION

student Radziuk A.A.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Parcel transportation is a way of delivering small goods over short and medium distances.

When transporting such goods by sea, instead of a bill of lading, a special transport document is used - a parcel receipt, in which the cost of the parcel is entered. A parcel receipt is a registered transport document. Accordingly, it cannot be transferred to another person by applying the usual transfer inscription on it. The receipt of the recipient in receiving the parcel is called a parcel receipt. The parcel receipt shall indicate: the name of the cargo, shipper, consignee, number of places, weight, port of destination, as well as other necessary information. On the loading order it is usually stated “to be shipped under parcel receipt”, that is it is shipped according to the parcel receipt. Loading, unloading, transportation of parcel cargo is carried out at a special linear rate, and for exhibition cargo and promotional materials they are usually reduced [1]. One of the main features of parcel transportation is the possibility of delivering goods in small volumes - from a few kilograms to several tons. This allows companies to save on transportation without overpaying for unused cargo volume. In addition, parcel transportation usually has shorter routes, which contributes to faster delivery of cargo to its destination. This is due to the fact that drivers can directly deliver goods without having to transfer them through various transport hubs.

An important feature of parcel transportation is also the possibility of delivering goods to the client's door. Such transportation is often carried out

using small-sized vehicles, which allows the cargo to quickly reach its destination.

However, there are several nuances that need to be considered when choosing parcel transportation.

First, you need to check the reputation of the transport company and make sure of its reliability. You can do this by reading customer reviews and checking licenses.

Secondly, you need to take into account that parcel transportation may take longer than regular transportation, especially if there are a lot of goods or they are distributed along different routes.

Thirdly, it is important to ensure accurate delivery information and delivery times as much depends on the logistics and organization of transportation.

Finally, it must be taken into account that parcel transportation may have a higher cost than regular transportation due to the fact that the vehicle must visit several destinations.

Thus, when choosing a parcel transportation, it is necessary to take into account all the above nuances in order to choose a reliable carrier who can organize the transportation of goods on time and without trouble.

Parcel transportation means greater flexibility in choosing the volume of cargo, shorter routes, as well as the ability to deliver cargo to the client's door.

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THE INFLUENCE OF TRANSPORT LOGISTICS ON THE ECONOMY OF THE COUNTRY

students Rakovshchik O.B., Kostukevich P.E.
scientific supervisor – senior lecturer Slesaryonok E.V.
Belarusian National University of Technology
Minsk, Belarus

The role of transport operations in the modern world is growing annually. Globalization obliges manufacturers to expand their field of work and develop various routes across the world in order to stay afloat among other international companies and increase their profit, not to mention cooperation between countries as many unions have been created over the past decades to provide every member of a union with all they might need.

At the moment the impact is so crucial that the government puts its development on one of the most prioritized places. Logistics in economics can contribute to achieving competitive benefits both in production – through rational usage of available capacities, reduction of working capital reserves, cooperation, integration, refinement of calendar planning, etc. – and in service through improving commercial service, progressive strategy of distribution channels, more complete fulfillment of consumer's needs, etc.

The implementation of modern logistical concepts and systems is one of strategic ways of increasing the marketability of domestic business organizations. Seeking to enhance private indicators, firms also take care of ensuring the partner's interests and conditions for developing contractual relations of supplying commodity. Besides, by sticking to logistical methods and expanding horizontal economic relations, companies compete with each other for increasing the quality of production delivery with the least expenses [1].

Logistical methods have a multifaceted influence on functions of public administration in terms of development market relationships.

Firstly, their coordinative duties are utilized. Commodity flows require economic regulation and coordination. Secondly, activity of recommendatory and scientific-methodical kind is evolving in local public administration as a form of providing state support to logistical structures. Thirdly, with the help of logistical methods administrative bodies explore additional sources of enhancing budget possibilities. For instance, owing to regulating the prices for logistic services, it is possible to decrease companies' spendings on these services and create the conditions for raising the revenue of state budget. Fourthly, the usage of logistical methods by public administration has to boost the development of inter-sector connections of industrial, transport and marketing business. Fifth, logistical management methods gain development in sphere of interstate relations. Consequently, they can be considered and widely used in the system of foreign economic ties with other countries in forming transnational financial and industrial groups [2].

Thus, the development of the logistics functions of state structures, the use of logistics management methods has an impact on improving the economic policy of the state, increasing the effectiveness of ongoing reforms. In current conditions, logistics and logistical systems are becoming important elements of developing the potential of a country's market economy, a crucial production segment of the economy that, in any case, must be constantly monitored and thoroughly reviewed.

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MARKETING ACTIVITY OF THE COMPANY

students Rodko D.D., Iskenderova I.R.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Marketing activity is the activity to solve the practical tasks facing the marketing department in a commercial company (enterprise, firm).

The main goal of marketing activity is to ensure the commercial success of the company (enterprise, firm) and its products in the market, which is most often achieved by increasing the volume of sales in natural and monetary terms. However, depending on the specific situation of a particular company, the objectives of marketing activities may be different [1].

Organization of marketing activity of the enterprise consists in realization of the following functions:

1. Analytical function. At this stage, study of external and internal actions that influence the company, analyze consumer tastes and commodity assortment. Do not ignore the analysis of the internal environment of the enterprise to control competitiveness.

2. Production function. Concludes in the development and mastering of new technologies, organization of the production process of goods and services, the purchase of raw materials and material and technical resources necessary for the smooth functioning of the enterprise. The sphere of activity also includes quality management of finished goods, measures to enhance its competitiveness.

3. Functions of management and control. Responsible for provision of planning process on production, development of forecasts, organization of communication systems, risk management and information support.

4. Sales functions. Concludes in determining the pricing and commodity policy of the organization, ensuring the system of movement of goods and increasing demand.

5. Innovation Function. It takes an essential place in the process of development and creation of new products or services.

Marketing activity can be divided into 4 directions:

- collection of marketing information about the external and internal environment of the company - market research, competitive intelligence, etc.;

- analysis of marketing information and making marketing decisions (segmentation and choice of target segments, evaluation of competitiveness, positioning, etc.);

- planning of marketing activities (development of marketing strategy and marketing plan);

- formation and implementation of marketing complex [2].

In implementing the strategy, the marketing department has four global tools. These include: product offer, price, distribution, promotion. Understanding how these components work together can help you create successful marketing campaigns that bring in more customers and sales. A marketing strategy aims to get your offer in front of your target market at the right time.

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THE IMPACT OF DEGLOBALIZATION ON GLOBAL LOGISTICS

student Ryzhykh N.A.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

In this article I want to examine the concept of deglobalization, which refers to the weakening or decline of globalization. It looks at the factors that determine this process, its impact on global logistics, and the opportunities and challenges it presents for business. The common approach to deglobalization is that it is a “process of diminishing interdependence and integration between certain units around the world, typically nation-states.” In other words, deglobalization would be a call to isolation or to revert from the increasing integration of the world in the nearest future. Deglobalization is the process of weakening or reducing globalization, which began in the 2010s and intensified in recent years. This process is caused by a number of factors, such as the rise of nationalism and protectionism, changes in technological and economic conditions, and political changes in many countries around the world. Deglobalization has a significant impact on global logistics. It causes changes in production and supply chains, increases risks for global corporations, and intensifies competition between national economies [1]. However, it also creates new opportunities for the development of local production and supply, as well as for the development of more sustainable and environmentally responsible logistics systems. One example of deglobalization is “Brexit” - the UK’s exit from the European Union. This has caused changes in the supply chains of many companies, which are now forced to seek new suppliers and markets. This has also led to increased delivery times and logistics costs. Another example is the trade war between the US and China. As a result of the establishment of trade

barriers between these two countries, many companies have revised their production and supply chains. Some companies have decided to move their production to other countries to avoid high tariffs and taxes. The COVID-19 pandemic was another major event that had a major impact on global trade, and consequently on global logistics. This not only isolated suppliers from different countries, but also halted the production of goods, sea and land transportations. However, deglobalization also creates new opportunities for the development of local production and logistics systems. For example, local semiconductor and microprocessor manufacturers have begun to emerge in many countries around the world. This allows companies to produce domestic goods instead of ordering them from abroad. These measures increase the independence of the economy from foreign TNCs.

How can the process of deglobalization affect the market for logistics services in Belarus? Firstly, this is a reorientation of logistics to Eastern countries such as Russia and China. We can already see the results of this shift in trading partners today. In addition, the level of integration of logistics in Belarus into the EAEU system is increasing.

Thus, deglobalization creates new challenges and opportunities for global logistics. Companies must be prepared to adapt to changing conditions and revise their strategies to maintain competitiveness in the new economic reality.

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ENSURING FLIGHT SAFETY

student Salash A.D.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Designing

In static tests, the fuselage and wing are loaded to such an extent that the aircraft almost folds in half and withstands. Also, any model of the aircraft is blown with super-strong air flows, subjected to shock loads. If it is not possible to break the plane to certain loads, then the plane is durable.

Weather radar

Each airliner has a weather radar installed. The microwaves that it emits are reflected from water droplets, as a result, with insufficient visibility or at night, clouds can be seen.

Lightning strike

It is dangerous here if a spark occurs in the fuel system. People and electronics may also be affected by the discharge. To do this, lightning rods are placed on the wings, antistatic components are added to the paint. If carbon fiber composite materials are present, conductive cores are introduced into them. Sensitive systems are shielded, that is, protected from the accompanying electromagnetic pulse [1].

Types of checks

There are quite a lot of checks in aviation, which makes the flight even safer. Every eight to 10 weeks, airplanes need what is known as the A Check. In this process, technicians change filters, check, and lubricate critical systems. They also give a detailed inspection of all the emergency equipment. Meanwhile, there used to be a B Check. Operators have phased out these Checks and merged them into the A Checks. The B Check used to be made every six to

eight months. It took up to 180 labor hours and could be completed within one to three days at an airport hangar. The C Check happens every 18 months to two years. It takes three weeks. Interestingly, during the D-check, the aircraft is completely disassembled into components, parts, equipment. All parts are checked and, if necessary, replaced with new ones. Power elements undergo “non-destructive testing” to find, for example, micro-cracks. For example, capillary flaw detection: A special ultraviolet paint is applied to the surface and it penetrates into micro-cracks, where they are, the remains of the liquid are removed and shone with ultraviolet light or a special developing mixture is applied. So, it is possible to detect a micro-crack up to 1/100 of a millimeter.

Why is hard touch better?

When landing on a wet strip, pilots use a harder touch. It is safer to "drop" the plane onto the runway a little, although it is not so pleasant for passengers. This will not only reduce the chance of slipping during contact or separation, but also allow the automation to work more accurately. In addition, the "confident touch" dissipates some of the aircraft's energy, and a shorter runway length is required to extinguish the remaining one [2].

We can conclude that thanks to the careful work of airlines and airports, air transport is one of the safest.

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MODERN TRENDS IN DEVELOPING TRANSPORT POLICY

student Savchenko Y.A.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

The transport policy of any industrialized country is an integral part of its economic and spatial policy. In all developed countries, it is considered as one of the most important components of the national strategy, and transports itself, as a rule, is under constant and fairly strict control by the state. Transport policy deals with developing a set of constructs and propositions that are established to achieve specific objectives relating to social, economic, and environmental conditions, and the functioning and performance of the transport system [1].

Transport has always been and will remain the most important component of the economy, a factor ensuring its unity and integrity. In this area, many questions are raised about public safety and the environment. Public safety issues have led to certain restrictions: the requirement of a driver's license, the restriction of drivers' working hours, the establishment of speed limits, the mandatory application of traffic rules, seat belts, etc. More recently, environmental standards and control measures have been introduced due to awareness of the impact of transport on the environment. Since the European transport policy and strategy are primarily aimed at reducing the negative impact of transport on the environment and improving traffic safety, respectively, a reduction in demand for freight and passenger transportation is encouraged. And this already requires coordination in the use of territories, stimulating the development of environmentally friendly modes of transport, the adoption of stricter norms and standards for emissions, noise, and traffic safety. The key issue of transport policy is the improvement of state regulation of transport

activities, first of all, the revision of the procedure for granting subsidies from the budget, taxation rules, and tariff policy [2].

The Republic of Belarus has all modern modes of transport, except sea, and its transport communications in their structure and location mainly meet the internal needs of the country, but need to be improved. The transport system of the Republic of Belarus as a whole is gradually adapting to the new political and economic conditions of life, but many issues of its effective operation and further development still need to be addressed. Organizational management structures suffer from excessive centralization and overload. Unfortunately, a unified transport policy has not yet been formed in the republic and a continuous struggle continues between forces advocating a radical renewal of the entire transport system and conservative circles defending their departmental interests.

In accordance with the “Main directions of socio-economic development of the Republic of Belarus” and “The Concept of development of the transport complex of the Republic of Belarus”, the strategic goal of transport development is to create an economical, reliable transport system capable of meeting the needs of the population and economy in transportation and services, the entry of Belarusian carriers into the international transport market.

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TYPES OF ADVERTISING

students Shut A.A. , Krivlenya M.V

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Advertising is a convincing means of information about a service or an organization (enterprise), commercial propaganda of consumer properties of a service and the merits of the activity of a transport enterprise, preparing a real and potential buyer for purchase.

Advertising accompanies the implementation of the service, the accelerated and successful completion of the process of turnover of funds, that is, the process of reproduction at the enterprise level. With the help of advertising activities, you can influence and manage demand.

In the field of business, there is a distinction between commodity and prestigious advertising. The main task of prestigious advertising is the formation and stimulation of demand for the service. By promoting a specific type of service, advertising promotes its sale. Product advertising informs the consumer about the properties and advantages of the service, arouses interest in it [1].

Prestigious advertising is an advertisement of the advantages of a transport company that favorably distinguishes it from competitors. It emphasizes the concern of the motor transport company for the consumer, the environment, improving the well-being of society, and pursues the task of forming the consumers and buyers think of him as a reliable partner, a solid, highly qualified representative of the provision of services transportation, seeks to create a favorable image of the company and there by promote the active sale of all services produced by it.

The first type of advertising is informative. It is used when introducing a service to the market, that is, at the stage of implementing the service life cycle.

The objectives of this type of advertising are as follows:

To tell the market about a new type of service or about new conditions of transportation; of an existing type of service; informing the market about tariff changes; explanation of the principles of service provision; description of the services provided; correcting misconceptions or dispelling consumer concerns; formation of the image of a transport enterprise.

The second type of advertising is admonitory (persuasive). This type of advertising is used in the formation of demand for a service, when approving the advantages of one brand of service compared to another (the stage of growth of the service life cycle);

The tasks of this type of advertising are as follows:

The formation of brand preferences; encouragement to switch to your type of service; changing the consumer's perception of the properties of the service; convincing the consumer to make a purchase without delay.

The third type of advertising is reminiscent. This type of advertising is used when the market is saturated with a certain type of service in order to make the consumer remember about the service.

The tasks of this type of advertising are as follows:

Remind consumers that they may need the service in the near future; a reminder to consumers about where to buy the service; retention of the type of service in the memory of consumers; maintaining awareness of the service at the highest level.

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FROM THE USSR TO THE PRESENT

students Solodukho A.A. and Dorohova V.A.
scientific supervisor – senior lecturer Slesaryonok E.V.
Belarusian National University of Technology
Minsk, Belarus

Do you think it is possible to upgrade an old Soviet-era car with the help of spare parts of modern cars? I can say with confidence that this is possible, but only if you have a lot of work experience and professionalism. My father and I improved the 1970 LOISE in a month with the help of spare parts of various cars, selecting them according to certain parameters. The purpose of this experiment was to make the car more powerful in order to improve cross-country ability and not get stuck in the mud. Let's take a closer look at what has been changed. The only thing left of the stock LOISE is the body and manual transmission. The factory 40-horsepower gasoline engine was replaced with a 68-horsepower diesel engine taken from a Volkswagen Passat. We replaced it in order to be able to install larger diameter wheels to increase ground clearance, since it would be difficult for the old engine to rotate these large wheels. All other parts were matched to the manual transmission and the engine. The clutch is the main element that had to be picked up when docking a more powerful motor with a native LOISE gearbox. It was taken from the Audi 80. To do this, a special transition plate was measured and made, which was attached to the gearbox, the drive shaft of the gearbox was centered with the center of the crankshaft. A bearing was selected, which was installed in the crankshaft so that the shaft of the box got into the crankshaft of the engine. The clutch was selected so that the clutch disc was put on the primary shaft of the box and pressed against the basket. The basket was also taken from the Audi 80, and the clutch disc from the Chevrolet Niva. We took the new starter from the Audi A6 C5. The cylinder came from the BMW 3, because a large cylinder stroke was

needed. The release bearing came from the VAZ-2108. As a result, out of four cars, we assembled a clutch assembly that works at full capacity. For convenience, the seats were taken from the Lancha zetta with heating and with a 180° turn. We are planning to install different-wide tires from the quad bike BRP 1000. New disc brakes were installed because the pre-installed drum brakes were in bad condition because they got clogged with dirt and stopped working properly. The rear and front brake discs were taken from Mazda 626. Adapter plates were machined in order to be installed on discs, which were taken from the VAZ-2109 as well as brake pads. The steering system has been completely redesigned. At the factory in Lugansk, LUAZ steering was made through a steering reducer and 8 additional levers. This is a very complex steering, and often it breaks and there is a big backlash in the steering wheel. A steering rack was installed from the Tavria. We extended the steering rods, installed an angular steering reducer from Volkswagen Transporter T2, which was put on the steering rack, since it stands at the back, and the steering wheel is opposite it. The entire cooling system was redesigned. We installed a fan switch sensor from the Volkswagen Golf, a radiator from the Volkswagen Passat B2, an engine from the Volkswagen Passat B3, a fan installed from the Mitsubishi Outlander, the second one will soon be installed. Why Mitsubishi Outlander? Because the new engine turned out to be longer than the native one, and the distance from the radiator to the engine was very small, so we had to choose a thin cooling fan. It was connected via a fan switch-on sensor, which was installed at the radiator inlet. As soon as the temperature rises to 90°, the sensor is triggered and the fans automatically turn on. To accommodate the radiator, it was necessary to trim the hood mount, because the hood opened forward.

Thus, the LOISE was assembled by the method of selection and measurement from various vehicle parts, most of which were bought at auto disassembly.

THE CONCEPT OF AUTONOMOUS VEHICLE

student Tomshis D.V.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

An autonomous car is an automated or autonomous vehicle capable of performing the basic transport functions of a traditional car without human intervention. Autonomous vehicles are also known as self-driving cars, driverless cars, or robotic cars. The term self-driving car is becoming a standard as these technologies continue to mature.

How self-driving car works? Autonomous cars are equipped with various sensors and high-speed cameras - in particular, they use ultrasonic systems, infrared or laser sensors. When using these systems, the car simply scans the environment every few milliseconds, using all this technology. These special scanning systems can detect the environment and other vehicles around them not only on the highway, but also in a large metropolis. Unfortunately, it is not possible to ensure complete safety at the moment, since autonomous vehicles cannot outperform vehicles that still require driver participation.

But Autonomous vehicles have a number of advantages:

1) Reducing traffic jams: According to the American Society of Civil Engineers, Americans currently spend more than 6.9 billion hours a year in traffic jams. “Our experiments show that, provided that only 5 percent of vehicles are automated and carefully controlled, we can eliminate accidents caused by human driving behavior,” said Daniel B. Work, associate professor at the University of Illinois at Urbana-Champaign, lead researcher in the study of traffic jams. Under normal circumstances, human drivers naturally create emergency traffic, even in the absence of bottlenecks, realignments, mergers or other failures. This phenomenon is called “phantom traffic jam”. Researchers

from the University of Illinois found that by controlling the speed of an autonomous car during the study, they were able to level the traffic flow for all cars.

Even reducing the number of accidents could reduce congestion, since up to 25% of congestion is caused by road accidents, says a study of the potential impact of connected and automated vehicles on energy consumption.

2) Reducing CO₂ emissions: Reducing congestion is also likely to lead to a reduction in CO₂ emissions. In addition, the Future of Driving report from Ohio University states: “Since the car will be controlled by software, a modern car can now be programmed to reduce emissions as much as possible. It is expected that the transition to new generation cars will lead to a 60% reduction in emissions.”

3) More efficient parking: The Future of Driving report, prepared by Ohio University, states that a significant "impact of self-driving cars is that such cars can park 15% less space. Currently, cars must be parked with sufficient space between them so that the driver can exit after parking and enter when taking the car out of the parking space. With self-driving cars, vehicles can be located close to each other. Urban areas experiencing an acute shortage of space will benefit from switching to driverless cars."

However, the technology is gradually evolving and adapting, and most forecasts show that this innovation will be an ideal tool in the next few years.

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EFFECT OF AIR POLLUTION FROM VEHICLES

students Cheptsov A.A., Bocharov A.M.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

Vehicle pollution can be defined as the introduction of harmful materials into the environment by motor vehicles. These materials are known as pollutants, and they have several adverse effects on the ecosystem and human health. Transportation is a primary source of air pollution in several countries worldwide because of the high number of vehicles available on the roads nowadays. The air pollution due to vehicles in urban areas, especially in big cities, has become a severe problem.

In today's world life without vehicles is unimaginable, and even though vehicle pollution cannot be eliminated, it is extremely important to understand why it is worth reducing them to an acceptable level. Global warming is considered the leading effect of automobile pollution. Pollutants emitted by vehicles lead to the release of greenhouse gases into the atmosphere, which leads to the depletion of the ozone layer [1].

The destruction of the ozone layer leads to an increase in the temperature of the atmosphere, which in turn causes global warming. Other effects of road pollution include the formation of smog and acid rain, and reduced air quality. Also, automobile emissions have a harmful effect on humans. Exhaust gases contain about 200 chemical compounds. Among them are substances that are harmless to the human body (nitrogen N_2 , oxygen O_2 , water vapor H_2O , carbon dioxide CO_2) and very toxic compounds, including carcinogens. Carbon monoxide (CO) is a product of the incomplete combustion of automotive fuels. Carbon monoxide is considered an "inhaled poison" capable of creating an

oxygen deficiency in the tissues of the body, which can cause headache, dizziness, nausea, unconsciousness and even death. Nitrogen dioxide (NO₂) is a yellowish-brown gas that greatly impairs visibility, is highly toxic.

Research shows that exposure to nitrogen dioxide can lead to both acute and chronic health effects in humans. Hydrocarbons (CH) in the presence of nitrogen dioxide under the influence of sunlight are oxidized and form toxic oxygen-containing compounds with a sharp unpleasant odor – photochemical smog. Polycyclic aromatic hydrocarbons contained in soot and resins are strong carcinogens. Certain classes of hydrocarbons are capable of causing mutations. Formaldehyde is a colorless gas with a pungent odor in high concentrations, irritates the eyes and respiratory tract, has a general toxic effect, causes damage to the central nervous system, and has an irritant, allergenic, mutagenic, and carcinogenic effect. Dust (suspended particles, less than 10 microns in size) can cause diseases of the mucous membranes and respiratory organs, as well as conjunctivitis and dermatitis.

What can help reduce these effects? Carpooling, use of bicycles, electric public transport (metro, urban railways, buses) improvement of road infrastructure, its improvement, installation of engines running on compressed natural gas, improvement of maintenance, repair and organization of control over the technical condition of vehicles - these are the priority ways protection from the negative aspects of motor transport.

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UK LOGISTICS

students Tishkevich R.A. Shabrov A.A.

scientific supervisor – senior lecturer Slesaryonok E.V

Belarusian National University of Technology

Minsk, Belarus

Logistics is an important and unique direction in the modern world, especially in the economy of each country. UK logistics is one of the most developed in the world. This is due to the fact that the UK is one of the largest trading centers in the world, and also has a highly developed infrastructure and transport system.

The British logistics system is based on the country's long and rich history of transport development. It includes a wide range of means of transport, ranging from railways and roads to waterways and airways. Thanks to this versatility, the UK fully meets all the needs in domestic and international logistics. The UK has a wide network of highways, railroads and ports that provide fast and efficient delivery of goods throughout the country and beyond. In addition, the UK has a high degree of automation and the use of new technologies in logistics, which allows to reduce delivery times and improve the quality of services.

One of the main reasons for the success of the UK in logistics is the investment policy of the government. The British government continues to invest in transport and logistics infrastructure. For example, in 2020, the HS2 project was launched, a high-speed rail route connecting London with Birmingham and Manchester, which will increase productivity and expand the opportunities for logistics companies.

The UK has a developed air transportation system that plays an important role in the country's logistics. Most of the major cities in the UK have their own

airports, which serve many international and domestic flights. One of the UK's largest airports is Heathrow, which is one of the world's busiest airports. It serves over 80 million passengers annually and has direct flights to many cities around the world.

Sea transport also plays an important role in UK logistics, ensuring the efficient and reliable delivery of goods and passengers within and outside the country. The country has many ports located along its coastline that serve both international and domestic routes.

One of the largest ports in the UK is Portsmouth, which is one of the busiest ports in Europe. It serves more than 200,000 cargo ships annually and has direct routes to many cities around the world. The UK has a developed ferry transportation system that connects it with other European countries. Ferry carriages are widely used to transport goods and passengers, especially over short distances.

Overland transport is also an important part of UK logistics. The country has a developed network of roads and railway lines that provide delivery of goods and passengers throughout the country.

One of the largest land freight companies in the UK is Royal Mail. The company serves more than 29 million addresses nationwide through its network of post offices, road and rail. Most freight transport is carried out on vehicles with trailers that can carry up to 44 tons of cargo. Container transportation on freight trains is also widely used in the country.

An important element of UK overland transport is its system of tolls and taxes. Truck and bus drivers are required to pay road tax, which depends on the weight of the vehicle and its environmental classification.

In conclusion, we can say that British logistics is a connecting element that helps to connect the needs of producers, traders and end users. Its efficiency is becoming a key factor in the UK's economic progress and its international trade.

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN LOGISTICS PROCESSES

student Yankovich Y.I.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

The use of artificial intelligence and machine learning to optimize logistics processes is one of the most promising innovations in logistics. With the help of these technologies, a large amount of data can be collected and analyzed, making it possible to optimize delivery processes, reduce the time for loading and unloading cargo, reduce inaccuracies, and improve service quality.

The use of artificial intelligence and machine learning makes it possible to create demand forecasting models for goods, which helps optimize inventories in warehouses and reduce the cost of goods storage. These technologies can also be used to optimize delivery routes, taking into account various factors such as traffic congestion or weather conditions.

Innovations in artificial intelligence and machine learning also make it possible to create systems for the automatic management of logistics processes, which reduces errors and increases the quality of customer service.

There are many studies and practical examples of the use of artificial intelligence and machine learning in logistics. For example, one of the most promising applications is autonomous delivery of goods using unmanned vehicles. There are also systems for predicting fuel prices and optimizing freight transportation costs.

Another example is the use of artificial intelligence to analyze data on the condition of vehicles, which allows timely identification of malfunctions and prevention of accidents. There are also systems to optimize the time that goods

remain in storage, which take into account the demand for goods and the possibility of rapid delivery.

Computer vision is a field of research that is responsible for developing various methods to help computers see and understand images and video. And it is exactly the kind of tool that can provide warehouse automation and solve a number of problems. For example, computer vision systems can automate the process of reading barcodes, and therefore speed up and simplify it.

They can also monitor the perimeter of the warehouse and keep track of employees, analyze data, and prevent theft and security breaches. And thanks to facial recognition technology, the computer vision system can also detect who is entering and exiting the warehouse [1].

To reduce shipping costs and make the delivery process itself faster, it is possible to use artificial intelligence to make decisions about the best routes. This is important in the case of large e-commerce companies with a large number of customers.

Customers are always happy to receive their orders as soon as possible, without any delays. And artificial intelligence (AI) is what is needed to analyze existing routes, to carry out route optimization. In this way, better results and greater profits can be achieved.

Overall, the use of artificial intelligence and machine learning in logistics can improve operational efficiency and service quality, which in turn contributes to the competitiveness of companies and economic development.

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THE MOST EFFICIENT TYPES OF TRANSPORTATION CONTAINER

student Yaskevich D.A.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

A container is a standardized reusable packaging designed for the carriage of goods by road, rail, sea and large-sized transport quickly and reliably from point of origin to clients, consumers, distribution centers or others elements of supply chain. Containers are adapted and mechanized reloading from one vehicle to another.

The invention of containers in 1956 greatly contributed to the development of globalization and world trade. Trading transportation had a number of problems before: slowness, big danger for loaders and high costs of in-port operations.

From the appearance of the first units to the present day, a great variety of maritime and multimodal containers have emerged as a response from the logistics chains to ensure the correct handling of loads. Factors that influence on classification of containers: the size, weight, nature, degree of standardization of the load. Also type of crane and spreader required for that cargo is very important, because it is important while transloading and unloading of trucks in points of consumption.

One of the most common container classification includes the following:

- Dry storage container;
- Flat rack container;
- Open top container;
- Open side storage container;
- Refrigerated ISO container;
- ISO Tanks;

- Half height containers;
- Special purpose containers [1].

Dry storage containers are the most common containers used in the shipping industry. These containers do not allow for temperature controls, so they are not suited for moving food or chemicals that require refrigeration. There are about seventeen million intermodal containers in the world, and a large proportion of the world's long-distance freight generated by international trade in shipping containers.

There is a very wide variety of spreaders according to the number of cycles and to the type of cranes to be used. They come in length of 20 and 40 feet. These dimensions of containers are the most popular in international trading. All the trucks and loading areas in transport and logistics centers are designed and built in accordance with the dimensions of these containers.

But nowadays in America it becomes widespread to use high-cube 45 feet containers. It is connected with dimensions of American trucks, because they are longer and wider, than European ones. A lot of 40 feet containers have a recess in the floor at the front end which serves to center the containers on so-called gooseneck chassis. These recesses allow the containers to lie lower and therefore to be of taller construction [2].

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**DIRECTIONS FOR THE DEVELOPMENT OF GENERATION
FACILITIES IN THE REPUBLIC OF BELARUS**

post-graduate student Akulenok I.G.
scientific supervisor – senior lecturer Slesaryonok E.V.
Belarusian National University of Technology
Minsk, Belarus

No wonder that the electric power industry is called the main branch of the modern economy because it has a direct impact on all the life support systems of society, the social climate and economic development. Without a technologically modern, investment-attractive electric power industry, it is impossible to achieve sustainable GDP growth and increase the competitiveness of Belarusian producers. Today, the electric power industry faces serious and responsible tasks that require effective solutions. It is highly profitable production with minimal costs that is able to ensure the development of the country and is relevant not only today, but also in the distant future. Attention to the study of the methodology for improving the efficiency of generating facilities is explained by the lack of basic energy resources: almost 90% of the fuel used in the energy sector is imported from the Russian Federation; the increasing cost of their production, global environmental problems. Optimization of the equipment configuration of power generating sources of organizations of the State Production Association “Belenergo” is to be carried according to the specified values of the definite indicators and have an economically justified approach, taking into account external and internal conditions [1]. In particular, the values of the indicator “The ratio of the total installed capacity of power plants to the maximum actual load in the energy system (reservation)”, lying above the threshold of 140%, allow us to speak about the guaranteed possibility of providing reliable power supply to consumers by manufacturers, however, a significant excess of this threshold

generates an additional financial burden on the consumer. In order to ensure a balance between the interests of producers and consumers, it is necessary to prevent unreasonable growth of power generating capacities in the republic, and decommission depreciated capacities in a timely manner. The values of this indicator set by the Energy Security Concept are at the level of 155% in 2025 and 150% in 2030. To achieve them, it is necessary to decommission generating sources with a total installed capacity of 2026 - 3,077 MW, by 2031 - 3,242 MW (on an accrual basis) [2]. At the same time, taking into account the commissioning of NPPs, it is necessary to update the methodology for calculating the indicator, which will take into account the power reserve required for NPPs in the power system. Optimization of generating sources of the power system must be carried out considering modern trends in the development of science, engineering and technology. It is necessary to monitor the development of the production of electric energy storage devices and, if it is technically and economically feasible, to use this equipment in balancing the operating modes of the power system.

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**THE CURRENT STATE OF THE ELECTRIC POWER INDUSTRY IN
THE REPUBLIC OF BELARUS**

post-graduate student Akulenok I.G.

scientific supervisor – senior lecturer Slesaryonok E.V.

Belarusian National University of Technology

Minsk, Belarus

At present, the wear and tear of generating equipment of organizations State Production Association “Belenergo” is at a normal level and amounts to 42.5%, which is due to the systematic modernization of generating equipment carried out since 2006, including the commissioning of large generating sources at Berezovskaya GRES, Lukomlskaya GRES, CHPP-5. At the same time, until 2030, the standard operating life of a significant part of the equipment of generating sources expires. In order to maintain the depreciation indicator within the limits corresponding to energy security, when developing five-year development programs, it is necessary to rank objects for their replacement, modernization, and reasonable periods for extending operation or decommissioning. At the same time, it is necessary to take into account the need to maintain power reserves in the energy system, which will increase significantly after the commissioning of the Belarusian atomic power station. The existing heat supply schemes for regional and district cities, which were designed in the 60-70s of the last century, were suitable for centralized heat supply in the industry and housing and communal services, as well as to cover peak heat loads in heating systems. Since the mid-1990s, most boiler houses have been used exclusively as peak and backup heat sources, with thermal power plants providing the main heat load. Despite the annual increase in housing under construction, the actual consumption of thermal energy in the whole country is declining, which is due to the active implementation of energy-saving measures in industry and housing and communal services [1].

In 2018, the installed capacity utilization rate of district boiler houses as a whole for organizations of the State Production Association “Belenergo” amounted to 6.9%, and the number of hours of installed capacity use was 604 hours. This indicates the presence of excess capacity, which ultimately has a negative impact on the value of the constant component in the cost of thermal energy. For this reason, it is necessary to consider the possibility of optimizing the composition of the existing equipment of regional boiler houses with its possible decommissioning (dismantling, conservation). Moreover, the low level of use of boiler equipment is due to a significant reduction in industrial consumers of thermal energy, the need to maintain a reserve of thermal power for consumers [2]. To make a decision on the further operation of morally and physically obsolete power equipment and high-voltage transmission lines at the power grid facilities of the Republic of Belarus, their examination and technical opinion on the state of the facility and the need for its reconstruction is of vital importance. In addition, the depreciation policy of electric power industry organizations should be based on the need to take into account the actual depreciation of production assets (technical standards for operating time).

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THE DEVELOPMENT OF CONTAINER TRANSPORT IN BELARUS IN 2023

students Anisko D.V., Lubenko P.D.
scientific supervisor – senior lecturer Lapko O.A.
Belarusian National University of Technology
Minsk, Belarus

Container transport is one of the fastest-growing industries in the world. It's a type of freight transportation that's carried out in special containers that can be easily transferred one mode of transportation to another. In Belarus, the development of container transport is gaining momentum, and experts predict in the nearest future the country will become a key player in this industry.

One of the main factors that contribute to the growth of container transport in Belarus is the country's strategic location. Belarus is located at the crossroads of major transportation routes between Europe and Asia, which makes it an appealing transit point for cargo transportation. The country has a well-developed railway network that connects it to Russia, Ukraine, and Europe. The country also has several large airports and a modern system that allows for simple access to neighboring countries [1].

Another necessary factor that contributes to the development of container transport in Belarus is the government's support. The Belarusian government has implemented a number of measures to invite foreign investors and promote the development of the transportation sector. One of these measures is the creation of special economic zones that proposes tax breaks and other incentives to companies that invest in the country's economy.

The growth of container transport in Belarus will have a positive effects on the country's economy. It will create new jobs, invite foreign investment, and generate extra income for the government.

Another challenge is the necessity to expand the capacity of transportation infrastructure. This includes expanding the railway network, building new highways, and improving the efficiency of ports and airports.

One potential opportunity for the development of container transport in Belarus is the increasing demand for e-commerce and online shopping.

Another area of potential growth for container transport in Belarus is the export of agricultural products.

In conclusion, container transport is a rapidly growing industry in Belarus, and soon the country is expected to become a key player in this sector. The government's support, strategic location, and well-developed transportation infrastructure create it an appealing destination for foreign investors who are looking to widen their business in this region. However, there are also challenges that necessity to be addressed in order to fully realize the potential of container transport in Belarus. With proper planning and investment, Belarus can become a major transit hub for container transportation between Europe and Asia [2].

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DIGITAL TRANSFORMATION OF LOGISTICS PROCESSES

student Korneychik M.D.

scientific supervisor – senior lecturer Lapko O.A.

Belarusian National University of Technology

Minsk, Belarus

In recent years, electric vehicles (EVs) have been gaining popularity in the logistics industry as a more sustainable and environmentally friendly alternative to traditional gas-powered vehicles. Electric vehicles offer several benefits to logistics companies, including reduced operating costs, improved efficiency, and increased sustainability. This article will explore the benefits of electric vehicles in logistics and some of the challenges that need to be addressed for their widespread adoption.

One of the most significant advantages of electric vehicles in logistics is reduced operating costs. EVs have lower fuel and maintenance costs compared to traditional gas-powered vehicles, which can save logistics companies a significant amount of money over time. EVs also have fewer moving parts, which means they require less maintenance and have a longer lifespan than gas-powered vehicles.

Electric vehicles also offer improved efficiency. They have faster acceleration and smoother driving compared to gas-powered vehicles, which can help reduce delivery times and improve overall productivity. Perhaps the most significant benefit of electric vehicles in logistics is their positive impact on the environment. EVs emit zero tailpipe emissions, making them much cleaner than gas-powered vehicles. This can help companies reduce their carbon footprint and meet sustainability goals [1].

Despite these benefits, there are still some challenges that need to be addressed for electric vehicles to become more widespread in the logistics industry. One of the most significant challenges is the lack of infrastructure for

charging EVs. Logistics companies need to invest in charging stations for their EVs, which can be expensive. Additionally, there is a need for more public charging stations to support the growing number of EVs on the road. Governments and private companies need to work together to build a network of charging stations that can support the growing demand for EVs. Another challenge is the range of EVs. While EVs have come a long way in terms of range, they still have a shorter range than gas-powered vehicles. This can be an issue for logistics companies that need to transport goods over long distances. However, with the development of more efficient batteries and charging technology, the range of EVs is expected to improve in the coming years.

Finally, there is a need for more education and training on EVs in the logistics industry. Many logistics professionals are not familiar with EVs and may be hesitant to switch from gas-powered vehicles. Companies need to invest in training programs to help their employees understand the benefits of EVs and how to operate and maintain them properly.

In conclusion, electric vehicles offer several benefits to logistics companies, including reduced operating costs, improved efficiency, and increased sustainability. While there are still some challenges that need to be addressed for their widespread adoption, the future looks bright for electric vehicles in logistics. As technology continues to improve and infrastructure develops, we can expect to see more logistics companies switch to electric vehicles and reap the benefits they offer.

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USING AN AUTOMATED WAREHOUSE

students Zhevnerov M.V., Timofeev V.V.

scientific supervisor – senior lecturer Lapko O.A.

Belarusian National University of Technology
Minsk, Belarus

In the world of logistics, time and efficiency are crucial. The faster goods can be received, processed, and shipped, the better. With the rise of e-commerce, the demand for faster delivery times has increased exponentially. This has led to the development of automated warehouses, which have revolutionized the way goods are stored and shipped.

An automated warehouse is a facility where most of the tasks are performed by machines and software systems. These systems include automated storage and retrieval systems (ASRS), conveyors, robots, and other technologies that work together to streamline the process of receiving, storing, and shipping goods. Automated warehouses are designed to maximize space utilization and reduce labor costs while increasing efficiency and accuracy.

One of the main advantages of an automated warehouse is that it can operate 24/7 without human intervention. This means that goods can be received, processed, and shipped at any time of the day or night, increasing productivity and reducing turnaround times. Automated warehouses also have a higher accuracy rate than traditional warehouses, as machines are less prone to errors than humans.

Another advantage of an automated warehouse is that it can store more goods in a smaller space. ASRS systems use vertical space to store goods, allowing for more storage capacity than traditional horizontal shelving. This means that automated warehouses can store more goods in a smaller footprint, reducing real estate costs and increasing profitability.

Automated warehouses also have environmental benefits. Since they are designed to maximize space utilization, they require less energy to operate than traditional warehouses. Additionally, since they are fully automated, they require fewer personnel to operate, reducing the carbon footprint associated with human labor [1].

However, there are some challenges associated with automated warehouses. The initial investment required to set up an automated warehouse can be significant. Additionally, maintenance and repair costs can be higher than for traditional warehouses due to the complexity of the systems involved. Finally, there is the risk of system failure, which can lead to significant downtime and lost productivity.

Despite these challenges, the benefits of automated warehouses far outweigh the drawbacks. As e-commerce continues to grow, the demand for faster delivery times and more efficient logistics operations will only increase. Automated warehouses are the future of logistics, and companies that invest in this technology now will be at a significant advantage in the years to come.

In conclusion, an automated warehouse is a facility where most of the tasks are performed by machines and software systems. Automated warehouses are designed to maximize space utilization, reduce labor costs, and increase efficiency and accuracy. While there are some challenges associated with automated warehouses, the benefits far outweigh the drawbacks. Companies investing in this technology are at a significant advantage in the years to come.

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OUTSOURCING OF LOGISTICS SERVICES

student Karpuzovich N.G.

scientific supervisor – senior lecturer Lapko O.A.

Belarusian National University of Technology
Minsk, Belarus

In this work, I would like to consider the advantages and reasons of using outsourcing in different logistics departments from storages and purchases to transport and accounting. Actually, outsourcing is a new approach to logistics processes all over the world.

One of the ways of reducing costs in logistics processes is the use of third party and fourth party providers, which specialize on some particular economic or transport process. The most prevalent companies that offer outsourcing services are 3PL- and 4PL-providers. 3PL is a way, in which a business-company gives one or some of its logistics processes to a third party company that can make this production stage faster, better and cheaper. On the other hand, logistics-company still controls and manages the process. 4PL-provider is usually a partner of the business-company, which regulates every transport logistics process. The provider focuses on helping the customer optimize their supply chains.

Outsourcing in transport logistics refers to the practice of hiring external service providers to manage various aspects of transportation and logistics operations. This can include outsourcing services such as transportation management, warehousing, inventory management, freight forwarding, customs clearance, and other related activities. The primary reason for outsourcing in transport logistics is to reduce costs and improve efficiency.

By outsourcing non-core activities, companies can focus on their core and main competencies and allocate resources more effectively. Outsourcing also

allows companies to access specialized expertise and technology that they may not have in-house.

Another advantage of outsourcing in transport logistics is the ability to scale operations up or down quickly in response to changing market conditions. By outsourcing, companies can avoid the need to invest in expensive infrastructure and equipment, and can instead rely on the expertise and resources of their outsourcing partners [1].

However, outsourcing also comes with some potential risks and challenges. Companies need to carefully select their outsourcing partners and ensure that they have the necessary expertise and resources to meet their needs. They also need to establish clear communication channels and performance metrics to ensure that outsourcing partners deliver the expected results. Overall, outsourcing in transport logistics can be a valuable strategy for companies looking to improve efficiency, reduce costs, and access specialized expertise and technology. However, it requires careful planning and execution to ensure success.

In conclusion, I want to express the idea that outsourcing can be a very powerful tool in the hands of a skillful manager, who knows, which process can be given to a 3PL- or 4PL-provider and which process is better done by his company. Outsourcing is, undoubtedly, the new chapter in logistics history and that company will be the market leader, which is the fastest to read and understand this chapter.

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TRANSPORT AND LOGISTICS IN THE REPUBLIC OF BELARUS

student Voicicky S.D.

scientific supervisor – senior lecturer Lapko O.A.

Belarusian National University of Technology

Minsk, Belarus

Due to its geographic location, the Republic of Belarus serves as an important transit country in Eastern Europe. Belarus is located at the crossroads of major transportation routes, connecting Western European states with Eastern European countries, and regions on the Black Sea coast with those on the Baltic Sea coast.

According to 2021 estimates, transportation accounted for 5.1% of the gross domestic product of the Republic of Belarus. Transportation services accounted for about 43% of the country's total services exports and 41% of the services foreign trade balance; in 2021, the value of transportation services exports was \$4.4 billion and the transportation services foreign trade balance was positive \$1.8 billion. In the field of the transportation complex of the Republic of Belarus, as of January 1, 2022, there are more than 10.8 thousand organizations of various forms of ownership and more than 37 thousand private entrepreneurs; in 2021, about 159.6 million people were transported by all types of passenger transport (including cabs). At the same time, there is a trend toward shifting national mobility to air transportation, with the share of air transportation reaching more than 22% of the total passenger traffic in the Republic in 2021 [1].

To improve the quality of service, work efficiency, and safety, a number of infrastructure projects are being implemented: In 2019, the highway P80 Sloboda-Papernya, the highway M6 Minsk-Grodno-border of the Republic of Poland (Bruzgi), the highway M1/E30. The reconstruction of the bridge over the Mukhavets River was completed. The second artificial runway at Minsk

National Airport became operational. In Belarusian Railways, electrification of the tracks and renewal of rolling stock continued. In the field of water transportation, emphasis is being placed on the development of the international waterway E40 and the reconstruction of navigable structures on the Dnepr-Bug canal. The development of the transportation sector is closely linked to the development of the logistics system of the Republic of Belarus.

At the beginning of 2022, 61 logistics centers with different functions were in operation in the country.

Transportation by container trains through the territory of the Republic of Belarus on the China-Europe-China connection is effectively developing, the infrastructure of the cargo terminal of the Belarusian railroad on the Belarusian-Polish border has been opened, as well as a transportation management center.

A project to build a large-scale regional logistics center on the territory of the Great Stone Industrial Park is actively underway. Currently, the first stage of the logistics facility with a total area of 50,000square meters, a technical platform for cargo handling operations and a container terminal are functioning on the industrial park's premises.

The next stage is the construction of a bimodal cargo terminal with an area of 800 thousand square meters with the participation of the management company of the largest river port in Europe "Duisburg Hafen", the logistics operator "China Merchants Group", the Belarusian Railway. In the transport sector, work continues to improve existing technological processes and increase the level of their automation and digitalization.

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SCIENCE AND TECHNOLOGY OF ANCIENT EGYPT

student Kibisov E. A.

scientific supervisor – senior lecturer Tsimafeyeva Yu. V.

Belarusian National University of Technology

Minsk, Belarus

Egypt is one of the oldest civilizations. All modern achievements have their roots, including in the culture of Egypt. Without scientific knowledge, the normal functioning of the economy, construction, military affairs, and governance of the country is impossible. 2500 years BC the Egyptians already had extensive knowledge in geometry, medicine and astronomy [1].

Water and sundial stand out noticeably among the technical achievements of Ancient Egypt. The obelisks served as a sundial, the shadow of which represented the hour hand. In the first half of the 2nd millennium BC, a water clock appeared. They were an inverted stone cone, through the hole of which water dripped evenly. The time was determined by changing the water level.

The Egyptians began to produce paper from the *papyrus* plant. For this purpose, strips from the core of the plant were used. Many ancient papyrus sheets have reached our time in perfect condition. In addition, in many European languages, the word “paper” is directly related to the Egyptian “papyrus”.

Ink and pen appeared after the papyrus and undoubtedly had world significance. To create black ink, a mixture of soot with vegetable oil and beeswax was used. The durability of these inks has been proven by time. The role of the pen in ancient Egypt was played by reed pens.

The *plow* (in which the ox was harnessed) was of great economic importance. The use of the plow facilitated and accelerated the process of loosening the soil. The plow was attached to the animal's body with straps. Two people were required for plowing: one led the plow, the other drove the animal with a stick.

Without irrigation systems, the development of a high-level civilization in Egypt would not be possible. The first invention that increased the efficiency of irrigation was the *shaduf* – a water-lifting “crane” for watering fields. Then the Egyptians invented a *water-lifting wheel*, inside of which there were jugs.

It was the Egyptians who invented the decimal system. They also knew how to determine the area and volume, divide and multiply, had an idea of fractions and the square root. *Mathematics* played the role of applied science, which was actively used to solve practical needs.

The Egyptians distinguished planets and stars. There were fairly accurate maps of the starry sky and catalogs of stars. It was thanks to *astronomical knowledge* that the Egyptians managed to compile an accurate calendar. Unlike other peoples of the East, the Egyptians had not a lunar, but a solar calendar.

The basis for the development of Egyptian *medicine* was the custom of mummification, which allowed studying the anatomy of the human body. One of the main achievements is considered to be the doctrine of blood circulation and the heart. In ancient Egypt, such complex operations as skull trepanation and amputation were carried out [2].

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EMERGING TECHNOLOGIES IN JAPAN

student Fomaidi A. Yu.

scientific supervisor – senior lecturer Tsimafeyeva Yu. V.

Belarusian National University of Technology

Minsk, Belarus

Japan has been at the forefront of research and development in emerging technologies such as artificial intelligence, robotics, and quantum computing. These technologies have the potential to transform a range of industries and change the way we live and work.

Japan has been investing heavily in *artificial intelligence* (further – AI) research and development, with the government providing funding for a range of projects in areas such as natural language processing, computer vision, and machine learning. Companies such as Sony, Fujitsu, and Hitachi are also developing AI systems for a range of applications, including healthcare, manufacturing, and finance.

Japan has long been a leader in *robotics* research and development, with a range of innovative humanoid robots developed by companies such as Honda and Softbank Robotics. In recent years, there has been a growing focus on developing robots for use in healthcare and eldercare, with companies such as Cyberdyne developing exoskeletons that can help people with disabilities or mobility issues.

Japan has also been investing in research and development in *quantum computing*, with the goal of developing a practical quantum computer that can solve complex problems that are beyond the capabilities of traditional computers. In 2017, the Japanese government launched the Quantum Innovation Initiative Consortium, a public-private partnership aimed at advancing research in quantum computing and developing practical applications for the technology [1].

Despite its long history of scientific and technological innovation, Japan faces a range of challenges in maintaining its position as a global leader in science and technology. One of the key challenges is aging population, which is expected to have a major impact on the country's workforce and economy in the coming years. Another challenge is increasing competition from other countries, particularly China and South Korea, which have been investing heavily in research and development in recent years. In order to remain competitive, Japan will need to continue investing in emerging technologies and fostering collaboration between industry, academia, and government [2].

Japan has a rich history of scientific and technological innovation, and has made major contributions to the world in fields such as electronics, automotive manufacturing, and robotics. The Japanese government has played a key role in promoting scientific research and development, with a range of policies and institutions designed to support innovations.

In recent years, Japan has also been investing heavily in emerging technologies. Japanese technological community is well-positioned to continue making important contributions to the world, and to drive the country's economic growth and prosperity in the years to come. However, the country faces a range of challenges and it will need to continue investing in research and development and fostering collaboration in order to remain competitive in the years to come.

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**DETERMINATION OF THE SIZE OF THE GAUGE BLOCK BY THE
ABSOLUTE MEASUREMENT METHOD**

Graduate student Volchok O.P.

scientific supervisor – PhD in Philology, associate professor Khomenko E.V.

Belarusian National University of Technology

Minsk, Belarus

The unity of measurements is the state of measurements in which the results of these measurements are expressed in units of quantities approved for use in the Republic of Belarus, metrological traceability is ensured, and measurement accuracy indicators do not exceed the established limits with a given probability. Reproduction, storage and transmission of unit sizes is carried out measurement standards [1].

Ensuring the uniformity of measurements contributes to the elimination of technical barriers to trade, increases the competitiveness of products, works and services, guaranteeing the reliability of information about their characteristics and effectiveness. Currently, the measurement standard base of the Republic of Belarus consists of 64 national standards. The development of the national measurement standard base and its maintenance at a high international level is part of the state policy in the field of scientific, scientific, technical and innovative activities. Within the framework of the "Standards of Belarus" subprogram of the State Scientific and Technical Program "National Standards and High-tech research Equipment" for 2021-2025, work is underway to modernize and create new standards and units of quantities [2].

The meter is one of the seven basic units of measurement adopted in the International System of Quantities. The definition of a meter as a unit and its physical implementation have changed over time. The first standard of the meter was a platinum - iridium bar, the unit of length - meter was determined by the distance between the axes of the two middle strokes applied on the bar. In 1895,

the II General Conference on Weights and Measures recognized that the wavelength of monochromatic light can be a natural witness to the size of a meter. Later, the definition of a meter was adopted: "A meter is a unit of length equal to the path traversed in vacuum by light in $1/299792458$ fraction of a second". At the primary level, the meter is reproduced as a wavelength using iodine-stabilized helium-neon lasers. At sublevels, material measures are used, and traceability is verified by means of optical interferometry.

Gauge blocks were proposed in 1898 by C.E. Johansson as composite gauges for controlling the dimensions of machine parts. Despite their simplicity, gauge blocks became a significant invention at that time and is still widely used today, because they are the only accurate material carriers of linear dimensions.

Currently, the reproduction of a unit of length - a meter is due to the use of various radiation sources, the wavelength of which is known with a certain accuracy. In practice, gas-discharge lamps filled with the following gases and metals in a gaseous state can be used as radiation sources: helium He, krypton Kr, iodine I or cadmium Cd. The gauge block is made in the form of a rectangular parallelepiped with a normalized size between the measuring planes. The absolute measurement method consists in comparing the length of the end measure with the wavelength of the radiation source, which is a fundamental physical constant.

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**SCIENTIFIC AND METHODOLOGICAL SUPPORT OF
METROLOGICAL TRACEABILITY A LENGTH UNIT – A METER**

Graduate student Volchok O.P.

scientific supervisor – PhD in Philology, associate professor Khomenko E.V.

Belarusian National University of Technology

Minsk, Belarus

Metrological traceability is a property of a measurement result, according to which this result can be correlated with a national measurement standard of a quantity unit or another basis for comparison through a documented unbroken chain of verifications and (or) calibrations [1]. Etalon is a measuring instrument (or a set of measuring instruments) that provides reproduction and (or) storage of a unit, as well as the transfer of its size to the measuring instruments lower in the verification scheme and approved as a standard in the prescribed manner.

Metrological traceability is an essential condition for ensuring the uniformity of measurements. One of the main principles for ensuring the uniformity of measurements is the metrological traceability of measurement results to units of the International System of Quantities, primarily reproducible by national measurement standards. Methods for ensuring metrological traceability have been extended to international standards of units of quantities and standards of foreign countries, including the bases for comparison, reproducible by standard samples and reference (primary) measurement methods (methods). Ensuring the uniformity of measurements in the country contributes to obtaining correct and accurate measurement results both for solving domestic issues and for supporting the export of domestic products.

According to the BIPM, OIML, ILAC and ISO Joint Statement on Metrological Traceability: metrological traceability is one of the elements that

provides international confidence in the equivalence of measurements and thus largely removes technical barriers to trade.

The main issues of realization of the unit of length – meter with the use of absolute physical constants are considered. An analysis of ensuring the traceability of a length unit was carried out. Taking into account the relevance of the use of laser radiation sources to ensure the traceability of a length unit, an analysis of the existing and new traceability schemes was presented. The issues of creating methodological support for the analysis and processing of measurement results were considered.

At the primary level, the meter is reproduced as a wavelength using iodine-stabilized helium-neon lasers. The sublevels use material measures such as gauge blocks and traceability is verified by means of optical interferometry to determine the length of the gauge blocks when the length mentioned above is taken as a reference value. End measure of length is a standard measure of length, made in the form of a rectangular parallelepiped with a normalized size between the measuring planes. The absolute method of measurement is to compare the length of the gauge block with the wavelength of the radiation source.

Until now, gas discharge lamps filled with the following gases and metals in the gaseous state (helium He, krypton Kr, iodine I or cadmium Kd.) can be used as radiation sources on standards intended for measuring the length of end measures. The use of laser sources of radiation to determine the length is a priority in metrology at the present time.

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**IMPROVEMENT OF THE PROCESS APPROACH TO THE ISSUES OF
COMPETENCE AND AWARENESS OF PERSONNEL IN THE FIELD
OF GAS EQUIPMENT**

graduate student Stepanova E.L.

scientific supervisor – associate professor Khomenko S.A.

Belarusian National University of Technology

Minsk, Belarus

In today's rapidly changing market environment, an organization is required to search for new methods of carrying out its activities with subsequent adjustment of priorities to improve the efficiency of the organization's life. One of the most important factors ensuring the competitive advantages of the organization is the personnel, which plays a key role in shaping the economic stability of the company and determines the prospects for its strategic development. The implementation of business strategies is impossible without qualified and motivated employees, whose competencies and professional potential are a key factor in improving the efficiency of the organization. Competence is the most important criterion for evaluating an employee. It also acts as a guarantor of the quality of an employee's activity.

The very concept of *competence* (Latin origin), translated as «conform», was introduced by 1959 to describe the abilities of a graduate of an educational institution. In relation to personnel management, the term *competence* was applied by R. Boyatsis [1], defining it as the sum of the abilities of a person directed to achieve the desired results. Competence is a completely new concept in the ISO 9000 series of standards. It is noteworthy that in the first (1987) and second (1994) editions of the standard the relationship between the quality of products and the level of competence of the person producing it was not traced.

These are the specific knowledge and skills that determine the professional component of the individual and give priority value to the

employer. Systematic work on personnel development will allow you to have highly qualified employees with the necessary competencies for the organization. Such employees become a key factor in the stable development and economic growth of the organization, since the competitive advantages of the organization are largely achieved through knowledge, innovation, professionalism, the source of which is a person.

The origin of the gas industry is attributed to the XVIII–XIX centuries. The compliance with safety requirements is an integral part of any production process, especially of increased danger. Enterprises in such industries as gas and oil are classified as hazardous production facilities because of accidents and other incidents related to emergency situations which may occur during their operation.

Thus, in order to ensure a high level of professionalism and competence of personnel, their awareness, it is not enough to treat personnel management issues as one of the quality assurance resources within the ISO 9001 management system. The right solution is to develop a personnel management system that will unite all the necessary tools for managing the competence and awareness of personnel. Thus, the international standard ISO 10015 will allow us to develop systematic processes necessary for effective management of personnel competence and development of human resources.

By view of the above, it is possible to determine the appropriate personnel management processes:

personnel formation process (includes sub-processes of recruitment, selection, adaptation of personnel);

personnel development process (includes sub-processes of professional development, retraining, training, career development);

personnel evaluation process (includes initial evaluation, periodic and ongoing personnel evaluation);

resource provision process of personnel (includes subprocesses of technical, material, financial, informational, methodological and other support for the activities of employees);

the process of using personnel (includes subprocesses of creating optimal and safe working conditions, personnel movement, personnel rotation).

Competence assessment is the process of determining the priority professional qualities necessary for the effective work of employees, their analysis, diagnosis, calculation and formation of employee development plans. Assessing the competence of the staff, specific goals are pursued aimed at measuring the degree of compliance of the employee and his activities with established standards, communicating the goals and values of the organization, as well as identifying internal needs and intra-organizational problems.

It is worth noting that the effective use of the ISO 10015 standard can bring a number of advantages to the organization, including increasing customer satisfaction with the services provided, as well as increasing staff satisfaction with the work done and the efficiency of the working environment. The personnel management system plays an important role for the successful development of the organization.

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**THE HISTORY OF THE DEVELOPMENT OF PERSONNEL
MANAGEMENT IN CONJUNCTION WITH THE DEVELOPMENT OF
MANAGEMENT SCIENCE**

Graduate student Stepanova E.L.

scientific supervisor – PhD in Philology, associate professor Khomenko S.A.

Belarusian National University of Technology

Minsk, Belarus

The history of personnel management in an evolutionary way is considered as a process of becoming autonomous and forming an independent scientific approach.

The origins of the modern personnel management system go back to the distant past, when the first labor relations were created. Handicraft work is the very initial stage of labor relations, which were characterized by the maintenance of the established organization of work, remuneration for it, the establishment of a working regime, as well as supervision over the productivity of the worker.

The industrial revolution destroyed small manufactories and workshops, instead of them came factories with a relatively large number of workers, the collectivism of labor, its directed specialization. Along with these changes, the intensity of exploitation of the labor of workers was increasing as well as, the separation of ordinary workers from owners and employers and, as a result, the aggravation of social conflicts in factories. Workers' parties, in tandem with trade unions, led labor movements against the exploiters [1].

Historically, until the XX century. personnel management as an original function was not singled out - the dominant direction in personnel management was the strict maintenance of labor discipline, the maximum productivity of each employee and indifference to the interests and rights of employees.

As human labor, rather than machines, became a fundamental factor in the success of an enterprise, there was a need to effectively manage personnel through the creation of a comfortable environment and working conditions that had scarcely improved since the Victorian era.

For the first time, the idea of a scientific component to personnel management was promoted by Frederick Taylor [2]. His focus was on increasing labor productivity by reconstructing the psychological attitude of both business owners and their workers.

Harrington Emerson and the Gilberts are no less prominent personalities in the field of personnel management [3]. Emerson paid close attention to the totality in solving the problems of organizing production and managing it. The ideology of the Gilbert school comes down to the use of observation, measurement, logical thinking and analytical methods in order to improve manual labor operations. Ford's practice also had a great influence: by highlighting the process of creating each product to the most primitive operations-movements, he managed to significantly reduce the cost of manufactured products [4].

Personal contribution to research in the field of management, as a science for the formation and development of personnel management, was made by such «whales» of management as Taylor, Emerson, Hugo, Weber, Fayol, Follet, Ford, Mayo, Shewhart, Barnard, Deming, Drucker, Beer, MacGregor , Feigenbaum, Maslow, Russell, Chandler, Hammer, Rampersad, Juran, Gates and others, as well as Makarova, Ashkinazi, Polkhovskaya.

ISO is the International Organization for Standardization. Since 1946, ISO has been developing technical standards for virtually every business, industry and technology. The purpose of this organization is to promote the development of standardization on a global scale to facilitate international trade and mutual assistance, as well as to expand cooperation in the field of intellectual, scientific,

technical and economic activities. Within the ISO structure, there are many technical committees for various industries and fields of activity.

In total, we can say that the historical scientific contribution of researchers to the study of the issue of personnel management recreated a new trend and played a decisive role in building a personnel management system. Thus, the current personnel management system has gone through a long period of its formation and improvement, and thanks to a thorough study of the historical aspects of its formation, it is at a fairly high level.

To understand the inner content of this issue, it is necessary to analyze its evolutionary development, all the main stages in the history of personnel management, analyze existing approaches to its implementation, identify the basic advantages and disadvantages of models in order to extrapolate positive experience to modern conditions.

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EXTRACTION OF HELIUM-3 ON THE SURFACE OF THE MOON

Student Taletskaya D.Y.

Scientific supervisor – senior lector Yalovik E. I.

Belarusian National University of Technology

Minsk, Belarus

The Moon, our celestial companion, holds an abundance of resources. The lunar surface is rich in minerals such as chromium, iron, aluminum, titanium, magnesium, silicon, and phosphorus. But it's not just solid resources that the Moon holds. However, the biggest challenge of mining these resources is the high cost of transportation back to Earth, which has rendered lunar mining economically unviable [1].

Despite being rare on Earth, helium-3 is found in abundance on the surface of the Moon, making it a potentially valuable resource for atomic energy. This helium isotope can only be extracted in small amounts from natural gas. While helium-3 can be produced in atomic reactors, it is an expensive and inefficient process. Tritium, an artificially obtained element and its production is limited for exclusive vital applications. In contrast, there are approximately 500 million tons of isotope present on the Moon's surface, while only around 35,000 tons of this isotope exist in the Earth's atmosphere. Helium-3 is referred to as the «treasure of the Earth's satellite» [2].

Helium-3 is found in regolith on the Moon. Regolith is made up of sand, rocks, and clay. Helium-3 can be extracted from the regolith using various methods such as high-temperature processes and laser ablation. The process of developing and extracting helium-3 is still in its infancy and requires extensive research and development. Innovative technologies, including the use of robots and autonomous machines, are being explored as potential methods for the efficient extraction of this valuable resource. As research into the extraction of

helium-3 continues, it is expected that the Moon will become an increasingly important source of this precious element. The technology of separating helium 3 from the regolith of the Moon is already known, and it could be used to extract the isotope. Studies conducted by some scientists indicate that just 1 kilogram of helium-3 can produce up to 19 MW of energy during the fusion process. The extraction of helium-3 on the Moon could potentially free the Earth from its dependence on fossil fuels for centuries to come. This element is crucial in the production of powerful magnets used in a range of fields such as medical technology and other scientific applications [1].

Helium-3 is a unique isotope that poses no threat to the environment due to its non-radioactive properties. While various techniques for extraction helium-3 are being researched and developed, they are not yet economically practical. To establish more efficient and cost-effective ways of extracting helium-3, further exploration and development are necessary. Despite the difficulties, investing in the extraction of helium-3 on the Moon has the potential to yield significant benefits for the future given its scarcity and potential use in nuclear energy [2].

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MINING IN SPACE

student Shkurganova M. A.

scientific supervisor – senior lecturer Yalovik E. I.

Belarusian National University of Technology

Minsk, Belarus

People's needs are growing every day, and Earth's resources are being depleted. According to geologists' forecasts, the remaining resources should be enough for us for more than 30 years. What should we do? Do we need to take a more rational approach to the use of Earth's resources or look for new ways to extract minerals? The answer is obvious. With the increase in the consumption of minerals and the depletion of their reserves on Earth, humanity will probably have to start extracting resources in space.

The objects where, according to scientists, it is possible to extract minerals in space are asteroids. Asteroids are small celestial bodies that move in orbit around the Sun. They appeared during the formation of the Solar System more than 4.6 million years ago. The largest cluster of these celestial bodies is located between Jupiter and Mars, it is called the main asteroid belt. Various minerals and volatile compounds that make up the rocks of the asteroid will serve as a source of iron, nickel and titanium. Geologists expect that some asteroids contain water-containing minerals from which oxygen can be obtained, which is very important for the existence of life, as well as hydrogen, one of the main types of rocket fuel [1].

After all, some elements such as gold (Au), cobalt (Co), platinum (Pt), iron (Fe), manganese (Mn), molybdenum (Mo), nickel (Ni), osmium (Os), palladium (Pd), rhenium (Re), rhodium (Rh) and ruthenium (Ru), which are now extracted from the upper layers of Earth, lay in the bowels of asteroids when they fell to the Earth. Resource extraction can also be carried out on the planets

closest to Earth. The second planet closest to us, Mars, has a geological structure similar to Earth. This means that all the main compounds belonging to the Earth can be mined there, such as iron, calcium, aluminum, cobalt and the like. Geologists also suggest that there may be traces of lithium, copper, gold, zinc, nickel, niobium and other elements on the Red Planet. Venus and Earth have similar sizes, mass, composition and the time at which they formed. The crust of Venus, like our planet, consists of basalt, there is also a large iron core and a mantle full of silicates. It is believed that some of these celestial bodies contain more precious metals than the entire earth's crust. Due to the large mass of our planet and gravity, a significant part of heavy metals have sunk to the core, and on most asteroids, whose weight is many times less than the weight of the Earth, metals are distributed more or less evenly.

We need new ways of developing civilization on Earth. The exploration of space for the purpose of mining opens up new horizons for us. This will help support the global economy as a whole for a long time. As we can see, space exploration is developing quite intensively. Although in the near future, industrial extraction of metals in space and their delivery to Earth is a difficult task, and so far such projects pursue rather scientific goals that require large investments. In addition, researchers have other long-term plans for these celestial bodies: scientists consider asteroids as a site for the construction of space cities.

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ARE ORGANIC EMISSIONS HARMFUL WASTE OR AN IMPORTANT RESOURCE?

student Svetlova Y.S.

scientific supervisor – senior lecturer Yalovik E.I.

Belarusian National University of Technology

Minsk, Belarus

One-third of the world's food produced, or 1 billion tons of food, is wasted or spoiled, the authors of the United Nations Environment Programme (UNEP) report on the 2021 food waste index concluded. The evidence presented in the Food Waste Index report demonstrated that food waste at the consumer level is everyone's problem. The problem is not just a reflection of wasteful use of resources. It affects the climate, as experts estimate that 8-10% of global greenhouse gas emissions come from unused food. They also reduce biodiversity and pollute the environment.

Organic waste is biodegradable waste generated in households, catering and retail establishments. These include food, as well as wood and vegetable waste from green areas and household plots. When organic waste is buried in landfills, they become an ideal breeding ground for dangerous pathogens, a source of unpleasant smell, carry the risk of spontaneous combustion, and when they decompose in anaerobic conditions of the landfill, greenhouse gases are released into the atmosphere [1].

The priority should be to ensure environmentally safe and cost-effective use of waste. Depending on this, there are the following technological directions of processing of the organic part of municipal solid waste: composting (with the production of organic compost for the recultivation of disturbed lands, landscaping); solid-phase fermentation under anaerobic conditions (with the production of biogas, electric and heat energy); the use of organic solid

municipal waste as solid fuel (for direct combustion in power plants). An important factor in solving many problems, including in the field of waste management, is to be able to establish a dialogue with the population. To do this, it is necessary to regularly expand the knowledge of citizens about the types of waste, their disposal and recycling through billboards, brochures, announcements, holding various events to make the population aware of the current situation and ways to improve it. Since population has to pay for waste recycling, separate collection is one of the ways to reduce citizens' expenses.

The most effective method of solving the problem of food waste is to minimize their formation. With so many hungry people around the world and the worsening problem of global warming, letting our food go to waste is simply unacceptable. So, in many countries there are food banks – organizations for the collection of high-quality food residues, which, instead of recycling, can be redistributed among people in need. It is important to note that reducing food waste will reduce greenhouse gas emissions, slow down the destruction of nature due to land transformation and pollution, increase food availability and thus reduce hunger and save money during the global recession [2].

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HONING: WHAT IS IT, PROCESS AND EQUIPMENT

student Liashuk A.N.

scientific supervisor – senior lecturer Yalovik E. I.

Belarusian National University of Technology

Minsk, Belarus

Honing is a technology for abrasive processing of cylindrical iconic parts using special nozzles, hones, which provides the necessary surface roughness and maximum accuracy of their parameters.

As a rule, the cavities of various structural components are honed, but external processing of dimensional parts is also carried out, which requires modified or specialized grinding and horizontal boring machines. The technology is applicable both to products made of ferrous (steel, cast iron) and non-ferrous (aluminum, magnesium, zinc alloys, bronze, brass) metals [1].

Special machines are used for the honing process. These are devices with a vertical or horizontal arrangement in the space of the spindle. Each of them has its own purpose depending on the work being done. Honing equipment is specialized for a narrow profile. The manufacture of universal machines is a thing of the past.

Honing is used mainly as a final operation for processing high-precision holes in parts and is a more efficient technological operation than lapping and polishing with abrasive suspensions and pastes. As a rule, honing is carried out after the operations of grinding, boring, reaming, reaming, pulling; in some cases, rough honing replaces grinding operations. The range of sizes of honed holes is very wide: diameter from 5 to 500-800 mm, length up to 20 m. Honing is often used to machine multiple coaxial holes at the same time.

Honing and some of its varieties are used in the processing of internal, external and flat surfaces. These include honing with additional oscillating

movements, honing of intermittent (multi-tiered) holes, combined honing of a hole and the end adjacent to it, honing of limited spherical surfaces, processing of working surfaces of piston rings, diamond countersinking and reaming.

Honing with an additional oscillating movement is one of the advanced processing methods. On the basis of studies conducted in our country and abroad, it has been established that the introduction of an additional oscillating (oscillatory) movement into the composition of movements during honing makes it possible to increase the accuracy of the geometric shape of machined holes, improve the machinability of hard-to-machine materials and increase the productivity of metal removal. The intensification of the metal removal process in the case under consideration occurs due to the fact that with the correct choice of the parameters of the processing mode, the honing process has a continuous character, and the cutting grains do not follow the trajectories of the previous grains during their movement. As a result, their cutting properties are used to a greater extent [2].

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