MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE UKRAINIAN STATE UNIVERSITY OF SCIENCE AND TECHNOLOGIES

The Seventh International Scientific Multidisciplinary Conference of Students and Beginner Scientists

«Modern Technologies: Improving the Present and Impacting the Future»

November 23-24, 2023 (Dnipro, Ukraine)

2023

УДК 81’243

Editorial board: I.A. Koliieva

The editorial board bears no responsibility for the content of the abstracts and any possible errors.

Publishing board address:
Ukrainian State University of Science and Technologies, Academician V. Lazarian Street, 2, Dnipro, Ukraine, 49010

Modern Technologies: Improving the Present and Impacting the Future: International Scientific Multidisciplinary Conference of Students and Beginner Scientists – Дніпро: Український державний університет науки і технологій; 2023. – 139 с.

Збірка містить тези доповідей Міжнародної наукової мультидисциплінарної конференції студентів і молодих учених «Modern Technologies: Improving the Present and Impacting the Future», яка відбулася 23-24 листопада 2023 р. в Українському державному університеті науки і технологій. Тези представлені англійською, німецькою, польською, французькою та іспанською мовами.
Для студентів, аспірантів, викладачів.Друкується в авторській редакції.

Natalia Gustova
Univercidad de Malaga, España

INTERACCION DE LA ECONOMIA Y LA SOCIEDAD COMO UN FENOMENO DE DESAROLLO

La interacción entre la economía y la sociedad es un fenómeno complejo que abarca diversas dimensiones. En primer lugar, la desigualdad económica emerge como un factor determinante que influye en la estructura social y genera tensiones palpables. La distribución de recursos y riqueza impacta directamente en la equidad y cohesión de una sociedad, dando forma a las oportunidades y desafíos a los que se enfrentan sus miembros.

El empleo y el desempleo constituyen otro aspecto crucial de esta interacción. La disponibilidad de oportunidades laborales y las tasas de desempleo no solo afectan la estabilidad económica individual, sino que también tienen consecuencias significativas para la cohesión social. En este sentido, el acceso al empleo se vincula estrechamente con la calidad de vida y el bienestar general de la población. La relación entre la economía y la educación es igualmente crucial. La demanda de habilidades y niveles de educación por parte del mercado laboral puede influir directamente en la estructura social. Por otro lado, el nivel de educación y competencias en la sociedad desempeña un papel fundamental en la productividad económica y la capacidad de adaptación a cambios tecnológicos.

El crecimiento económico sostenible es un objetivo comúnmente perseguido, ya que está estrechamente ligado al mejoramiento de las condiciones de vida. Sin embargo, es esencial considerar cómo este crecimiento afecta a diferentes segmentos de la sociedad y si contribuye a la equidad social. Un estancamiento económico o recesión, por otro lado, puede tener efectos adversos en la cohesión social al generar tensiones y desafíos económicos.

El acceso a servicios básicos, como salud, vivienda e infraestructura, constituye otro componente vital en la interacción entre la economía y la sociedad. La disponibilidad y accesibilidad de estos servicios afectan directamente la calidad de vida de la población, creando una conexión intrínseca entre el desarrollo económico y el bienestar social.

La globalización, con su interconexión económica a nivel mundial, introduce dinámicas adicionales. Desde cambios en el empleo hasta influencias culturales, la globalización puede alterar la dinámica social local, generando desafíos y oportunidades que requieren respuestas adaptables.

Las decisiones de política económica y social también desempeñan un papel crucial en esta interacción. Factores como la política fiscal, los impuestos y los programas de bienestar social tienen un impacto directo en la distribución de recursos y, por ende, en la calidad de vida de la sociedad.

Tecnología y automatización emergen como fuerzas transformadoras, alterando la naturaleza del trabajo y creando la necesidad de adaptación por parte de la sociedad. Los avances tecnológicos no solo afectan el empleo, sino que también influyen en las habilidades requeridas, planteando desafíos en términos de formación y reorientación laboral. Finalmente, las crisis económicas, como recesiones, tienen consecuencias sociales significativas. Desde el aumento del desempleo hasta tensiones en la cohesión social, estas crisis ponen de manifiesto la fragilidad de la interacción entre la economía y la sociedad.

En resumen, la complejidad de la relación entre la economía y la sociedad implica la consideración de una multiplicidad de factores interrelacionados. La comprensión de estas dinámicas es esencial para abordar los desafíos contemporáneos y diseñar políticas que promuevan un desarrollo económico equitativo y sostenible.

E. T. Kucherenko
University of Oxford, England

If we continue to develop our technology without wisdom or prudence,
our servant may prove to be our executioner.
Omar N. Bradley

MAKING INNOVATIONS SAFE FOR THE WORLD: THE ROLE OF ETHICAL CONSIDERATIONS IN DEVELOPING NEW TECHNOLOGIES

In recent years, the world has seen a wave of innovations that may revolutionise the way we work, manufacture goods, and structure our daily routines. In 2022, we all witnessed the rise of large language models (LLMs) – pre-trained neural networks that have access to infinite volumes of information. While such AI-powered technology opens up fascinating opportunities for increasing productivity of the economy and simply making humans lives better, longer, and more comfortable, they simultaneously entail numerous perils, including consumer privacy, job losses, manipulation, surveillance, etc. Balancing advantages and disadvantages of emerging technologies, their safe development and use hinge on our ability to incorporate ethical considerations in the technological design of new inventions, in the way we develop new technology.

One way of preventing harm to humans arising from newly emergent technology is limiting their autonomy. Even though we may reach the level of technological development at which machine learning will be self-sufficient and will not rely exclusively on pre-determined algorithms of its creator, we had better refrain from fully using our technological prowess in this aspect. Deliberately limiting autonomy of new technology, making it contingent on human decision-making (both inventor's and operator's) will prove crucial for the safe exploitation and capitalization on the newly emergent ground-breaking technology.

This principle may be applied, for instance, to autonomous weapons, often referred to as LAWS (lethal autonomous weapons system). In January 2023, the Parliamentary Assembly of the Council of Europe held debates and adopted Resolution 2485 (2023) on Emergence of lethal autonomous weapons systems (LAWS) and their necessary apprehension through European human rights law. The resolution underlines the tension between technological development and the danger that artificial intelligence poses to the humanity. As an ethical solution to the problem, the resolution proposes retaining humans' control over the application of any weapons. Even if the use of certain AI-powered algorithms is permissible in weapons systems, the final decision to apply a lethal weapon should be made by a human operator.

Another interesting case of the interplay between ethical considerations and innovation is cloning. While science has made great strides in enabling cloning, testing it on animals, it is a general consensus that cloning humans is impermissible and disruptive. In this case, disadvantages of this technology would clearly exceed its benefits. Again, it is ethical considerations that allow us to make the best use of the newly emergent technology.

The final discussion worth mentioning is the use of nuclear weapons. In 1996, the International Court of Justice issued an advisory opinion requested by the UN General Assembly on the Legality of Threat or Use of Nuclear Weapons. The ruling was preceded by a massive public campaign drawing attention to the sheer destructiveness and immoral nature of the application of this weapon. However, back then, the Court did not conclusively prohibit nuclear weapons.

The above-mentioned examples demonstrate that debates on the ethical use of technology are ongoing in many domains. While their outcomes are not always certain, there is absolutely no doubt that ethical considerations, informed by humanitarian education, play a crucial role in making the best possible use of newly emergent technology, in making them function for the benefit of humankind.

Mariia Odarenko
Constantine the Philosopher University in Nitra, Slovakia

ECOLOGICAL TOURISM AS "ETHICAL" TOURISM

Tourism, as an industry, is a phenomenon witnessing a rising presence in the dynamics of the global economy. For numerous nations and regions, it stands out as a primary activity contributing to income, employment, and overall development.

In recent years, there has been a surge in alternative tourism, introducing new and diverse forms of tourism under various names. Each variant seeks to highlight a crucial and distinctive factor that adds value to the experience.

Ecological tourism represents an approach to tourist activities that prioritizes the preservation and appreciation of the natural environment welcoming travellers. Given its rapid growth, it is also recognized as a subsector within the broader tourism industry. This movement emerged in the late 20th century but gained substantial international interest only in recent years, leading the United Nations Organization to dedicate the year 2002 to ecological tourism. Essentially, ecotourism involves environmentally responsible journeys to pristine regions, aiming to enjoy the natural environment, appreciate local cultures, and attribute tangible monetary value to conservation. This value serves as an argument to convince both visitors and locals about the significance of preserving resources.

While there are varying interpretations, ecotourism is generally promoted as "ethical" tourism, emphasizing the well-being of local populations. Despite its relatively short existence, ecotourism is viewed by conservation groups, international institutions, and governments as a viable alternative for sustainable development. However, criticisms exist, particularly due to the absence of standardized criteria and regulations for service homogenization.

Sustainable tourism faces the significant challenge of global warming, requiring governments and companies to focus efforts on raising awareness and educating tourists. Ecotourism is seen as a means to boost employment rates and support local businesses. Environmentally, it has a low impact as organizations bear the responsibility to protect and preserve natural areas.

Ecotourism in Slovakia has gained popularity for its pristine natural landscapes and rich biodiversity. The country offers numerous protected areas, including national parks and biosphere reserves, making it an ideal destination for environmentally conscious travellers. Visitors to the High Tatras, Slovakia's highest mountain range, can explore diverse ecosystems, including alpine meadows and forests, while participating in sustainable outdoor activities such as hiking and wildlife observation. The efforts to promote ecotourism in Slovakia often involve collaboration with local communities to ensure responsible tourism practices, supporting both conservation efforts and the well-being of residents.

Ecotourism offers numerous advantages for people, fostering a deeper connection with nature and promoting environmental awareness through immersive and sustainable travel experiences. Engaging in ecotourism allows individuals to explore and appreciate the natural world, leading to personal well-being by reducing stress and enhancing mental health. Additionally, ecotourism often involves interactions with local communities, providing economic benefits and supporting the preservation of cultural heritage, creating a positive impact on both travellers and host communities.

Hermela Samuel
Gondar University, Ethiopia

ETHIOPIA IS A REPIDLY DEVELOPING AFRICAN COUNTRY

Ethiopia has one of the fastest growing economies in Africa and in the East African region. With its excellent climate and fertile soils, there is huge opportunity for agriculture, agribusiness and agritech and for innovation in this field. Ethiopia offers investors strong Guarantees and Protections, and efforts are being made to increase the ease of doing business in Ethiopia to increase its attractiveness as an

investment destination. The country has a young and trainable labour force with the highest source of technical talent in Africa today.

As a regional hub with access to a wide market and with its now improved economic infrastructure, competitive incentive packages and the launch of our new investment and commercial codes, the Ethiopian Government is committed to making Ethiopia a more attractive, competitive place to do business.

Ethiopia's population was 123 million people in 2022 and will grow at 2.6 percent per year, making it the second largest in sub-Saharan Africa (SSA). That number will rise from about 117 million in 2020 to nearly 150 million in 2030, a projected increase of 27 percent over the next decade, according to the UN. The country's economy is currently the largest in East Africa ($111.3 billion in 2021), followed by Kenya and the fourth largest in sub-Saharan Africa (SSA). The United Nations continues to classify Ethiopia as a least developed country and The World Bank ranks it as a low-income country, although it aims to achieve lower-middle-income status by 2025.

Currently, about three million young people enter the labor market each year, facing already high levels of underemployment in rural areas and high unemployment in cities and towns. At the same time, although the public investment-led growth model pursued since the mid-1990s has raised incomes, reduced poverty and stimulated human development, it has proven unsustainable, leading to serious debt problems and growing macroeconomic imbalances. Moreover, the structural reforms were insufficient in both concept and implementation. They have prevented the private sector from driving the transition from a subsistence economy based on agriculture to a more modern economy based on higher productivity - and therefore higher incomes - in manufacturing and services. In effect, the dominant role of the state in the economy has crowded out and stunted the growth of a vibrant private sector. The situation has become more complex and complex as a result of a series of shocks that have hit the Ethiopian economy and society in the second decade of the 21st century: the COVID-19 pandemic; conflict in northern Ethiopia and increased levels of instability in other parts of the country; war in Ukraine; decline ODA (Official development assistance) in 2020–2022; and climate shocks manifested in severe droughts and floods.

Ethiopia is known as the land of origins but we are also a land of opportunity, of vast potential, abundant natural resources, limitless possibilities and untapped opportunities for growth and development.

Ethiopia is digitalizing the education sector and school connectivity in remote parts of the country and implementing innovation through edtech applications like open access to digital learning materials, online learning, systematizing physical and online learning.

William Antonio
Universidad Técnica de Angola

TOUGH ECONOMIC CHALLENGES OF ANGOLA

The country's emerging creative industries have enormous potential to diversify its oil-dependent economy. This requires large investments and political support.

Female street vendors, known as “zungueiras”, are a feature of many Angolan cities. These informal traders, often carrying a large plastic bowl of goods on their heads and a child strapped to their backs, represent the resilience and perseverance of Angolans who have weathered economic and political uncertainty since the country's independence in 1975.

Economic diversification gets new impetus in Angola Angola boasts a rich cultural history of film, theatre, publishing and literature. According to the UNCTAD study, the country also has a plethora of creative talent, start-ups and new innovation ecosystems hungry for opportunities in the CCI - with advertising, architecture and computer programming being the most notable fields.

But at the same time, Angola is overly dependent on crude oil, which accounts for 93% of its exports. Low productivity and meager opportunities in other sectors of the economy have left a third of the population below the poverty line. As Angola seeks to graduate from the UN's least developed country category, there is a renewed sense of urgency to diversify its economy. And a key path to this

goal is to use the creative and cultural industries to mitigate economic fluctuations associated with oil prices, employ more people in the formal economy, and simultaneously address a number of structural constraints.

Traditionally, Angola's main trading partners are China, the European Union and the United States. With the creative economy on the rise, the country is looking to strengthen economic ties with other economies.

Angola, which is usually the continent's second-largest oil producer, became Africa's largest oil producer in August 2022 with production of 1.17 million barrels per day (bpd) versus Nigeria's 1.13 million bpd. High oil prices, peaking in 2022 at around $125 a barrel, are clearly in the country's long-term interests, given proven reserves of nine billion barrels. In 2021, 84 percent of the country's $33.7 billion exports came from oil, improving its trade balance, although half of its output went to China to pay off debts.

Angolans may have a stronger sense of national identity than many African countries, representing the country as a melting pot of different tribes and ethnic groups. This unity was often shaped by a huge war, which those who survived are determined not to repeat. The hope for a better life is now placed on the further revival and modernization of the economy, based on the agricultural rule, which during the last five centuries of the Portuguese colonial regime turned Angola into a significant food exporter. The renewal of these possibilities was the subject of the World Economic Forum on June 13, 2022, which confirmed that the agricultural sector of the country could become the “power of Africa.”

Carlos Alfredo
Universidad de São Paulo, Brazil

PERSONAL DATA PROTECTION IN BRAZIL TODAY

As Brazil reaches the fifth anniversary of its personal data protection regulations, the authority entrusted with enforcing the rules has asked for additional resources and more cooperation to tackle the growing data challenges faced by individuals and businesses alike, including developing a data privacy culture in Brazil and addressing threats to privacy posed by cybersecurity risks and artificial intelligence.

Brazil's National Data Protection Authority, created in 2020, two years after the adoption of the General Data Protection Law (LGPD), has so far participated in 29 formal oversight processes to ensure compliance with the laws and recently issued its first authorization. : A fine of 14,400 reais ($2,870) and a warning to Telekall Infoservice for providing WhatsApp contact lists to election campaigns to distribute candidate materials. Since its inception, the agency has received for review more than 630 security incident reports, including data breaches and leaks, as well as more than 2,300 whistleblower requests and petitions.

Digital technologies have the potential to increase productivity in firms across all economic sectors. Big data and data analytics can help firms better understand their production processes, the needs of their clients and partners, and the overall business environment. Digital technologies can also improve firms’ access to skills and talent, such as through better job recruitment sites and in the outsourcing of key business functions, all of which can help improve their performance. New technologies can also facilitate access to a range of financing instruments. Finally, online platforms can support the productivity of lower tech service firms, for example by providing them with booking facilities and efficient matching algorithms based on consumer review and rating systems.

Brazil’s data protection regulations have been around for five years but only became effective less than three years ago. Still, there’s a notable shift in how the public and businesses perceive these rules, said Nairane Farias Rabelo, a director at the ANPD (Brazil’s National Data Protection Authority), in an interview with Al Jazeera. “People are becoming more aware of their rights, while companies and public entities are gradually investing more in privacy, influenced by competition, reputation, or the dire consequences of neglecting it,” she said.

The largest leak in the country's history became public in 2020 and exposed the personal data of 243 million Brazilians, including full names, addresses and phone numbers, due to weakly coded

credentials stored in the source code of the Ministry of Health website.

Cybersecurity and data privacy are two sides of the same coin. Massive databases, often shared between different businesses, need adequate protection. Failure to ensure this directly leads to security threats and violations of people's rights. Essentially, data cannot be truly protected without information security.

Other concerns for ANPD include the data trading industry, where people working for Brazilian companies profit from sharing personal information without the consent of individuals. Some Brazilians have developed their own methods of protecting themselves from this widespread practice.

One of Brazil's main achievements in the field of data protection was the recognition of data protection as a fundamental right, making it a constitutional guarantee. In addition, another important step was the transformation of the ANPD into a special autarky - that is, the body has its own technical, administrative and financial autonomy in decision-making, as well as financial autonomy. However, for the government to realize its full potential, additional changes such as a presidential decree are still needed, including changing the perception that the ANPD is somewhat out of touch with the average citizen.

M.Penot
Wissenschaftlicher Betreuer: Prof. Dr.-Ing.Oliver Gorf
Universität Rhein-Waal, Kleve, Deutschland

EIN WEITERER SCHRITT ZUR KLIMANEUTRALITÄT

Die Deutsche Bahn setzt sich ein ehrgeiziges Klimaschutzziel: Klimaneutralität bis 2040. Ein wichtiger Baustein auf diesem Weg ist der Einsatz alternativer Antriebe, etwa von grünem Wasserstoff. Bis Ende des Jahres wird in Augsburg eine Wasserstoff-Infrastruktur bestehend aus einer Tankstelle und einem mobilen Speicheranhänger entstehen. Dadurch wird es möglich, ab 2024 den ersten Wasserstoffzug in Bayern mit sauberem Wasserstoff zu versorgen.

Der Zweikomponenten-Wasserstoff-Elektrozug der Bayerischen Landesbahnen wird ab Januar 2024 den dieselelektrischen Zug auf den Strecken Augsburg-Füssen und Augsburg-Weilheim ersetzen. Dadurch werden rund 300 Tonnen CO2 pro Jahr eingespart, da Züge mit grünem Wasserstoff eine besonders umweltfreundliche Antriebstechnologie darstellen.

Ein Schlüsselelement, um die Wasserstofftechnologie gegenüber dem heute im Alltagsbetrieb verwendeten Dieselkraftstoff konkurrenzfähig zu machen, ist der schnelle Betankungsvorgang. Zu diesem Zweck hat DB Energie ein neues Verfahren entwickelt, mit dem die Betankung eines Wasserstoffzuges erstmals so schnell erfolgt wie die Betankung eines dieselelektrischen Zuges, und zwar in etwa 15 Minuten. Angesichts der engen Zugfahrpläne im Regionalverkehr ist dies ein wichtiger Aspekt. Dadurch wird die Wasserstofftechnologie im Alltagsbetrieb noch wettbewerbsfähiger als der bisher eingesetzte Dieselkraftstoff.

Die Deutsche Bahn testet Lösungen für den Einsatz von grünem Wasserstoff, unter anderem im Projekt H2goesRail. Gemeinsam mit Siemens geht Mobility neue Wege und treibt den Übergang zu nachhaltigem Verkehr voran. Derzeit arbeiten sie gemeinsam an einem innovativen gemeinsamen Wasserstoffsystem bestehend aus Tankstelle, Zügen und Wartungsinfrastruktur.

Das Ziel ist es, Diesel-Straßenzüge im Regionalverkehr zu ersetzen und dadurch den CO2-Ausstoß im Schienenverkehr weiter zu reduzieren. Dazu entwickeln wir von H2goesRail eine innovative mobile Tankstelle, deren intelligente Steuerung eine schnelle Betankung von Wasserstoffzügen ermöglicht.

DB Energie stellt für das Projekt die Wasserstoffversorgung sicher, von der Produktion über die Elektrolyse mit Ökostrom bis hin zur Speicherung und Lieferung.

Grüner Wasserstoff wird direkt vor Ort produziert. Durch die sogenannte Elektrolyse wird Wasser mithilfe von Ökostrom in Wasserstoff und Sauerstoff zerlegt. Der so erzeugte Wasserstoff wird anschließend komprimiert, in einem mobilen Speicher gespeichert und vor dem Betanken in einem angrenzenden Tank aufbereitet und gekühlt.

Die Kommunikation zwischen Zug und Tankstelle sowie ein druckgesteuertes

Tankmanagementsystem reduzieren den Energieverbrauch und die Betankungszeit. Dadurch kann der Zug gleichzeitig mit einem Dieselzug betankt werden.

Ergänzend zur neu entwickelten Wasserstofftankstelle der DB Energie entwickelt Siemens Mobility in enger Zusammenarbeit mit der DB den Wasserstoffzug Mireo Plus H. Er verfügt über einen Antrieb bestehend aus einer Brennstoffzelle und einer Pufferbatterie und ist so leistungsstark wie ein Elektrozug mehrere Einheiten.

Die Deutsche Bahn begleitet die Entwicklung des Zuges, indem sie beispielsweise den Designprozess unterstützt. Darüber hinaus bewertet die Deutsche Bahn die Konstruktion des gesamten Zuges mittels Fahrdynamiksimulationen und begleitet die notwendigen Tests zur Inbetriebnahme und Zulassung. Klimaschutz ist ein zentraler Bestandteil der grünen Transformation. Die Deutsche Bahn fördert die grüne Transformation umfassend in vier Umwelt-Handlungsfeldern: Klimaschutz, Naturschutz, Ressourcenschutz und Lärmschutz. Die Deutsche Bahn hat auch eine gesellschaftliche Verantwortung.

A.A. Kyselova
SWPS Universität für Sozial- und Geisteswissenschaften, Polen

KLIMASCHUTZ BEGINNT ZU HAUSE

Wer seinen Teil zum Klimaschutz beitragen möchte, sollte auf das Energiesparen achten. Aber auch in anderen Bereichen besteht Handlungsbedarf. Ist bekannt, dass übermäßiger Fleischkonsum negative Auswirkungen auf das Klima hat?

Kohlendioxid (CO2)-Emissionen sind eine Hauptursache des Klimawandels und entstehen überall dort, wo wir kohlenstoffbasierte Energiequellen verbrennen. Dabei handelt es sich vor allem um sogenannte fossile Ressourcen: Kohle, Öl und Gas, die wir verbrennen, um Strom, Wärme oder Bewegungsenergie zu erzeugen und dadurch die globale Erwärmung weiter zu beschleunigen. Private Haushalte haben maßgeblichen Einfluss darauf, ob Deutschland die CO2-Emissionen aus der Energieerzeugung, der Produktion von Gütern und Dienstleistungen sowie dem Verkehr im erforderlichen Umfang reduziert.

Wer seinen Beitrag zum Klimaschutz leisten möchte, muss daher besonderes Augenmerk auf das Energiesparen und die Förderung der Nutzung erneuerbarer Energiequellen legen. Aber auch in anderen Bereichen besteht Handlungsbedarf, so wirkt sich beispielsweise auch ein hoher Fleischkonsum negativ auf das Klima aus. Egal, ob Sie im Stau stehen oder beim Einkaufen sind, es gibt für jeden etwas zu tun.

Deutschland füttert mehr als die Hälfte seines Getreides, und ein Großteil dieses Getreides kann auch für die direkte menschliche Ernährung verwendet werden. Darüber hinaus werden täglich tropische Wälder abgeholzt, um Platz für neue Sojaplantagen und Viehweiden zu schaffen. Sojabohnen werden hauptsächlich als Tierfutter verwendet.

Die Abholzung von Wäldern verursacht Kohlendioxidemissionen, Rinder produzieren erhebliche Mengen Methan und Überdüngung verursacht ebenfalls Treibhausgasemissionen. Daher sollten der Fleischkonsum und der Verzehr anderer tierischer Produkte deutlich reduziert werden. Versuchen Sie daher, Ihren Verzehr von Fleisch und Milchprodukten einzuschränken.

Weiden tragen zum Klimaschutz bei, da Gräser ihre Wurzelmasse größtenteils unter der Erde haben. Beim Absterben dieser Gräser entsteht Humus, der Kohlenstoff bindet und so der Atmosphäre CO_2 entzieht. Kaufen Sie also Milchprodukte aus Weidehaltung.

Der Kühlschrank ist einer der größten Energiefresser im Haushalt. Sie können außerdem Energie und Kosten sparen, indem Sie das Gerät an einem kühlen Ort aufstellen.

Das Gerät verbraucht weniger Energie, wenn die Türen nicht länger als nötig geöffnet werden. Am meisten Energie verbraucht der Kühlschrank nach dem Einkauf, wenn das Gerät frisch eingelagerte Lebensmittel kühlen muss.

Wenn Sie heiße Speisen essen, lassen Sie diese auf Zimmertemperatur abkühlen, bevor Sie sie in den Kühlschrank stellen. Dadurch benötigt das Gerät weniger Energie zum Kühlen von Lebensmitteln.

Wenn sich im Gefrierfach Ihres Kühlschranks eine Eisschicht gebildet hat, sollten Sie diese abtauen, da dies den Energieverbrauch erhöht.

Stellen Sie nur Töpfe geeigneter Größe auf den Herd. Wenn die Pfanne über den Teller hinausragt, verlängert sich die Garzeit. Ist sein Durchmesser jedoch zu klein, geht die Energie ungenutzt verloren.

Wenn Sie Wasser für Tee oder ähnliche Getränke erhitzen, verwenden Sie statt eines Herdes einen Wasserkocher. Kochen Sie nicht mehr Wasser als nötig. Füllen Sie den Wasserkocher so viel, wie Sie wirklich brauchen. Mehr Wasser bedeutet mehr Stromverbrauch und der Wasserkocher braucht dann länger.

Wählen Sie eine Dusche anstelle eines Vollbades und duschen Sie nicht länger als nötig. Beim Duschen muss eine wesentlich geringere Wassermenge aufgeheizt werden.

M. Kraft
Universität Bern, Schweiz

DIE ERFORSCHUNGEN DER NEUEN COMPUTERTECHNOLOGIEN

Moderne Computer verarbeiten Informationen nach den Gesetzen der klassischen Physik: registrieren und Der Inhalt des Speichers hat immer einen Wert. Dies gilt auch dann, wenn Computerkomponenten wie Transistoren auf den Gesetzen der Quantenphysik basieren. In einem Quantencomputer wird die Information selbst quantenmechanisch verarbeitet: Register und Speicherinhalte können mehrere Werte gleichzeitig in Überlagerung halten, und Maschinenbefehle beeinflussen alle diese Werte gleichzeitig. Dies bedeutet, dass selbst ein einzelner Quantenprozessor von Natur aus massiv parallel ist, ohne dass parallele Hardware wie mehrere Prozessorkerne erforderlich ist.

Um diese Parallelität auszunutzen, muss man sich jedoch mit der probabilistischen Natur der Quantenphysik auseinandersetzen und Algorithmen in quantenmechanisch aufgelöste Gatter kompilieren. Aus diesem Grund erfordert die Nutzung der Quantenbeschleunigung zunächst die Entdeckung geeigneter Algorithmen. Dazu gehören heute schnelle Datenbanksuchen, das Durchsuchen von Graphen, das Lösen linearer Gleichungssysteme, die Anwendung schneller Fourier-Transformationen einschließlich Faktorisierung und diskreter Logarithmusberechnungen sowie die Modellierung von Quantensystemen einschließlich Chemikalien und neuen Materialien sowie maschinelles Lernen und Optimierung. Für einige dieser Anwendungen, insbesondere letztere, ist die Quantifizierung der erreichbaren Quantenbeschleunigung noch Gegenstand laufender Forschung. Deshalb sind Quantencomputer wichtig – wegen der möglichen Anwendungen, aber auch, weil die komplexe Ausstattung auf der Ebene von Rechenzentren und Hochleistungsrechnertechnologien angesiedelt sein wird und keine Büro- oder Mobilgeräte haben wird.

Quantencomputer wurden zunächst als hypothetisches theoretisches Konstrukt vorgestellt. Mittlerweile, nach mehr als 20 Jahren Entwicklungszeit seit den ersten Laborexperimenten, beginnt sich der Bereich der Hardwareplattformen zu konsolidieren, wobei der Zugang zu Quantenprozessoren als Dienstleistung von mehreren Unternehmen angeboten wird und auch eine ganz bestimmte Quantencomputing-Plattform angeboten wird. Diese Quantenprozessoren ermöglichen die Entwicklung und Evaluierung von Quantenalgorithmen. Allerdings übertreffen sie klassische Computer noch in keiner Anwendung. Führende Entwickler gehen jedoch davon aus, dass dieser Schnittpunkt, bekannt als „Quantum Supremacy“, innerhalb weniger Jahre erreicht wird.

Quantencomputing erlangt immer mehr Aufmerksamkeit. Unternehmen und Länder investieren Millionen in die Erforschung neuer Computertechnologien. Doch was ist ein Quantencomputer und welche Vorteile bietet er? IBM-Forscher helfen, diese Fragen zu verstehen.

Hörte es sich noch vor wenigen Jahren wie Science-Fiction an, sind mittlerweile sogar erste kommerzielle Geräte erhältlich: Die Bedeutung des Quantencomputers nimmt auch auf internationaler Ebene stetig zu. Im Jahr 2018 führte die EU ein zehnjähriges Flaggschiffprogramm zur Quantentechnologieforschung ein. Sie will unter anderem den leistungsstärksten Quantencomputer der Welt bauen.

Dadurch steht es im Wettbewerb mit einigen großen amerikanischen Unternehmen und China. Jeder will ein Stück vom Quantenkuchen. Letztendlich sollen Supercomputer völlig neue Anwendungsmöglichkeiten eröffnen, die den Nutzern klassischer Computer bisher nicht zugänglich

waren. Quantencomputer versprechen viele Möglichkeiten, bergen aber auch Risiken.

B. Sammer
Universität Liechtenstein

DIGITALISIERUNG DER BAUBRANCHE

Die Digitalisierung der Baubranche und die damit verbundene Automatisierung zahlreicher Planungs- und Bauprozesse nimmt immer mehr an Fahrt auf. Der Bausektor weist jedoch immer noch große Ähnlichkeiten zu anderen Branchen auf. Viele repetitive Aufgaben – Tätigkeitsbereiche, die beispielsweise im Automobilbereich längst mit Robotern und digitalen Steuerungen gelöst werden – müssen auf unseren Baustellen weiterhin manuell und mit körperlicher Gewalt erledigt werden. Künstliche Intelligenz und maschinelles Lernen bilden jedoch eine wichtige Grundlage, um Planung und Bau in Zukunft automatisierter, effizienter und noch besser zu gestalten. Und künstliche Intelligenz entlastet viele Menschen, die täglich auf Baustellen, in Architektur- und Designbüros komplexe Arbeiten verrichten.

Die Vorteile des Einsatzes von KI branchen- und technologieübergreifend werden mittlerweile in zahlreichen Studien immer wieder beschrieben und prognostiziert. Es lässt sich jedoch nicht genau vorhersagen, wie viel wirtschaftlicher Mehrwert künstliche Intelligenz und maschinelles Lernen im nächsten Jahrzehnt schaffen werden. Allerdings liegen die denkbaren Optimierungen, die durch die Automatisierung von Standardprozessen in der Baubranche erzielt werden können, so auf der Hand, dass sich das Potenzial allein für Deutschland im nächsten Jahrzehnt auf mehrere Milliarden Euro belaufen könnte.

Bis heute ist der Bau ein manueller Prozess mit allen damit verbundenen Vor- und Nachteilen. Intelligenz im Bauwesen entsteht seit jeher vor allem aus dem Know-how, das Architekturplanungsbüros, Bauunternehmen und spezialisierte Fachbetriebe in den Planungs- und Bauprozess einbringen und so die Qualität unserer Architektur maßgeblich steuern. Die menschliche Intelligenz, ein Analogon zur künstlichen Intelligenz, ist der Kompass, der die Weiterentwicklung intelligenter Systeme leiten soll. Es gibt die Richtung für digitale Entwicklungen vor. Hinzu kommen die vielfältigen Herausforderungen im Entwurfs-, Planungs- und Bauprozess sowie im späteren Betrieb des Gebäudes sowie die Vielfalt der Planungspartner und Akteure im komplexen Gefüge aus technischen Anforderungen, Normen und Vorschriften, Umsetzungen und Lösungsansätze für die gebaute Umwelt.

Digitale Planungstechniken wie Building Information Modeling schaffen frühzeitig im Planungsprozess einen umfassenden Daten- und Informationspool, der für die Nutzung von maschinellem Lernen genutzt werden kann. Künstliche Intelligenz in Form von „Deep Learning“ liefert bereits heute deutliche Effizienzgewinne, insbesondere im Ausschreibungs- und Vergabeprozess, der typischerweise unabhängig vom Bauvorhaben selbst gleich funktioniert und durch datenbankgestützte Unterstützung einen hohen Grad an Digitalisierung ermöglicht Prozesse. Zukunftsorientierte Bau- und Planungsunternehmen auf der ganzen Welt nutzen bereits Algorithmen, die aus verschiedenen Vorschlägen von Bietern für Planungs- und Bauleistungen das optimale Angebot ermitteln. Eine objektive Bewertung der relevanten Projektanforderungen erfolgt auf Basis vordefinierter Parameter, beispielsweise nachgewiesenes Know-how für eine bestimmte Aufgabenstellung, fortgeschrittener Technologieeinsatz, Effizienzvorteil im Markt. Das Verständnis der Angebotsanforderungen, das durch den weit verbreiteten Einsatz von Deep Learning in einer Vielzahl von Bauanwendungen, -anwendungen und -aufgaben entsteht, wird dann in die Software zurückgeführt und ermöglicht es intelligenten Algorithmen, beim nächsten Projekt erneut aus neuen Lösungen zu lernen.

Maschinelles Lernen und künstliche Intelligenz bringen neue Funktionen in den Planungsprozess, insbesondere für sich wiederholende Planungsaufgaben mit redundanten Aufgaben. Menschliches Wissen in Architektur- und Planungsbüros bleibt jedoch eine wichtige Grundlage für alle digital ermöglichten Lernprozesse in Software und Technologie.

O. Lesjuk
Technische Universität Wien, Österreich

IT-INFRASTRUKTURLEISTUNGEN AUF FREIEN MÄRKTEN

In vielen Unternehmen werden Softwareentwicklungsprozesse üblicherweise nach einem Wasserfallmodell organisiert. Dementsprechend erfolgen die verschiedenen Phasen der Entwicklung nacheinander: von der Anforderungserfassung, dem funktionalen und technischen Konzept, der Implementierung und dem Test bis zum Go-Live – in der Regel mit minimalen Feedbackmöglichkeiten zwischen den Phasen. Entwicklungsaktivitäten sind stark technologie-, produkt- und funktionsorientiert; Nutzerbedürfnisse und deren Anerkennung werden bislang nur bedingt berücksichtigt. Dieser Ansatz wird den Anforderungen der digitalen Welt nur bedingt gerecht. Wenn traditionelle Softwareentwicklungsprozesse im Unternehmenskontext auf die moderne Anwendungsentwicklung im Verbraucherkontext angewendet würden, würden Updates nur alle paar Monate oder sogar Jahre erfolgen. Dementsprechend wird sich die Anwendung am Markt nicht durchsetzen können, da heutige Nutzer es gewohnt sind, dass ständige Updates im Hintergrund laufen und die Anwendungen somit immer auf dem neuesten Stand sind. Daher sehen wir in Zukunft einen deutlich stärkeren Einsatz agiler Ansätze, insbesondere für die Entwicklung sogenannter „Light-IT“, also schnittstellendominierter und auf den Endkunden fokussierter Systeme. Der Kerngedanke agiler Ansätze besteht darin, dass zunächst sehr grundlegende Lösungen sehr früh eingesetzt werden und diese dann auf Basis des Nutzerfeedbacks iterativ verfeinert werden. Insgesamt steht der Anwender im Vordergrund der Entwicklungsaktivitäten. Nicht zuletzt werden Softwareentwicklung und Betrieb weiter verschmelzen.

Obwohl das Konzept des IT-Outsourcings der Beschaffung von IT-Dienstleistungen von Dritten bereits seit mehreren Jahren besteht, betreiben viele Unternehmen für den klassischen IT-Betrieb immer noch überwiegend eigene Hardware in internen Rechenzentren – oft mit Unterstützung Dritter. . Unternehmen, die Cloud Computing bereits nutzen, verlassen sich bisher weitgehend nur auf die interne „Private Cloud“.

Die Zurückhaltung beim Bezug von IT-Dienstleistungen von Dritten basiert unter anderem auf historischen Annahmen zur Leistungsfähigkeit von Weitverkehrsnetzen, dem Bedarf an unternehmensspezifischen Lösungen sowie Anforderungen an Datenschutz, Sicherheit und Stabilität, die unserer Meinung nach gelten nicht mehr oder nur noch eingeschränkt. Abschlüsse. Dementsprechend gehen wir davon aus, dass IT-Infrastrukturleistungen künftig nahezu vollständig von Dritten eingekauft werden. Diese Dienste könnten über börsenähnliche Märkte eingekauft werden, auf denen Tagespreise für standardisierte Infrastrukturdienste auf der Grundlage von Angebot und Nachfrage ermittelt werden. Dazu müssen sie sowohl technisch als auch fachlich standardisiert und von konkreten Anwendungen getrennt werden. Auf diese Weise können IT-Infrastrukturdienstleistungen zukünftig einfach und dynamisch eingekauft und genutzt werden.

Mit der zunehmenden Durchdringung der Informationstechnologie werden Unternehmen in der digitalen Welt immer abhängiger von der Verfügbarkeit ihrer IT-Systeme. Gleichzeitig führt die einfache Erreichbarkeit von Systemen über das Internet zu besonderen Schwachstellen. Je nach Branche und Geschäftsmodell, z. B. Banken oder Börsen, könnte ein kompletter Systemausfall bereits das Ende des betroffenen Unternehmens bedeuten.

Des Weiteren wird IT mit dem Einzug in digitale Produkte und Dienstleistungen auch in zunehmendem Maße das körperliche Wohlbefinden von Einzelpersonen beeinflussen – man denkt etwa an das selbstfahrende Automobil, Roboter im Pflegebereich oder autonome Steuerungssysteme von Kraftwerken.

S. Gruss
Universität Luxemburg

MENSCHENÄHNLICHE INTELIGENZ

Ein allgemeiner Begriff für Anwendungen, bei denen Maschinen menschenähnliche Intelligenz bereitstellen, ist Künstliche Intelligenz. Dazu gehören maschinelles Lernen oder maschinelles Lernen,

Verarbeitung natürlicher Sprache und Deep Learning. Die Grundidee besteht darin, mithilfe von Maschinen Annäherungen an die wichtigen Funktionen des menschlichen Gehirns zu liefern – Lernen, Urteilsvermögen und Problemlösung.

Diese Art des Lernens ermöglicht unter anderem die sogenannte natürliche Sprachverarbeitung. Hierbei handelt es sich um die Verarbeitung von Text und natürlicher menschlicher Sprache, die unter anderem im Sprachdienst Amazon Alexa zum Einsatz kommt. Deep Learning, das sehr tiefe neuronale Netze mit mehreren Schichten und großen Datenmengen nutzt, gilt derzeit als die vielversprechendste Methode des maschinellen Lernens.

Im Gegensatz zu NLP geht der Algorithmus in DL tiefer: Die Maschine erkennt Strukturen, kann diese auswerten und in mehreren Durchgängen hin und her selbstständig verbessern. Der Algorithmus nutzt mehrere Knotenebenen – Neuronen – parallel, um fundierte Entscheidungen zu treffen.

Beispielsweise unterstützt die Medizin Deep Learning bei der Früherkennung von Krebs oder Herzerkrankungen und kann die DNA-Profile von Kindern auf genetische Marker untersuchen, die auf Typ-1-Diabetes hinweisen. Die Forschung nutzt unter anderem Deep Learning, um Tausende Profile von Zellen und ihren aktiven Genen oder Partikelflüssen abzuschätzen, die entstehen, wenn Protonenstrahlen in einem Teilchenbeschleuniger kollidieren.

Da diese Art des Lernens komplexe nichtlineare Probleme löst, wird sie auch in autonomen Fahrzeugen eingesetzt, um verwirrende Straßenszenen richtig zu interpretieren: Fußgänger, Radfahrer, Wetter, Verkehrszeichen oder Bäume – das Verhalten der Verkehrsteilnehmer muss unter Berücksichtigung aller korrekt sein Mögliche Einflussfaktoren müssen berücksichtigt und prognostiziert werden.

KI ist für alle Branchen interessant, die große Datenmengen erzeugen. Beispielsweise für produzierende Unternehmen, wo Zulieferer, Sensoren in Maschinen und das ERP-System viele Daten liefern können. Selbstlernende Algorithmen unterstützen die Qualitätskontrolle und liefern Vorhersagen für die vorausschauende Maschinenwartung.

So vermeiden Unternehmen Produktionsausfälle und minimieren Lagerkosten, um nur einige Beispiele zu nennen. Auch die medizinische Bildanalyse und Roboterchirurgie bieten nahezu unbegrenzte Möglichkeiten für den Einsatz von KI im Gesundheitswesen.

Heutzutage entstehen branchenübergreifend Ideen, die häufig zu erheblichen Effizienzsteigerungen führen, da sich wiederholende Aufgaben in Prozessen automatisch ausgeführt werden. Dadurch gewinnen die Menschen mehr Zeit für strategische und kreative Aufgaben. KI führt aber auch zu neuen Geschäftsmodellen – etwa wenn ein Unternehmen nicht mehr Autos, sondern seine Leistung verkauft.

Künstliche Intelligenz vereinfacht Arbeitsabläufe, trifft genauere Vorhersagen und schafft neue Geschäftsmodelle auf Basis von Daten. Dies ermöglicht eine schnellere Entscheidungsfindung auf der Grundlage genauerer Daten und erhöht die Fähigkeit von Unternehmen, sich mit Echtzeitinformationen und Prognosen, die über die menschlichen Fähigkeiten hinausgehen, an Marktveränderungen anzupassen. KI schafft für Unternehmen weit mehr als nur Effizienz: Sie ist der Schlüssel zu mehr Wettbewerbsfähigkeit.

KI ist für alle Branchen interessant, die mit großen Datenmengen arbeiten. Selbstlernende Algorithmen unterstützen die Qualitätskontrolle und liefern Vorhersagen für die vorausschauende Maschinenwartung.

R. Loescher
Technische Universität Varna, Bulgarien

ERDWÄRME ALS ENERGIEQUELE

Die Menschen benötigen Energie beispielsweise zum Heizen. Früher wurden Häuser mit Kohle, Öl oder Holz beheizt. Aber das ist sehr schlecht für das Klima. Geothermie ist wesentlich umweltfreundlicher. Heißes Wasser aus den Tiefen der Erdkruste wird nicht nur zum Heizen, sondern auch zur Stromerzeugung genutzt. Dies ist an vielen Orten im Alpenvorland möglich, beispielsweise rund um München, aber auch in Straubing oder Simbach am Inn. Insgesamt wird in Bayern an mehr als zwanzig Orten Energie aus der Tiefe genutzt.

Tief in der Erdkruste im Alpenvorland befindet sich eine Gesteinsschicht, die heißes Wasser

enthält. Diese Gesteinsschicht kann gebohrt werden, um heißes Wasser nach oben zu pumpen. Dies kann das ganze Jahr über passieren, so dass Erdwärme kontinuierlich genutzt werden kann. Anders als beispielsweise Windenergie steht sie nur dann zur Verfügung, wenn der Wind weht.

Am einfachsten ist es, Wasser zum Heizen zu verwenden. Heißes Wasser wird gesammelt und dann in der sogenannten Fernwärme zu Wohnungen und Häusern geleitet. Natürlich können auch andere Gebäude, wie zum Beispiel Gewächshäuser, auf diese Weise beheizt werden. Eine weitere Möglichkeit, Warmwasserenergie zu nutzen, ist die Stromerzeugung. Wasser oder Dampf treibt Turbinen an und erzeugt so Strom.

Geothermie, auch Erdwärme genannt, ist eine für menschliche Verhältnisse unerschöpfliche Energiequelle. Wenn man von der Erdoberfläche aus tiefer vordringt, findet man auf den ersten 100 m Tiefe eine nahezu konstante Temperatur von etwa 10 °C vor. Danach steigt die Temperatur mit zunehmender Tiefe alle weiteren 100 m um durchschnittlich 3 °C an . Dies nennt man Geothermie und kann durch verschiedene technische Verfahren zur Energiegewinnung genutzt werden.

Dafür gibt es drei unterschiedliche Verfahren: oberflächennahe Geothermie, bis zu einer Tiefe von 400 m, sowie geothermische Systeme, die warmes Wasser im Untergrund nutzen (bis zu einer Tiefe von etwa 4500 m), und Systeme, die Wärme aus tiefem Gestein zur Erzeugung nutzen Strom, der derzeit bis in Tiefen von 5000 m vordringt.

Die oberflächennahe Geothermie wird hauptsächlich durch Wärmepumpen genutzt. Auch für Privatpersonen ist diese Form der Nutzung der Erdwärme möglich. Mit einer Wärmepumpenanlage kann ein Gebäude mit Heizung, Kühlung und Warmwasser versorgt werden. Effiziente Wärmepumpen werden durch ein Marktanreizprogramm gefördert.

Island ist ein Pionier in der Geothermie in Europa. Dort führt der durch die Insel verlaufende Mittelatlantische Rücken zum Aufbrechen der Erdkruste, was zu heftiger vulkanischer Aktivität führt. Island erlebt immer wieder Ausbrüche aktiver Feuerberge – 2010 legte der Ausbruch des Gletschervulkans Eyjafjallajökull den Flugverkehr in halb Europa lahm, 2014 spuckte Bárðarbunga monatelang Feuer und seit 2021 strömt Lava aus dem Vulkan Fagradalsfjall in der Nähe von Reykjavik.

Trotz der ständigen Gefahr durch aktive Vulkane profitiert Island auch von seinem feurigen „Unterbau“: Rund ein Viertel seines Stroms und 90 Prozent seiner Wärme bezieht das Land aus Geothermie. Entweder wird heißes Wasser, das bereits unter der Erde vorhanden ist, gepumpt, oder kaltes Wasser wird in Brunnen gepumpt, das dort erhitzt wird und in Form von Dampf Turbinen antreiben kann. Das Wasser, das aus einer Tiefe von 1000 bis 2000 Metern gepumpt wird, hat je nach Standort eine Temperatur von 80 bis 200 Grad.

Bisher nutzen selbst die größten Geothermiekraftwerke der Welt nur einen Bruchteil der in der Tiefe schlummernden Energie. Bei den Geothermieanlagen müssen häufig neue Brunnen gebohrt werden, da der Wärme- und Dampfdruck in alten Brunnen schnell nachlässt.

SECTION 1.
TRANSPORT TECHNOLOGIES AND EQUIPMENT

I.I. Barskyi
V.V. Artemchuk. *Doctor of Technical Sciences, Professor*
Zaporizhia National University, Department of Electrical Engineering and Cyberphysical Systems

PROSPECTS FOR THE DEVELOPMENT OF TRANSPORT TECHNOLOGIES

The modern world is experiencing a rapid development of transport technologies and equipment, which affects all areas of our lives. These innovations are changing the way people and goods move, improving the efficiency, safety and sustainability of transport systems. Let's consider some key aspects and directions of development of transport technologies and equipment.

In the automotive industry, electric cars and cars using hydrogen have serious prospects. The transition to electric vehicles is becoming a major trend in the automotive industry. Electric cars are known for their environmental cleanliness and efficiency. The infrastructure for charging electric cars is also developing, which makes their use more convenient and affordable.

The development of autonomous cars is reaching a new level. These vehicles can move without a driver using modern artificial intelligence and sensor systems, which opens up prospects for safer and more efficient public and freight transport systems.

High-speed trains play a significant role in the development of railway transport. These technologies help increase speed and increase travel comfort. Also, electric trains with autonomous power are appearing, which expand the possibilities of railway transport in the absence of electrified sections. "Avtomashinist" systems are increasingly implemented, which increases the reliability and safety of train movement and the energy efficiency of rolling stock.

Maglev trains, which work on the principle of magnetic suspension, allow you to reach very high speeds and reduce friction. This technology is used in high-speed trains and urban transport.

Aviation is also undergoing a technological revolution. Electric and hydrogen fuel cell aircraft are being developed to reduce CO2 emissions and lower fuel costs. Specialized drones are used in industries such as delivery and photography.

A healthy environment is becoming a priority for many cities. Much attention is paid to the development of bicycle and pedestrian infrastructures, as well as electronic systems for renting bicycles and electric scooters.

The development of information technologies allows for the improvement of transport management and monitoring of road traffic. This includes GPS systems, smart alarms and traffic prediction systems.

Providing communication in transport is becoming increasingly important. The development of 5G networks makes it possible to create integrated communication systems for cars and transport infrastructures.

Involvement of different types of transport in a single system helps to optimize transportation and reduce the time for cargo delivery. Intermodal terminals and logistics developments are becoming increasingly important.

Many of the above directions of development of transport technologies will be united by the wide use of artificial intelligence and all these technologies and directions of development of the transport sector are aimed at improving the quality of life, reducing the negative impact on the environment and ensuring the efficiency of transportation. The development of transportation technology and equipment is a key factor for our future, and this industry continues to grow and develop, providing new opportunities and solutions for transportation challenges.

Kirill Grenbal
Language supervisor: A. O. Muntian, Associate Professor, Candidate of Philological Sciences
Ukrainian State University of Science and Technologies (Dnipro)

RECOMMENDATIONS REGARDING THE ELIMINATION OF THE CONSEQUENCES OF ACCIDENTS WHEN TRANSPORTING DANGEROUS CARGO BY RAILWAY TRANSPORT

In the last decade, there has been a tightening of technical regulations and environmental requirements for the safety of the processes of transportation of dangerous goods by all modes of transport. This is directly related to the environmental consequences of possible accidental or technological losses of dangerous goods as a result of violation of the rules for their transportation.

Railway transport has a negative impact on all links of the biosphere, especially its rolling stock. Special attention should be paid to the transportation of dangerous goods. About 98,000 dangerous goods of a wide range of names are transported by Ukrainian railways, which in case of violation of conditions transportation and arising of emergency situations can cause various types of danger: fire and explosion, toxic, radiation, infectious and corrosive.

Emergency situations and disasters are preceded by the following reasons:

– employees do not have appropriate education;

– outdated equipment and low supply of material and technical base;

– lack of a clear algorithm of liquidation measures accident on railway transport. There are no

clear instructions on actions from the moment of the accident to the elimination of its consequences.

However, these problems can be solved, firstly, when transporting dangerous goods, it is necessary to be accompanied by a trained person, in which case it will be the first to be able to initiate all the necessary measures for localization consequences. The second is to attach the wagon with a special tool – universal sorption cover, which, if necessary, can be used as a means localization of negative consequences. As a filler for the sorption cover, it is suggested to use waste coffee beans and coarse or fine chips or shavings. As a bag for the sorption cover, it is planned to use fabric 56036.

In the event of an emergency situation during the transportation of dangerous cargo, a specially trained person opens the containers with the sorbent, takes out the sorption blankets, and throws them over the area of the formation of the leakage mirror, in order to prevent the entry hazardous cargo in the soil layer, and reduce the affected area. Used sorbents must be placed back in the containers, and upon arrival train to its permanent location, the sorbent is regenerated, and after regeneration it can be used again.

The implementation of this technological scheme allows not only to obtain operational access to liquidation materials in the area of spill localization, but also to a large extent to save time for the organization of procurement (purchase) and delivery of data materials. The technological scheme allows you to solve this problem the problem in advance: the selection, purchase and accumulation of sorbents takes place long before the spill occurs

Victoriia Koshtur
Language supervisor: T. A. Kuptsova, Cand. Sc, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

NEW CHALLENGES OF RAILWAY CYBERSECURITY

As far as we know the rapid advances in the use of digital platforms for control and communication across all aspects of the rail industry have created increasingly integrated security operations but have opened up greater threats from cyber-attacks. The railway industry is increasingly viewed as a viable target for cybercriminals. Signalling systems, traction systems, train control systems, passenger information systems, and station infrastructure are all potentially at risk. While the foundation of railways has always been safety, we must now consider a new paradigm: Cybersecurity. These attacks can have the potential to go beyond the electronic domain and cause serious threats to safety and security. One alarming example of this took place in Lodz, in Poland in 2008 when a teenage boy who hacked into the city's tram system used it like «a giant train set», causing chaos and derailing four vehicles.

The last few decades have witnessed such cyber security solution for a rails system as firewall. A firewall is essentially a router with a set of rules with the security provided by the software. The security that is provided with the help of it is considerable but you can easily manipulate and reconfigure it, making it possible to acquire access to the rails signalling network. Although widely accepted, a firewall suffers from certain limitations. As public transport is undergoing digital transformation, and industry becomes more reliant upon it, the attack surface for potential damage is massively increased. Clearly, traditional firewalls are not secure enough to keep pace with the progressively sophisticated attacks from hackers and cyber criminals. Fortunately, since 2007 Waterfall Security has pioneered a different approach to industrial cyber security technology. An Israeli company with customers worldwide, Waterfall keeps industrial networks secure with innovative «unidirectional security gateway» technology that provides a stronger alternative to firewalls.

As a final remark, it is also vital to mention that as rail systems go through a modernization process, we need people who understand the railway business, IT, operational technology (OT), and how cybersecurity needs to be integrated into all those worlds. We cannot but agree that «without digital transformation and uncompromising levels of cybersecurity, railways risk losing out on a vital opportunity to shape the future of mobility. By investing in cybersecurity today, the railway industry will move toward safeguarding its future for decades to come».

Literature:
1. https://scadahacker.com/library/Documents/White_Papers/SmartRail%20World%20-%20Protecting%20Rail%20and%20Metro%20from%20Cyber%20Security%20Threats.pdf
2. https://gca.isa.org/understanding-railway-cybersecurity

V. M. Mamchyts
Language supervisor: Muntian A. O., Candidate of Philological Sciences, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

FUTURE TRENDS IN TRANSPORTATION

Underground Tunneling. Underground transit is all about moving people or things through vast systems of tunnels underneath the Earth's surface. Underground tunneling, though in its early stages, is seen as an interesting concept that has the potential to reduce traffic congestion and the overall environmental effects of current car travel.

Hyperloop. Hyperloop is a type of transportation that uses physical vacuum properties to send people from one place to another. The aim is to improve inner-city transportation and reduce the complexity of travel. Currently, the technology can travel at a top speed of 600 MPH — twice the speed of modern-day trains.

Aerospace. The rise of commercial space flight has brought about a series of incredible technological advancements, including the use of reusable rocket boosters. Originally, rocket ships would shed their boosters about two minutes after liftoff. These boosters were one-time use and would fall back to the earth in a flaming heap. SpaceX has designed boosters that gently propel themselves back down to Earth with precision. The reusability of these rockets is an achievement in cost-saving travel tech

Autonomous Trucks. Today several truck manufacturers are working to produce autonomous trucks and vehicles. This is a huge opportunity which will not only revolutionize the way people and goods are transported, but also ease congestion and improve road safety on busy roads. Although this transportation technology is not completely driverless, it is similar to the autopilot mode existing in airplanes. Autonomous trucks are also designed to maintain distance and speed between vehicles and can be controlled remotely.

Conclusion. Transportation technology has always evolved in leaps, from the steam engine to digital navigation. We now stand at the cusp of a convergence of innovations ranging across autonomy, electrification, sharing, connectivity, and sustainability. Together, they will radically reshape transportation economics, society, and culture just as the automobile did 100 years ago. However thoughtful regulation and planning are vital to maximize benefits and minimize disruption across economies, communities and the workforce. The future beckons us to innovate, adapt, and prepare with wisdom.

Literature:

1. Sam *Daley. Transportation Technology: Definition & Examples* ***URL:*** *https://builtin.com/transportation-tech*
2. *How Technology is Reshaping The Future of Transportation,* ***URL:*** *https://medium.com/@Imaginovation/how-technology-is-reshaping-the-future-of-transportation-7ca4786ad7fe*
3. *Emerging Trends & Innovations: The Future of Transportation,* ***URL:*** *https://www.eurowag.com/blog/the-future-of-transport-what-can-we-expect-in-the-next-years*

V.V. Prokopenko
Language supervisor: V.V. Lemeshchenko-Lagoda, Senior Lecturer
Dmytro Motornyi Tavria State Agrotechnological University

RFID TECHNOLOGY IN MODERN WAREHOUSE LOGISTICS

One of the key elements related to enterprise management is warehouse logistics. This is a part of the overall logistics system, which is activated by tasks of receiving, sorting, placing, storing and dispatching goods. As an enterprise grows, its warehouse logistics processes naturally become more complex, which creates the need for a gradual transition from conventional solutions for accounting, searching and identifying goods entering the warehouse to more efficient and productive ones.

Barcodes have long been a classic way of recording and identifying warehouse goods. This method involves scanning goods individually and entering them into the warehouse database. At the same time, it is impossible to track the quantity and location of the required goods in real time. Therefore, barcodes are extremely ineffective for large quantities of products. In this regard, many companies are implementing RFID technology.

RFID (Radio Frequency Identification) is a method of identifying objects using which radio signals are read or data stored in so-called transponders or RFID tags is obtained. Any RFID system consists of a reader and an RFID tag [1].

The use of RFID in warehouse logistics can lead to increased operational efficiency in three main ways:

– quick accounting of products in storage;
– marking of containers and vehicles operating in the warehouse;
– preventing theft of products and containers by employees [2].

The key difference from barcodes is the ability to scan RFID tags over the air, out of line of sight from the reader, and to scan a large number of tags simultaneously. This significantly improves labor efficiency and reduces scanning time [1, 2].

Installing RFID tags on containers or warehouse vehicles makes it possible to track their location within the warehouse in real time, which also increases labor efficiency at each technological stage [2].

Also, due to reading tags over the air, it is possible to significantly reduce the possibility of theft of labeled products and empty containers by enterprise employees [2].

Despite the benefits, RFID technology currently has a significant disadvantage – the high cost of implementation. Therefore, a relatively quick payback is possible only for large enterprises with a high level of production and revenue from it [2].

To summarize, the use of RFID technology allows enterprises to optimize all warehouse operations and more easily control the movement of products in the warehouse, which will lead to a significant reduction in costs. However, the cost of implementation currently prohibits the use of this technology among small businesses. There is no doubt that RFID will continue to evolve and will eventually be used everywhere to create a future high-impact sector of the modern market.

References

1. Advantages of RFID technology. URL: https://www.activewaveinc.com/technology_rfid_advantage.php
2. Wanhua W. Design and Research of Logistics Distribution System Based on RFID. URL: https://www.researchgate.net/publication/341873663

N.V. Prus
Language supervisor: A.O. Muntian, Candidate of Philological Sciences, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

BOARD HYDRAULIC SERVO ACTUATOR FED BY A REGENERATIVE BRAKING SYSTEM

Many kinds of industrial vehicles are usually designed and assembled as customized versions of

commercial trucks equipped with electro-hydraulic tooling or manipulation systems devoted to perform specific operations required by the application. Typical applications are related to vehicles used for maintenance and services for urban centers such as garbage collection and other maintenance services.

Currently, most of these vehicles are conventional trucks with an internal combustion engine that is also used to provide the mechanical power needed to feed the board electro-hydraulic tooling and actuation systems.

Especially for vehicle devoted to perform urban maintenance services, the total amount of energy needed by on board hydraulic system is often relevant respect to the one needed for traction purposes mainly for two reasons:

• Overall travelled distances and mean speed of vehicle are quite low.

• Power required by the electro-hydraulic plant is relevant, and the way in which this power is generated and transferred by the internal combustion engine involve considerable amount of losses.

The aim of the work was the investigations of solutions able to substantially improve efficiency and performance of the vehicle including the on board electro-hydraulic servo-system proposing solutions that can be easily adopted not only for new vehicles, but also for the revamping of large fleet of conventional ones currently hold by public administrations.

For these reasons the installation of the proposed systems has to be, as much as possible, simple and also adaptable to different models of trucks.

In conventional vehicles electro-hydraulic plant is fed by the internal combustion engine of the truck so it cannot be switched off during a stop involving an increment of fuel consumption and pollution. In particular, in a mission of about 10 hours about 100 stops with a mean duration of around 80 seconds are performed. So, the introduction of this system should assure that the motor can be switched off for at least 2 hours, and twenty minutes which represent at least the 20-22% of the duration of the entire mission. Also, it should be considered that garbage collection in urban centres is often performed during the night so a significant reduction of the acoustic emission due to the switching off of the internal combustion engine is highly desirable.

Considering the over cited mission scenario, authors proposed to fed the electro-hydraulic plant of the vehicle through the electrical energy stored in the battery, which is continuously recharged exploiting the energy recovered during the braking manoeuvre.

Due to the encumbrance and cost limitation, it is fundamental to minimize cost and sizing of the energy storage system and of the adopted electrical machines and converters.

As a consequence, a non-secondary task of the activity was also a critical redesign and simulation of the hydraulic plant in order to maximize its efficiency respect to the current solution with affordable costs and intervention respect to the design of conventional plants that have to be modified and revamped.

References:

1. L.Pugi, M. Pagliai, A.Nocentini , G.Lutzemberger, A.Pretto. Design of an On Board Hydraulic ServoActuation fed by a Regenerative Braking System. URL: https://arpi.unipi.it/bitstream/11568/826868/2/nocentini_11_revisione_3.pdf

A. O. Ryzol
Language supervisor: I. H. Miroshnychenko, Candidate of Philological Sciences
Ukrainian State University of Science and Technologies (Dnipro)

TRANSFORMING TRANSPORTATION: THE IMPACT OF MODERN DIGITAL TECHNOLOGIES

The implemention and improvement of the modern digital technologies in the field of the transport can speed up the process of freight transportation for domestic and international transportation. Also using of digital technologies is an important component for a transparent transportation process. As a result, the efficiency of the freight transport sector is increased.

In recent years, the transport sector has undergone a revolutionary transformation due to the

integration of modern digital technologies. From enhancing efficiency to improving safety and sustainability, these innovations have reshaped the way we move and transport goods, ushering in a new era of connectivity and convenience.

One of the most prominent advancements is the rise of smart transportation systems. Cities around the world are adopting intelligent traffic management solutions, utilizing real-time data and analytics to optimize traffic flow. Smart traffic lights, for example, dynamically adjust signal timings based on current congestion levels, reducing gridlock and minimizing travel time for commuters.

The advent of ride-sharing and on-demand mobility services has redefined personal transportation. Digital platforms connecting drivers and passengers have not only streamlined commuting but have also contributed to the reduction of individual car ownership. This shift towards shared mobility has the potential to alleviate traffic congestion, decrease emissions, and create more sustainable urban environments.

Moreover, the logistics and freight industry has witnessed a digital revolution with the introduction of advanced tracking and route optimization technologies. GPS-enabled tracking systems provide real-time visibility into shipments, allowing businesses to monitor and manage their supply chains more efficiently. Intelligent route planning not only minimizes fuel consumption but also reduces carbon footprints, aligning with global efforts towards greener practices.

The emergence of electric and autonomous vehicles represents another significant leap in the transportation sector. Electric vehicles (EVs) are becoming more prevalent offering a cleaner alternative to traditional combustion engines and contributing to the reduction of air pollution. Simultaneously, self-driving vehicles are on the horizon, promising safer and more efficient transportation systems by minimizing human error and optimizing traffic patterns.

In the realm of public transportation, digital ticketing systems and mobile apps have made commuting more convenient than ever. Passengers can plan their journeys, access real-time transit information, and seamlessly pay for fares through their smartphones. This digitalization not only improves the overall travel experience but also helps transportation authorities gather valuable data to enhance service efficiency.

As we navigate the future, the integration of modern digital technologies continues to reshape the transport sector. The ongoing development of smart infrastructure, electric vehicles, and data-driven solutions not only enhances the efficiency of transportation systems but also contributes to a more sustainable and interconnected world. Embracing these innovations heralds a future where mobility is not just a means of getting from point A to B but a seamless and intelligent experience designed for the demands of the modern era.

A. V. Sahan
Language supervisor: I. H. Miroshnychenko, Candidate of Philological Sciences
Ukrainian State University of Science and Technologies (Dnipro)

CHANGES AND TRENDS IN MODERN LOGISTICS

Logistics is a vital cornerstone for economic development, serving as the crucial link between suppliers and customers and encompassing aspects like transport management, safety, and goods storage. This field continually evolves, adapting to changes in scientific development and incorporating advancements such as the telecommunications revolution. The term "smart logistics" denotes the integration of information technologies, showcasing logistics' responsiveness to innovative solutions for enhanced efficiency, timely deliveries, and cost-effective operations. This complexity requires ongoing knowledge improvement and the implementation of innovative solutions, involving trained personnel across all levels of the logistic chain.

The modern logistics landscape has undergone dynamic changes driven by technological advancements, changing consumer expectations, and global market dynamics. Here are some key aspects of the dynamic changes in modern logistics. Information technology has revolutionized logistics operations. The use of advanced software, data analytics, and automation has streamlined processes, improved accuracy, and enhanced overall efficiency. Technologies like the Internet of Things, artificial

intelligence, and machine learning play a significant role in optimizing supply chain management.

The rise of e-commerce has reshaped logistics strategies. With the growing popularity of online shopping, there is an increased emphasis on last-mile delivery efficiency, faster order fulfillment, and real-time tracking. Logistics providers are adapting to meet the demands of the e-commerce ecosystem.

Modern logistics emphasizes real-time visibility and transparency throughout the supply chain. Advanced tracking systems and data-sharing platforms enable stakeholders to monitor the movement of goods, anticipate delays, and make informed decisions, contributing to more responsive and adaptive supply chains.

There is a growing focus on sustainability within logistics. Companies are incorporating eco-friendly practices, optimizing transportation routes to reduce carbon emissions, and adopting green technologies. Sustainability has become a key consideration in both operational and strategic logistics decisions.

Collaboration is a growing trend in modern logistics. Businesses are forming strategic partnerships and alliances to create more integrated and resilient supply chains. Collaborative efforts enable sharing resources, reducing costs, and improving overall supply chain performance.

The adoption of automation technologies in warehouses is on the rise. Robotics, autonomous vehicles, and advanced warehouse management systems contribute to faster order processing, accurate inventory management, and improved overall efficiency.

Customer expectations have shifted towards faster and more personalized services. Logistics providers are investing in solutions that prioritize the customer experience, offering flexible delivery options, easy returns, and real-time communication.

The globalization of markets presents both opportunities and challenges for logistics. Companies are expanding their operations globally, leading to more complex and extended supply chains. Managing the complexities of international logistics, including customs regulations and cross-border trade, requires strategic planning.

O.I. Studenko
Research supervisor: O.B. Ochkasov, Candidate of Technical Sciences, Associate Professor
Language supervisor: A.O. Muntian, Candidate of Philological Sciences, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

DIAGNOSTIC AND MODERNIZATION TECHNOLOGIES TO IMPROVE THE EFFICIENCY AND RELIABILITY OF ROLLING STOCK

The dynamic development of science and technology leads to the requirement to reduce operating costs at all stages of the life cycle of any technical item. The railway rolling stock is no exception. Theoretical and experimental research on the elements of diagnostics and modernization of the rolling stock is becoming increasingly important.

The high degree of wear and tear of the locomotive fleet requires the development and application of measures for complex diagnostics and modernization of the available rolling stock to extend their service life and reduce operating costs. Increase the efficiency of locomotive use by choosing a rational modernization and diagnostic system.

The basis of such technologies is based on equipment monitoring and technical condition forecasting using modernization and advanced diagnostic methods for units and equipment. By analyzing rolling stock malfunctions that occur during operation, it is possible to make sure that the most heavily loaded equipment of locomotives is the least efficient. Therefore, it is recommended to improve diagnostic and modernization methods for locomotives. It is important to move from a planned repair system for rolling stock to maintenance based on the actual technical condition. This transition is only possible with the introduction of new diagnostic methods that provide for a non-destructive technical condition assessment of locomotive equipment. Non-destructive diagnostics is the detection of initial signs of malfunctions without disassembling the equipment. The application of such methods is advisable for locomotives equipped with on-board diagnostic systems, as the technical capabilities of diagnostic systems allow for monitoring of failure risks and provide for an assessment of the technical

condition of individual equipment.

Modernization of equipment is important as it leads to increased reliability and reduced maintenance and repair costs. The main objective is to increase the overhaul periods and reduce the amount of planned repairs. However, the condition of some locomotives may be such that modernization is impractical or unjustified. Budget constraints can be a serious problem for large-scale modernization projects. Without enough financial resources, technical upgrades can be difficult to realize. In some cases, it may be better to invest in new locomotives that already have modern diagnostic technologies and higher efficiency than to invest in modernizing older units.

References:

1. B. E. Bodnar, O. B. Ochkasov, D. V. Chernyaev, Y. I. Shevchenko. Operation and repair of transport vehicles.
2. Y. Kalivoda, L. Neduzha, O. Ochkasov, D. Chernyaev. Use of automated systems in the development and testing of rolling stock.
3. B. E. Bodnar, O. B. Ochkasov, T. S. Grishechkina. Selection of a Locomotive Maintenance System with Consideration of the Impact of Dependent Failures

O. S. Tihanov
Research supervisor: R. V. Rybalka, Candidate of Technical Sciences, Associate Professor
Language supervisor: A. O. Muntian, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

IMPROVING THE FAULT LOCALIZATION PROCESS IN THE RELAY-TYPE ELECTRIC CENTRALIZATION SYSTEM USING FUZZY INFERENCE SYSTEMS

The railways of Ukraine are an important part of its economy. The railway automatic systems allow to increase the efficiency of transportation. Most of the railway automatics in Ukraine are built using the relay element systems. Those systems are outdated, but still in use. They require maintenance, because of the malfunctions which increase continuously. Also, currently there is a lack of specialists working in this area, and there is no self-diagnosing in relay systems. Therefore, the time spent on failure recognition, localization and correction is significant. These facts follow the increasing direct and non direct economic losses.

Failure effects can be reduced by automating the process of failure localization in RI (relay interlocking) by applying the appropriate automatic monitoring and diagnosing (AMD) system. A subset of input signals of the latter is composed of signals from the sensors that measure the states of RI's elements. A large number of RI elements and limitations on the resources regarding the AMD system installation stipulate the virtual impossibility to equip all RI elements with corresponding sensors.

The purpose of this research of this work [1] is to determine a set of elements in the tower-located part of RI to be equipped with corresponding sensors intended to be used in the AMD system, considering the limitations on the resources regarding the AMD system installation. In this research, we propose to apply fuzzy logic to consider assessing the appropriateness of including particular elements in the tower-located part of RI to the elements-under-monitoring (EM) set obtained from a single individual (Mamdani fuzzy inference system) or a group (rank ordering) of experts in the field of the RI operating. Research results yielded recommendations regarding the process of selecting the elements in the tower-located part of RI to be included in the EM set, considering the limitations on the resources regarding the AMD system installation. The AMD system development is out of the scope of the current research. Further studies are needed to provide an economic justification of the AMD system operation based on the EM set.

For the adequacy of the solution proposed in this master's thesis, I propose to develop a model fragment of the electrical centralization system with the possibility of checking the simulation of its operation and introducing malfunctions. The model will be made using the DotNet development environment. It will be virtually equipped with a range of sensors, which is chosen using the proposed approach. Then, the time, which is spent for the malfunction definition using the proposed approach will be compared with the time, which needs the appropriate specialist for the failure finding using current

technical process.

References:

[1] - https://crust.ust.edu.ua/items/dda64282-debe-49c3-a44c-a3fc850e6f3a

A. Tsokur
Language supervisor: I. H. Miroshnychenko, Candidate of Philological Sciences
Ukrainian State University of Science and Technologies (Dnipro)

THE CRUCIAL ROLE OF TRANSPORT IN UKRAINE'S DEVELOPMENT AND GLOBAL INTEGRATION

The transport sector, often likened to a country's "circulatory system," plays a pivotal role in facilitating the movement of goods and passengers within and beyond borders. Ukraine, historically positioned as a natural bridge between Europe and Asia, boasts a dense network of transport arteries and a robust infrastructure, contributing significantly to its economic development.

However, recognizing the dynamic nature of the transport industry, Ukraine emphasizes the need for continuous evolution and innovation in tandem with other economic sectors. An essential aspect of this evolution is the development of a highly qualified workforce within the transport complex, encompassing not only skilled drivers and mechanics but also professionals in economic planning, distribution, and logistics.

Acknowledging the transformative role of logistics as a burgeoning branch of science, Ukraine underscores the necessity for a comprehensive approach to personnel training. In the realm of logistics, all transport systems are inherently interconnected, involving processes such as warehousing, finance, and labour. As a complex business, logistics must be commercially viable, prioritizing customer satisfaction and successful organization of transport operations.

Ukraine's geographical significance as a crossroads between continents positions it as a crucial player in the international transport market. However, the nation recognizes that maintaining its competitive edge requires a qualitatively new approach to staff training and a systematic, governmental commitment to implementing innovative technologies and structural changes in the transport complex.

In addition to the imperative for a skilled workforce, Ukraine acknowledges the transformative potential of logistics education, fostering expertise in the movement of goods from producer to recipient. The multifaceted nature of logistics involves a meticulous study of transport systems and extends to critical processes such as warehousing, finance, and labour.

Ukraine is working towards establishing seamless multimodal transportation, integrating various modes of transport to create an efficient and interconnected network. This approach is essential for optimizing the movement of goods across different regions and modes of transportation. As Ukraine continues to modernize its transport infrastructure and streamline logistics processes, it becomes increasingly integrated into global supply chains. This integration not only attracts foreign investments but also enhances the country's competitiveness on the international stage.

In conclusion, the transport complex serves as a linchpin in Ukraine's stable post-crisis development. As the country leverages its role as a natural bridge, it emphasizes the necessity for continuous advancement, emphasizing the crucial role of a skilled workforce and the adoption of innovative practices for sustained success in the global transport arena. The integration of comprehensive logistics education further fortifies Ukraine's commitment to remaining at the forefront of international trade and transportation.

V. I. Vlasova
Research supervisor: O. I. Pavlenko
Language supervisor: L. V. Afanasieva, Lecturer
Ukrainian State University of Science and Technologies (Dnipro)

TRANSPORT TECHNOLOGIES AND EQUIPMENT

1. General information about transport technologies. Transport technology is the organization

of international road transport; organization and planning of the enterprise's work; commercial work on transport.

1.1 Transport logistics is a functional field of logistics that deals with the management of the movement of material flows and the processor of their movement from the supplier to the final consumer.

2. Subject of labour – raw materials, fuel, and other stuff that is completely used in the process of production. Their cost is fully transferred to a new product and return in a monetary form to capitalist during one cycle.

3. Productivity of labour - is measured by an output in unit time. It depends on the level of development and improvement of production means, on development of science and its practical use, on the level of worker's proficiency and skills.

4. Labour intensity - is defined by labour inputs, expenditure of energy in unit time; it depends on individual efforts of each worker. The increase of intensity leads to increase of goods value.

5. Costs. Costs is monetary terms characterize the actual amount of resources, which is used to achieve a certain goal regardless of funding sources. Expenses are resources consumed in monetary terms (labour, material intangible and financial) for the enterprise to achieve a certain goal.

6. Click and collect is an online order with self-pickup, it is a method of online purchase, when there is no last point for delivery of goods to the buyer at a specific address. This method of delivery is very popular and profitable for the company.

7. Precinct system - the route is divided into sections, and cars move goods within them. Then the rolling stock changes, and the goods are reloaded by changing the body and transferring the containers to another car.

8. International road transport - transport by road with the crossing of borders of two or more states. The main advantage of cargo transportation by road is the so-called door-to-door transportation, which allows you to fully deliver the goods to their destination.

9. Toling is a type of transaction with toll raw materials and belongs to the category of foreign economic transactions. Its distinctive feature is that imports raw materials from abroad and after processing by its processor exports abroad finished products.

References:

1. https://uk.wikipedia.org
2. https://naurok.com.ua
3. https://onmu.org.ua/ua
4. https://mk.nmu.org.ua/ua/

M. O. Yadamenko
Language supervisor: I. H. Miroshnychenko, Candidate of Philological Sciences
Ukrainian State University of Science and Technologies (Dnipro)

ADVANTAGES AND DISADVANTAGES OF TRANSPORTING GOODS BY ROAD

Transporting goods by road has its advantages and disadvantages. On one hand, road transport is flexible and accessible, providing a wide range of opportunities for delivering goods to any location. Road networks are widely spread and available in most regions, allowing for deliveries to remote areas and rural regions. Additionally, road transport enables quick delivery as drivers can choose optimal routes and avoid traffic congestion. The flexibility in route selection is also an advantage of road transport.

On the other hand, road transport has limitations in terms of carrying capacity. Compared to other modes of transport, the payload capacity of vehicles is limited, which can be a challenge for large trucks or oversized cargo. Moreover, transporting goods by road can be fuel-intensive, especially for long distances. Most vehicles operate on internal combustion engines, emitting carbon dioxide and other harmful pollutants that have a negative impact on the environment.

The risk of traffic congestion and delays is also a disadvantage of road transport. Vehicles are susceptible to traffic jams and delays on the roads, which can result in delivery setbacks, time delays, and possible penalties for late deliveries. Congestion can also increase fuel costs due to the additional

time spent on the road.

Furthermore, road transport has limited range capabilities. Compared to other modes of transport, road transport has restrictions on long-distance haulage. Additional stops for refueling may be required for long international deliveries or transportation over extensive distances, which can prolong delivery times.

The risk of accidents associated with road transport should also be considered. Road accidents pose a real threat to the safety of cargo and personnel and can lead to damage to the goods being transported.

When choosing a method of transporting goods, it is important to consider all these factors and find a compromise that best suits the needs and delivery conditions. Road transport can be an efficient option for quick and flexible delivery of goods over short and medium distances, particularly to locations inaccessible by other means of transport. However, for large cargo or long distances, other modes of transport such as rail, sea, or air transport may be more efficient and cost-effective.

Overall, road transport is an essential component of the logistics system, facilitating the transportation of goods to various locations. It offers flexibility, speed, and accessibility but requires careful analysis and planning to ensure optimal delivery considering economic, environmental, and safety aspects. Road transport provides quick delivery opportunities, making it advantageous for short to medium distances, especially in remote or rural areas. However, limitations in carrying capacity, fuel efficiency, susceptibility to traffic congestion, and safety risks, particularly accidents, highlight the importance of careful analysis and planning. For large cargo or long distances, alternative modes of transport such as rail, sea, or air may be more efficient and cost-effective, emphasizing the need for a comprehensive approach to logistics decision-making.

SECTION 2.
ADVANCEMENTS, PROBLEMS, AND PERSPECTIVES OF ENGINEERING

Y. Y. Bohachenko
Language supervisor: A.O. Muntian, Candidate of Philological Sciences, Associated Professor
Ukrainian State University of Science and Technologies (Dnipro)

TRACK GAUGE AS A PROBLEM FOR THE INTEGRATION UKRAINIAN RAILWAYS INTO THE EU RAILWAY NETWORK

Track gauge is the distance between the two rails on a railway track. There are many different track gauges exist worldwide. The most common in the world are the standard gauge 1435 mm. It is currently used by approximately 60% of all railways in the world. The second most common in the world (17% of the total length of railways) is broad gauge 1520 mm. However, there are also many other gauges used in different countries, such as the Iberian gauge in Portugal and Spain (1668 mm), Irish gauge (1600 mm) etc.

The track gauge affects the construction and dimensions of the railway rolling stock, including the wheelset and axle load, as well as the infrastructure, such as the width of the railway platform and the spacing of bridges and tunnels. The choice of track gauge can also impact the transport capacity and efficiency of the railway system, as wider gauges generally allow for higher axle loads and larger trains.

The use of different track gauges between Ukraine and the EU countries create significant barriers to international trade and integration of the railway into the European transport system. As Ukraine uses a broad gauge (1520 mm) while the EU countries use a standard gauge (1435 mm), transportation of goods and passengers between these countries requires either changing the railway rolling stock or transporting the cargo between different types of wagons or platforms with acceptable track gauges. This adds the problems in the territories that are on the border of using these standards. It is necessary to either build additional tracks with the required track width, or at the border of the transition from one track width to another, transfer passengers and overload cargo, pump liquids from tanks or to change carts of wheel pairs under the train. All these things constitute additional logistics costs, slow down the crossing of the border, and also affect the cost of the ticket for the passenger.

One way to solve this problem is considered to transfer to the European railway gauge in Ukraine. Currently, there are several sections of the European track in Ukraine, which lead from the state border several tens of kilometers deep into the country. It is advisable to work on increasing the capacity for transshipment of goods at border stations and increasing the mutual penetration of both standards in the border zone. But it's unrealistic and impractical to switch all railways of Ukraine to the European track, since the difference is not only in the width of the track, but also in the overall and weight standards of wagons and locomotives. These are huge capital investments.

Another way is replacement of wheel pairs when moving from one railway gauge to another. This method does not require changing the track gauge in Ukraine and may help save a lot of costs. However, this operation take some time and also requires special infrastructure.

Eventually, the problem of different railway track gauges between Ukraine and the EU countries is an important task that requires a comprehensive approach and international cooperation. Finding an effective solution to this problem will contribute to the development of the transport system and improve trade relations between Ukraine and the EU countries.

O. O. Horbonos
Research supervisor: O.O. Malashkin V.V., Candidate of Technical Sciences, Associate Professor
Language supervisor: A.O. Muntian, Candidate of Philological Sciences, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

DEVELOPMENT OF COMPOSITE BRAKE PADS FOR RAILWAY TRANSPORT

The importance of transport in our country is great. It performs important social, economic, cultural, and defensive functions in our state. The social function is to provide people with business and domestic trips and the provision of passenger services during these trips. In the conditions of increasing competition in the passenger transportation market, special attention is paid to the quality of transport services. In addition, this factor is the best way to increase passenger traffic. This will increase the profitability of passenger transportation by rail.

The main reasons for the relatively large number of products under development are the various operational constraints on rail transport and the huge variety of vehicle types with associated braking equipment.

With an average freight car service life of over 31 years, almost two-thirds of the current fleet will have to be refitted if the industry is to meet its overall goals by 2022.

To reduce the time required to verify certificates and approvals, the design and test program was divided into two phases. After an initial analysis of the strengths and weaknesses of existing composite brake designs, five suppliers are currently developing their own technical solutions in parallel, each using several technical approaches. Working in parallel rather than sequentially should help avoid long lead times. At a later stage, the testing and validation work will be based on the testing processes and requirements that were jointly established at the beginning of the project.

The joint project of LaGiV (an outstanding German railway company) aims to develop technically and economically optimized composite brake pads (V-BKS) for use in freight wagons to reduce noise during railway traffic. When V-BKS is installed, rolling noise is reduced by 10 dB (A), which corresponds to a subjective halving of the noise load. Based on the current state, new products (V-BKS) must be developed and tested in accordance with international regulations.

The goal of LaGiV is to develop composite soles with better LCC (Logistics Communication Complex) performance than currently available soles. Therefore, new innovative material combinations are being tested. This experience increases the competitiveness of German manufacturers. However, the railway sector is faced with physically feasible requirements for composite brake pads. That is why only K-outs were successfully tested at the UIC (International Union of Railways) booth at Inno Trans 2018 in Minden. However, the LaGiV project will continue to systematically study and test materials to create solutions for both the LL and K outsole (IT company).

References:

1. https://www.innotrans.com/en/Press/InnoTransREPORT/IT-R2015-1BK.html
2. https://www.bahn.com/i/view/index.shtml

O.P. Karasev
V.V. Artemchuk, *Doctor of Technical Sciences, Professor*
Zaporizhia National University, Department of Electrical Engineering and Cyberphysical Systems

DEVELOPMENT OF ELECTRIC ROLLING STOCK WITH AUTONOMOUS POWER SUPPLY

With the growth of technology and increased awareness of climate issues, the modern world is becoming increasingly determined to reduce the use of traditional energy sources. In the field of transport, railway transport is becoming especially important, which is considered an environmentally friendly and energy-efficient way of transporting passengers and goods. However, about half of the railway tracks in Ukraine are not electrified, therefore, in this context, the use of electric trains with autonomous power becomes a promising direction for the development of the transport industry. This is possible due to the ability of trains to run continuously on non-electrified sections of railways, reducing dependence on catenary network availability and contributing to energy conservation.

A key component of self-powered electric trains is the energy storage system. This system may include batteries, supercapacitors, or other devices that allow storing energy for later use. During the train movement, when energy is generated, it can be converted and stored in the energy storage system, which allows this energy to be used to power the train in non-electrified areas.

The flexibility and increased efficiency of the use of existing transport networks is expressed in the fact that electric trains with autonomous power provide railway operators with greater flexibility in planning and expanding the network. Since these trains can operate on both electrified and non-electrified sections, they can be used where the construction of overhead catenary is uneconomical or impossible. This makes it possible to increase the coverage of the railway network and provide convenient and environmentally friendly transport for the transportation of passengers and goods in regions where it was previously limited. In addition, the introduction of electric trains with autonomous power will reduce costs for the construction and maintenance of the catenary network. Also, such electric rolling stock makes it possible to increase the competitiveness of railway transport. An additional direction of the development of hybrid/autonomous railway vehicles is the possibility of their use as additional passenger transport in urban conditions. This type of transport has already proven its effectiveness in civilized countries, so it is appropriate to use this experience in the conditions of our country.

However, as with any ambitious endeavor, there are various challenges that can be encountered during the implementation of such a transport system. One of the primary challenges is the efficient storage of electrical energy. Autonomous power supply systems must provide sufficient range and performance to meet the demands of various rail routes. Balancing the weight of energy storage systems with the power required for acceleration and operation is a critical design consideration. Adapting autonomous power supply to existing electric rail systems can be complex. Compatibility issues, voltage and power supply mismatches, and the need for retrofitting are potential challenges. The initial capital investments for autonomous power supply systems can be substantial. Balancing these costs with the long-term benefits and return on investment is a key consideration for transit agencies and governments.

Despite these challenges, the development of electric rolling stock with autonomous power supply holds significant promise in reducing emissions, improving energy efficiency, and enhancing transportation systems. Addressing these obstacles through innovation and collaboration is vital to realizing the full potential of this technology.

D. Ye. Mazanko
Language supervisor: I. A. Kryvonos, Senior Lecturer,
Dmytro Motornyi Tavria State Agrotechnological University

ANTIOXIDANTS IN THE FOOD INDUSTRY

The use of antioxidants in the food industry has become a key aspect of the modern global food system. With the emergence of a wide range of food products with different shelf lives and storage requirements, the issue of food stability and quality has gained new significance. We will consider the role of antioxidants in the food industry, their impact on product quality, as well as the importance of food preservation and consumer protection through the application of these beneficial compounds.

Antioxidants are food additives used in the food industry to delay/prevent oxidation processes, which can lead to the deterioration of food products. Both natural antioxidants and their synthetic counterparts can be utilized in food production.

Commonly recognized antioxidants that play an important role in preservation of food products are natural antioxidants, synthetic antioxidants, dietary antioxidant and endogenous antioxidant are identified as the most common antioxidants and.

A lot of people prefer natural antioxidants over synthetic antioxidants to minimize e adverse effects on human health but natural antioxidants are more expensive than synthetic antioxidants thefore we can find synthetic antioxidants used in many food products. Nevertheless, the safety of synthetic antioxidants in food is a significant concern, leading to their regulation in the majority of countries because antioxidants that have caused health problems, for some people, are primarily synthetic (BHA, BHT and TBHQ). *Natural antioxidants* are found in natural sources, such as fruits, vegetables and meats. *Synthetic antioxidants* are those antioxidants that do not occur in nature but chemically synthesized and added to food products as preservatives to help prevent lipid oxidation [1].

The use of plant-derived antioxidants is becoming increasingly relevant as they do not have dosage limitations and do not have negative side effects on the human body. Viktoriia Cheliabiieva's, Anna Kostyuchenko, and Helena's Semenyuk's study explored the possibility of using powders made from the skins of red grape varieties and eggplant skins as antioxidants in the production of sugar cookies.

During the study, it was found that the use of extract from the powder of red grape skins makes it an effective antioxidant for the fatty base of sugar cookies, as it increases the stability of table margarine 82% by 2.3 times. The extract of red grape skins is used during the emulsion preparation stage [2].

During the production of cookies, the powders from the skins of red grape varieties and eggplant have a positive effect on moisture content when added to flour. The moisture content of all tested samples of cookies complied with the requirements of DSTU 3781-98. Additionally, it was found that eggplant powder may be uaed as a stabilizer for beta-carotene.

References:

1. Muluken Kebede, Shimelis Admassu Application of Antioxidants in Food Processing Industry: Options to Improve the Extraction Yields and Market Value of Natural Products: website. URL: https://openventio.org/wp-content/uploads/Application-of-Antioxidants-in-Food-Processing-Industry-Options-to-Improve-the-Extraction-Yields-and-Market-Value-of-Natural-Products-AFTNSOJ-5-155.pdf (Last accessed 09.11.2023)

2. El-Baroty, G.S., M.F. Khalil, S.H.A. Mostafa NATURAL ANTIOXIDANT INGREDIENT FROM BY-PRODUCTS OF FRUITS: website. URL: https://thescipub.com/pdf/ajabssp.2014.311.320.pdf#:~:text=The%20natural%20antioxidant%20is%20preferred,natural%20compound%20with%20high%2Dantioxidant%20activity (Last accessed 10.11.2023)

Mylonenko Karyna
Language supervisor: I. A. Kryvonos, Senior Lecturer
Dmytro Motornyi Tavria State Agrotechnological University

THE ROLE OF PALM OIL IN PRODUCTION AND ITS IMPACT ON HUMANS

Palm oil is extracted from the softness of the fruits of the oil palm, which is a heat-loving plant, but

which needs a lot of moisture. The main producers of this oil in the world are Malaysia, Indonesia, as well as Colombia, Nigeria and Thailand. The demand for this vegetable oil began to grow in 2007 and now occupies a leading position. For the production of palm oil, fresh fruits of the oil palm are collected then they are sent for sterilization to remove insects. Fresh fruits are then separated, which are boiled to prepare for the next stage - pressing, where crude oil is obtained [1]. But that's not all, it will be washed - the oil will be mixed with water, and then dried so that the moisture evaporates. After that there will be a refining stage, but at this stage the production of palm oil is not yet complete. Now it must be divided into solid and liquid fractions. And only after that everything is done.

The cheapness of extraction has made palm oil very popular in the modern world. But there is a big environmental problem: palm trees from which this oil is extracted are planted in large areas and this affects the fauna of those regions where this happens. This is if we consider palm oil from an ethical and ecological point of view. As for the pros and cons, any oil that is extracted is subject to technological processing. And as a result of this processing, substances that have carcinogenic properties are formed in palm oil [2].

To summarize, the harm of palm oil lies in 2 things: in the carcinogenic component and in the composition of which product it enters our body [3]. Historically, dietary fats and oils have been the subjects of debates regarding the type and quantity of oil most desired for use in daily diets, as well as its role in regulating body weight and its importance in the etiology of chronic diseases. Palm oil is easily digestible and absorbable.

In human nutrition experiments it was found that diets with palm oil produced cholesterol reduction. In addition to being rich in beta-carotene and vitamin E (food additives and antioxidants), palm oil is effective in inhibiting oral cancer in animals. The tocotrienols that palm oil contains in abundance, and that are not found in other edible oils, play a fundamental role in blood coagulation and in the suppression of cholesterol production [4].

References:

1. 8 Things To Know About Palm Oil: website. URL: https://www.wwf.org.uk/updates/8-things-know-about-palm-oil (Last accessed 09.11.2023)

2. Клопотенко Є. Пальмова олія: website. URL: https://klopotenko.com/palmovoe-maslo-tak-li-vredno-kak-o-nem-govoryat-rasskazyvaet-dietolog-svetlana-fus/ (Last accessed 10.11.2023)

3. Ethical sourcing and mindful consumption of Sustainable Palm Oil: website. URL: https://www.zsl.org/about-zsl/policies/sustainability-zsl/palm-oil (Last accessed 11.11.2023)

4. Franziska Spritzler. Palm Oil: Does It Have Health Benefit?: website. URL: https://www.healthline.com/nutrition/palm-oil (Last accessed 08.11.2023)

I.Y. Pavlova

Research supervisor: O.A. Mukha, Candidate of Technical Sciences, Associate Professor

Language supervisor: N. I. Bilan, Candidate of Philological Sciences, Associate Professor

Dnipro University of Technology

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING: TODAY AND THE FUTURE

Underground mines are hazardous environments that potentially expose workers to a range of health and safety risks. From extreme working conditions such as heat stress, atmospheric pressure and ventilation hazards to rock explosions and heavy equipment accidents, underground workers are exposed to fatal and chronic environmental diseases. Therefore, personnel safety is of paramount importance in the mining industry and the industry has made significant strides in recent years to create a safer working environment. Technological advances and the introduction of strict safety regulations from Mining Monitoring Systems have led to a decrease in the number of workplace accidents in recent years, but have not completely eliminated the possibility of safety hazards.

The use of internet of things-related wearables has far-reaching potential for safety in the mining industry. Some of the most common applications of these devices today include detecting environmental conditions such as air quality, worker location, and monitoring the fatigue levels of truck drivers and

heavy equipment operators. The devices provide early warning signals of potentially harmful or dangerous situations, thereby reducing risks and preventing accidents [3].

Autonomous technologies provide a new level of safety in mines and increase operational efficiency. The expansion of the capabilities of robots and automated machines have resulted in their taking over functions that were traditionally performed by human operated machines. From self-driving trucks to robotic transportation, drilling, and other processes, autonomous equipment improves safety by eliminating the need for workers to work in unsafe conditions [2].

Mining companies are increasingly turning to Radio-frequency Identification tags to track their assets underground - both human and vehicle. These lightweight, low-cost tags are used to locate workers and equipment in real time and track their movements. Clothing equipped with Radio-frequency Identification tags is used to monitor the environment and warn miners of potential hazards. Another application of Radio-frequency Identification systems is to monitor the usage patterns of the heavy equipment on which they are applied, which helps to plan the replacement of parts or fluids and optimize the operation of the equipment.

Drones offer great opportunities for safety in the mining industry. By collecting images from hazardous areas of mines that require complex safety measures for inspectors to access and then creating digital models of the terrain, drones are replacing traditional, time-consuming and labor-intensive methods of photography, inspection and mapping [1].

Workplace simulators are increasingly being used in the industry to provide inexperienced miners with on-the-job training in a virtual environment without exposing them to hazardous conditions they have not yet encountered. This provides employees with the opportunity to practice different work scenarios they may encounter during their work activities, and is also an important tool for identifying any shortcomings in their knowledge and skills [4].

Although underground mines pose numerous health and safety risks to workers due to specific challenges and environmental conditions, the mining industry has made significant strides in improving workplace safety. Technological advances and strict safety standards have considerably reduced the number of workplace accidents. However, despite these improvements, potential safety hazards still exist, and this underscores the continued need for diligence, training and adherence to safe protocols in this industry.

References:

1. Drones for mining: how to use and choose what's best. URL: https://wingtra.com/drones-for-mining/#:~:text=Mining%20drones%20are%20used%20for,nature%20of%20the%20mining%20industry (date of access: 25. 03. 2023).
2. How to explain Robotic Process Automation (RPA) in plain English. URL: https://enterprisersproject.com/article/2019/5/rpa-robotic-process-automation-how-explain (date of access: 07. 09. 2023).
3. Kinza Yasar Wearable technology. URL: https://www.techtarget.com/searchmobilecomputing/definition/wearable-technology (date of access: 12. 09. 2023).
4. Turner B. What is a Mining Simulator? URL: https://www.aboutmechanics.com/what-is-a-mining-simulator.htm (date of access: 17. 08. 2023).

I. S. Perekopskyi
Research supervisor: F. D. Shylo, Candidate of Technical Sciences, Associate Professor
Language supervisor: L. V. Afanasieva, Lecturer
Ukrainian State University of Science and Technologies (Dnipro)

ACHIEVEMENTS, PROBLEMS AND PROSPECTS OF ENGINEERING

The report presents a comprehensive evaluation of the current state of engineering, spotlighting the notable achievements that have revolutionized various industries worldwide. The past decade has witnessed extraordinary breakthroughs in engineering, with remarkable advancements in fields such as robotics, biomedical engineering, and material science, leading to the development of life-changing

technologies and transformative solutions. From the development of advanced prosthetics and medical implants to the creation of efficient and sustainable infrastructure systems, engineering has significantly improved the quality of life for individuals globally.

However, the report also sheds light on the multifaceted challenges confronting the engineering community. One pressing concern is the urgent need to address environmental sustainability in the face of climate change. Engineers are increasingly tasked with developing innovative solutions to minimize the environmental impact of industrial processes, mitigate carbon emissions, and promote the adoption of renewable energy sources. Moreover, the growing threat of cybersecurity breaches and data privacy violations has highlighted the critical importance of integrating robust security measures into engineering designs, systems, and technologies.

Additionally, the report analyzes the evolving role of engineering in addressing societal needs. It highlights the imperative for engineers to align their efforts with the United Nations Sustainable Development Goals, emphasizing the role of engineering in promoting social equity, economic development, and environmental stewardship. By leveraging technological innovations and sustainable practices, engineers have the potential to drive positive societal change and contribute to the creation of more resilient and inclusive communities.

Emphasizing the importance of innovation and adaptability, the report discusses the promising prospects for engineering in the era of the Fourth Industrial Revolution. It underscores the transformative potential of emerging technologies such as 3D printing, nanotechnology, and quantum computing in reshaping the future of engineering. These technologies offer unprecedented opportunities for the development of personalized healthcare solutions, the creation of smart and interconnected urban infrastructure, and the advancement of sustainable manufacturing processes. The concludes by highlighting the crucial role of continued research, collaboration, and education in fostering a thriving engineering ecosystem capable of addressing global challenges and shaping a more sustainable and technologically advanced future.

S. M. Samoilenko
Research supervisor: V.A. Derbaba, Candidate of Technical Sciences, Associate Professor
Language supervisor: N. I. Bilan, Candidate of Philological Sciences, Associate Professor
Dnipro University of Technology

BREAKING THE CONCRETE CEILING: INNOVATIVE SOLUTIONS TO CEMENT'S CARBON FOOTPRINT

The topic of my study is innovative solutions to cement's carbon footprint. The purpose of the investigation is to raise awareness about the carbon emissions associated with cement production and to explore potential solutions to reduce its carbon footprint. The study highlights the significant contribution of cement production to global carbon emissions and climate change and discusses the need for innovative solutions to address this issue. It should be noted that cement is one of the most widely used materials in the world, with over 4 billion tons produced annually. However, this comes at a significant cost to the environment due to the carbon emissions associated with its production. In fact, cement production accounts for approximately 8% of global carbon emissions, making it one of the largest contributors to climate change.

First of all, the production of clinker is a crucial step in cement manufacturing, and it involves a chemical reaction that releases a significant amount of carbon dioxide into the atmosphere. This reaction occurs when raw materials such as limestone, clay, and other minerals are heated to high temperatures in a kiln. The resulting clinker is then ground into a fine powder to produce cement.

In addition to the carbon emissions associated with the production of clinker, the use of fossil fuels in cement production also contributes to the industry's carbon footprint. Fossil fuels, such as coal and natural gas, are burned to power cement plants and transport raw materials. This combustion process releases carbon dioxide and other greenhouse gases into the atmosphere, contributing to climate change.

The first way to reduce the carbon emissions associated with cement production is to use alternative raw materials. For example, industrial waste products such as fly ash and slag can be used

instead of traditional raw materials like limestone and clay.

By using these alternative materials, not only can carbon emissions be reduced, but waste products can also be diverted from landfills and used for a good purpose.

Another solution to the carbon problem in cement production is to implement carbon capture and storage (CCS) technology. CCS involves capturing the carbon dioxide that is emitted during cement production and then storing it underground or using it for other industrial processes.

While CCS technology is still in its early stages, it has the potential to make a significant impact on reducing the carbon footprint of cement production. By capturing and storing carbon dioxide, CCS can prevent it from entering the atmosphere and contributing to climate change.

In conclusion, while CCS is not a perfect solution to the carbon problem in cement production, it has the potential to be a key tool in mitigating the effects of climate change. Its implementation will require continued research, development, and investment, but it offers a promising avenue for reducing carbon emissions in the cement industry. Cement production is responsible for a significant portion of global carbon emissions and is a major contributor to climate change. However, we have the technology and knowledge to tackle this problem. By using alternative raw materials like fly ash, slag, and other industrial by-products, we can reduce the amount of carbon emissions from cement production. Additionally, implementing carbon capture and storage technology can further reduce the carbon footprint of cement production by capturing and storing carbon dioxide emissions. While these solutions are not without their challenges, they offer a path towards a more sustainable future. It is up to us, as individuals, governments, and industries, to prioritize sustainability and take action to reduce our carbon emissions. By making these changes in the cement industry, we can make significant progress towards a more sustainable and resilient future for ourselves and future generations.

A.A. Shchebet
Language supervisor: T.V. Zhukova, Senior Lecturer
Dmytro Motornyi Tavria State Agrotechnological University

THE BASICS OF SUCCESSFUL MELON GROWING

A perfectly ripe, locally grown melon is one of the great taste treats of the produce world. Sweet and fragrant, with a texture that practically melts in the mouth, a fresh, well-grown local melon bears little resemblance to its supermarket counterpart. Most of the melon varieties favored by grower-shippers selling to supermarkets have been bred to withstand the rigors of shipping and handling, for good shelf life and, to make matters worse, are picked before they are fully ripe.

Melons are a diverse group that includes three major categories: muskmelons, honeydew melons and watermelons. Muskmelons and cantaloupes generally have netted or ribbed skins and orange flesh. Honeydews are closely related to muskmelons but have smooth skin and green flesh. Watermelons are a different species originating from tropical Africa with greater heat requirements and a longer growing season than muskmelons and honeydews.

Melons require a lot of light to mature good quality fruit, so they are difficult to grow successfully in partly shaded gardens. Lighter textured soils high in organic matter are best for melons. In areas with short growing seasons, it is best to start melons, especially watermelon, in peat pots and transplant them into the garden. You can't do anything to change the climate where you live or the amount of sun your yard gets, but there are a couple tricks for making the most of the available heat in any location. Covering the soil in melon beds with garden-grade black plastic film, which traps heat much like an asphalt surface, is one time-honored trick. You can also install clear plastic or see-through fabric "row covers" over melon beds to create a mini-greenhouse. These must come off in early summer when the plants begin to blossom so that insects can pollinate the flowers. Cover the beds again in late summer to ensure optimal ripening as the weather cools.

Melons grow on sprawling vines and do not ripen effectively when grown in cramped quarters. The seedlings are typically planted on mounds (three to a mound) spaced 2 feet apart in rows 6 feet apart. Thin the fruit to three melons per vine, as this will result in more nutrients (and thus sugars) pumped into each melon. If space is an issue, build a sturdy trellis and train the melons up the

south side of it – this saves bed space, but also puts the fruit into better contact with the sun's warming rays.

Keeping melon leaves lush also requires copious amounts of irrigation. This is best applied with soaker hoses or a drip system, as overhead irrigation encourages fungal disease, which definitely detracts from melons' sweetness. During the final weeks of ripening, however, excess water dilutes the sugar content of the fruit. So as the fruit approaches its full size, cut back on irrigation, providing only enough water to keep the leaves from completely wilting. It is normal at this stage for some of the older leaves to turn brown.

Sugars are produced in the leaves through the process of photosynthesis, and then pumped into the fruit – so the lusher the leafy growth, the higher the Brix rating. To encourage strong growth, blend 4 to 6 inches of composted manure into your melon beds prior to planting. Then add a balanced organic fertilizer (such as a mixed blood meal/bone meal product) every 3 to 4 weeks. Some gardeners elect to plant melons right into their compost pile, which not only provides loads of nutrients, but a bit of extra heat.

Knowing just when to harvest a melon crop is part art and part science, but a skill you can acquire through observation and practice. To start, there are signs that herald the approach of peak ripeness or indicate its presence for the various types. How much time you expect to pass before the melon will be eaten is the other major consideration (more about this below). Telltale signs to watch for. Visible or palpable changes at ripeness can involve the following: change in skin cast or coloration, cracking, striations, or other markings, slight softening of the fruit, browning and shriveling of tendril and/or leaf most proximal to fruit stem, shrinking of the area where stem attaches to the fruit. When this occurs, it's time to test for ripeness. This is the primary clue growers use to assess ripeness, as it is characteristic of the melon type and relates to how the fruit is usually removed from the vine.

The best way to tell if a watermelon is ripe is to look at the tendril across from where the fruit is attached to the vine. If the tendril is dry and brown, the fruit is mature. Muskmelons are ready when the fruit pulls easily from the vine. Here are some guidelines:

- Netted melons store best at 36–41°F (2–5°C) and 85–95% humidity;
- Other melon types should be stored at 45–50°F (7–10°C) and 85–95% relative humidity;
- All melons will hold for a few days without refrigeration, but will hold longer if chilled.

With regard to eating quality, there can be a flavor penalty with chilling melons. Chilling can dull flavor, especially over time, and melons are generally juicier and softer if kept at room temperature for 1–2 days before serving.

To sum up, after reviewing all the steps of growing melons from sowing seeds and transplanting to the best way to harvest and store each type, with the right varieties and knowledge you can produce melons that are far superior to the common varieties. They will produce a wonderful crop all year long and customers will be very happy with the product. To achieve a ripe and sweet fruit you need to plant seeds earlier, find the warmest climate, water regularly, protect the plant from pests and diseases, sprout your melons that would not overload the vine, use organic fertilizer and compost.

S. O. Shevtsov
Language supervisor: I. A. Koliieva, PhD, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

DELTA WORKS, PROJECT TO CREATE FLOOD PROTECTIVE STRUCTURES IN NETHERLANDS

Delta Works is a series of construction projects to create protective structures in the south-west of the Netherlands to protect lands in the Rhine delta and Rotterdam from flooding. The project, which lasted from 1950 to 1997, created several dams, locks and storm barriers. The goal was to shorten the Dutch coastline and reduce the number of dikes that had to be built when there was a threat of flooding. Sometimes Delta Works called the "eighth wonder of the world."

Following the construction of the Afsluitdijk dam in 1933, the Dutch government began research and efforts to control flooding in the Rhine, Meuse and Scheldt estuaries before the devastating flood of 1953. The main idea was to shorten the coastline and turn it into freshwater lakes but after February 1953, which killed 1835 people and devastated 2070 km2 of land, the Dutch government realized the urgent need to address flooding and coastal management.

The project ensured the reduction of coastlines and, as a result, the length of the dams would decrease. This helped protect a huge area from flooding and drain low lying areas that were regularly flooded with salt water and protect fresh water supplies for the population. As a result, many new roads and connecting bridges over dams and dykes were also built, ending the historical isolation of some areas from the rest of the Netherlands and dramatically reducing travel times. Shipping has improved significantly, especially between Rotterdam and Antwerp. The project also improved recreational facilities and created jobs.

The Hollandse IJssel is a storm surge barrier that was Delta Works first design in response to the catastrophic floods of 1953. Construction was completed in 1958. The barrier secures the Randstad in the western Netherlands, which is the countries lowest-lying and most populated area. The locks are closed only during periods of very high water, and at other times ships can pass under the raised gates.

The Grevelingendam was completed in 1965. Built using caissons, a new technology was used: delivering stones using a cable car. The dam later helped in the construction of other dams due to its strategic location.

Haringvliet Dam was built in 1971. Instead of blocking the mouth with a dam, it was decided to build 17 locks to allow salt water to enter, prevent the Meuse and Rhine rivers from freezing, and drain these rivers in case of flooding.

Brouwersdam, built using caissons and a cable car, was completed in 1972. The dam created Lake Grevelingenmeer.

The Maeslantkering barrier consists of two steel doors that close in case of flooding and is controlled by an automated system that monitors sea levels and weather conditions. In case of prolonged closure of the barrier, a mechanism is provided for draining the Rhine water - air is pumped into the doors, they rise, and excess water flows out into the sea. He created a new waterway near Hook in Holland. It was completed in six years, from 1991 to 1997.

The largest of the Delta complexes, Oosterscheldekering, is a huge storm surge barrier and the largest in the world. Its doors only close in extreme weather conditions. This means that the unique saltwater environment, where mussel and oyster farming is a traditional activity for the area's fishermen, is protected and the tides remain constant to preserve wildlife.

This gigantic structure consists of 65 precast concrete columns with 62 steel guides between them. To strengthen the soil on which the barrier was installed, synthetic mats with gravel filler were used.

This project led to dangerous tides causing dangerous floods have been reduced, now are lovely areas to explore by boat. Some of the uncovered shores have become recreation parks. Many sandbars and shores, however, especially in the Oosterschelde, are part of an important nature reserve. It was the largest project of its kind anywhere in the world and took 30 years to build.

References:

1. Rijkswaterstaat Ministry of Infrastructure and Water Management. Article about Delta works. Link website: http: //surl.li/mfcmm

2. Delta works. From the Wikipedia website: https://en.wikipedia.org/wiki/Delta_Works#Projects

3. 7wonders.org: Delta works. Link website: https://7wonders.org/europe/netherlands/rotterdam/delta-works/

4. Delta Works Flood Protection, Rhine-Meuse-Scheldt Delta, Netherlands. From the Water technology website: https://www.water-technology.net/projects/delta-works-flood-netherlands/

V. V. Symonenko
Research supervisor: A.A. Adamchuk, Candidate of Technical Sciences, Associate Professor
Language supervisor: N. I. Bilan, Candidate of Philological Sciences, Associate Professor
Dnipro University of Technology

RANKING OF COUNTRIES BY USEFUL MINERALS

The world's economic landscape is significantly influenced by vital minerals, encompassing oil, natural gas, ores, coal, and chemical elements. These resources serve as linchpins across diverse industries, including energy, transportation, and technology. However, obtaining up-to-date information on lithium and cobalt reserves proves challenging, as these metals, not primary resources, predominantly originate from nations like Chile, Australia, China, and the Democratic Republic of Congo. Precise valuation remains elusive due to the dynamic nature of natural resource prices.

In the hierarchy of mineral-rich nations, Iran reigns supreme, boasting 155.6 billion of oil, 32 trillion cubic meters of natural gas, 1.7 billion tons of coal, 3.78 billion tons of certain ores, and 95 tons of gold. Following closely, China possesses substantial reserves, including 26.2 billion barrels of oil, 6.4 trillion cubic meters of natural gas, 133.4 billion tons of coal, 179.2 billion tons of specific ores, and 2250 tons of gold. USA secures the third spot with 68.9 billion barrels of oil, 12.9 trillion cubic meters of natural gas, 219.5 billion tons of coal, 179.2 billion tons of particular ores, and 9350 tons of gold.

A more granular analysis reveals China as the leader in specific ore reserves (179.2 billion tons), while Republic of South Africa emerges with the most significant gold reserves (36,000 tons). Venezuela claims the top spot for oil reserves (302.3 million barrels), and the USA commands the highest coal reserves (219.5 billion tons).

Moreover, the strategic significance of these mineral-rich nations extends beyond economic and geopolitical realms. The control of Iran, China and the United States over vast energy resources positions them as critical players, wielding influence in global energy markets and international politics. In the case of Iran, its geopolitical standing in the Middle East intertwines with its substantial energy resources, making it a key actor in shaping regional and global dynamics. China's ascent as a major consumer of resources aligns with its rapid industrialization, solidifying its pivotal role in the interconnected global supply chain.

Examining specific categories of mineral reserves unravels further intricacies. While Venezuela and Saudi Arabia lead in oil reserves, Canada and the USA showcase substantial oil sands and shale resources, respectively. This diversity underscores the nuanced nature of global resource allocation.

Yet, the mere abundance of resources doesn't guarantee universal prosperity. Effective resource management, technological innovation, and robust infrastructural development emerge as crucial determinants. The environmental impact of resource extraction remains a paramount concern, prompting nations to grapple with sustainable practices and ecological conservation.

In conclusion, beyond the sheer quantity of mineral reserves, a comprehensive understanding of the geopolitical, economic, and environmental intricacies becomes imperative. These complexities not only shape a nation's economic trajectory but also delineate its role on the global stage. As the world grapples with heightened resource demand, adopting holistic strategies encompassing sustainability, innovation, and international collaboration is essential for a balanced and prosperous future.

References:

1. Oil, gas and coal trade. BP Statistical Review of World Energy. URL: https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/oil-gas-and-coal-trade.html (date of access: 15.01.2021).;
2. Primary energy. BP Statistical Review of World Energy. URL: https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/primary-energy.html (date of access: 31.05.2021).;
3. Statistical review of world energy. BP Statistical Review of World Energy. URL: https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html (date of access: 30.01.2021).

4. Oil demand. BP Statistical Review of World Energy. URL: https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/oil-demand.html (date of access: 05.01.2021).

O. A. Toporkov
Language supervisor: I. A. Koliieva, PhD, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

DANGERS OF THE DNIPRO METRO CONSTRUCTION

In Ukraine the metro was built only in three cities: Kyiv, Kharkiv and Dnipro.

The general plan for the construction of the Dnipro metro was ratified in 1979. The official reason for the start of the construction of the metro in the city closed at that time for foreigners was the need to build a reliable anti-aircraft shelter. Then it was planned to build 4 lines and about 40 stations. Construction began in 1981. On December 29, in 1995, the first and still the only Central Factory Line was opened, the length of which, according to various sources, ranges from 7.1 km to 7.8 km and consists of 6 stations.

The relief of our city is ambiguous. The central part is located on granite, which is quite difficult to build. In remote residential areas, which were planned to connect with the center with the help of the metro, groundwater is very close. When building at the groundwater level, there is always a risk of collision with granite boulders, which is very dangerous.

In the construction of the Dnipro metro, the technology of deep laying was used. Although, for example, the «Pokrovska» station is shallow and does not contain an escalator at all (construction at the groundwater level is very dangerous, and residential areas near the station are located near the floodplain). After the station «Muzeina» metro was planned to bring to the surface, and to communicate with the left-bank part of the city, traffic would occur across the bridge.

The complexity of the relief of the city and not always appropriate management decisions caused several accidents, the elimination of which led to unpredictable financial costs and additional work. So, due to the early cessation of freezing, there was a breakthrough of the quicksand into the slaughter, one of the tunnels of the «Pokrovska» – «Prospect Svobody» race was flooded and a duplicate mine barrel was dug to continue construction. There was also a breakthrough of the soil waters with the collapse of the rock in the slaughter of the inclined course of the «Metalurgiv» station and the collapse of the rock in the face of one of the races, followed by the failure of dips on the surface.

At the «Muzeina» station, the penetration of the barrel began in 1982. Already in those days, builders were faced with the problem of quicksand, the location of which was quite unusual – two meters from the exploration well. Through considerable efforts and the latest drainage technology at that time using electric current, quicksands were curbed ("Rasskaz o Dnepropetrovsky metro" S. Akhmatov).

The subsidence of the soil under part of the foundation of the dormitory building №2 of the Dnipro Polytechnic in 2019 is associated with the negligence of the Turkish company «Limak», which in 2016 won a tender to continue the construction of the metro in Dnipro. But sciencescientists also do not exclude a spontaneous phenomenon in the form of an unusually located float.

To date, «Limak» has evacuated its employees from Dnipro and Ukraine. The metro construction process is mothballed. The issue of ensuring the safety of the tunnels passed is being resolved.

Now, in 2023, due to the military aggression of the Russian Federation, the metro really performs the function of a reliable anti-aircraft shelter. And the idea of connecting remote areas of the city with the center will remain an impossible dream.

K. O. Vadurin, D. R. Mardeeva, A. Y. Kovalenko, Y. O. Morozov
Kremenchuk Mykhailo Ostrohradskyi National University

ANALYTICAL MODEL OF A DRONE BATTERY FOR A FLIGHT SIMULATOR

Relevance. Recently, the use of unmanned systems such as quadcopters, robotic platforms,

drones has increased to solve environmental monitoring, emergency response, delivery automation, and many others. Given the need to train operators of such devices, an urgent task is to implement simulation environments for controlling such devices with a certain set of functions that are close to the real ones. One of the most important characteristics of modelling such an object is the battery, as it determines the range that an unmanned device can move, the time resource the operator has to perform the tasks, etc.

Materials and equipment. A physical FPV drone to compare the battery discharge process with the model; a drone control panel; and a Mathcad package to develop an analytical model.

Research objective. To develop an analytical model of the battery discharge process that corresponds to the process in a physical FPV drone**.**

$$
\begin{aligned}
BP := \;& SPm \leftarrow SP + 1 \\
& RVCC \leftarrow \frac{SPm}{2}\cdot\left(EC_{0,1} - EC_{0,0}\right) + EC_{0,0} \;\text{ if }\; \frac{SPm}{2} > 0 \\
& RVCC \leftarrow 0 \quad \text{otherwise} \\
& C\_Rate \leftarrow \frac{(RVCC\cdot NE + CoE)\cdot LS}{BC} \\
& TW \leftarrow 1 - \frac{\frac{3600}{C\_Rate} - 1}{\frac{3600}{C\_Rate}} \\
& Ans \leftarrow TW\cdot 100 \\
& Ans
\end{aligned}
\qquad
\begin{aligned}
& \\
& \\
& \\
& \\
& BP = 0.1225 \\
& \\
& Time := \frac{100}{BP\cdot 60} = 13.605
\end{aligned}
$$

Fig. 1. Analytical model of the discharge process developed in Mathcad

BC is the value of the remaining capacity (5 A-h), EC is the current consumption limits of the motors (2-5 A), NE is the number of motors (4 pieces), CoE is the consumption of other equipment (1 A), LS is the charging/discharging losses (multiplier 1.05), SP is the value from the virtual control (from -1 to 1, the value 1 was used in the simulation)

When calculating the model, the first step is to recalculate from the range [-1;1] to the range [0;2] and obtain the value of SPm. The next step is to calculate RVCC, which is responsible for the motor current, depending on the current value of the control. Next, C_Rate is calculated, the current value of the current consumption rating of the entire device. Next, TW is calculated, which is the value of the charge consumed per second. The final percentage consumed per second is calculated as Ans. The percentage consumed per second can be converted to the number of minutes the drone can fly under the current load using the Time ratio.

Conclusion. In the course of the work, an analytical model of the battery discharge process of an unmanned device was synthesised. Based on the first comparisons with a physical device, the discharge time error is 20%, and it is planned to improve the calculation accuracy in the future.

SECTION 3. MODERN ECONOMIC PROBLEMS AND THE WAYS OF SOLVING THEM

Y.V. Artemchuk
V.V. Artemchuk, *Doctor of Technical Sciences, Professor*
Zaporizhia National University, Department of Electrical Engineering and Cyberphysical Systems

TODAY'S ECONOMIC CHALLENGES AND POSSIBLE SOLUTIONS

The modern world is experiencing numerous economic challenges and problems that arise as a result of globalization, technological changes, demographic transformations, military conflicts and other factors. These problems can have a serious impact on social stability, the global economy and the quality of life of the population. Let's briefly consider some of the most pressing economic problems of our time

and possible ways to solve them.

One of the main economic problems is the growth of income inequality. The gap between rich and poor sections of society can cause social tensions and discontent. This problem is not new and has been known since ancient times. This problem attracts special attention when whole clans are formed that enrich themselves illegally. Injustice in the distribution of resources, ineffectiveness of laws, lack of transparency in doing business, etc. cause at least people's excitement or, in another extreme case, lead to revolutionary changes. Inequality can be reduced by introducing progressive taxes, improving access to education and health care, and ensuring equal opportunities for all people. It is also effective to create favorable conditions for the development of small and medium-sized enterprises.

On the one hand, the development of technology and the automation of production can lead to job losses and increased unemployment. On the other hand, one must understand that automation and robotics are an inevitable stage of production development. Therefore, to solve this problem, we can offer retraining of the workforce, as already mentioned above - support for small and medium-sized enterprises, as they create new jobs, the development of innovative industries that can provide new opportunities for employment, as well as the development of the service sector. Stimulating people to creative activity can be a separate direction.

Changes in the composition of the population, increasing life expectancy and declining birth rates can have an impact on the pension system, health care and social security. Solutions to this problem include reforming pension systems, supporting families and women in the labor market, and encouraging managed migration.

Financial crises and rising indebtedness can cause serious threats to economic stability. Ways to solve this problem include regulation of financial markets, strengthening supervision of banks and financial institutions, as well as increasing financial literacy of citizens.

Ensuring sustainable energy development and reducing dependence on coal fuels is an important economic task. Ways to solve this problem include the development of renewable energy sources, increasing energy efficiency and reducing energy consumption.

As experience has shown, humanity is not always ready for challenges of a global scale. For example, the Covid-19 pandemic led to a near stop or a significant decline in production in various industries, job losses, etc., and at the global level. Also, russia's full-scale invasion of Ukraine and threats to other civilized countries have led to significant fluctuations and financial risks, which is due to many obvious reasons. To reduce the risks of the appearance of such aggressive actions, serious mechanisms of a global scale should be applied. These include the timely application of powerful economic sanctions, reforming world institutions with the aim of political and economic influence on the aggressor country.

In general, today's economic problems require a complex and innovative approach to solving them. Policy solutions, social programs, technological innovation and cooperation at the international level play an important role in solving these problems. On the way to lasting economic stability and improving the quality of life of the population, it is necessary to actively interact and improve approaches to solving the most difficult challenges.

V. D. Balachuk
Language supervisor: T. A. Kuptsova, Cand. Sc, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

GENDER ECONOMICS

In recent decades there has been growing interest in gender problem. But the study of gender and gender roles takes a main position in the social sciences. This has been less true in economics than in many other fields since, for much of its history, economic research focused narrowly on market interactions and much of the economic activity of women has occurred outside formal markets. However, interest in gender-related topics has been much more obvious in recent years. «Men and women tend to occupy distinct social roles, though the size and nature of the differences vary widely over time and space, and these roles generate measurable inequality on outcomes of interest to economists, including time use and control of material resources. The documentation of these differences, and their rationalization, is the subject of a growing literature that commands considerable

attention across the discipline. The root of gender differences in economic and social status lies in the gender division of labor, which concentrates female economic activity in private households in many societies. This implies that issues of economic demography—fertility, health, migration— cannot be understood without considering the distinct interests and capabilities of men and women, and the same is true of the study of human capital, given the importance of early investments in children» [1]. These are the traditional topics of gender economics, but it is becoming apparent that gendered behavior across a wide range of other domains, from crime to corporate governance, from labor markets to taxation, can shine a light on deeper issues in economic motivation and economic interactions.

Much of the most recent work in gender economics can be placed into three categories:

1) documentation of gender differences in traits and behavior using novel sources of data, including field and lab experiments,

2) causal estimation of social influences on gendered dimensions of behavior, such as labor supply and entry into STEM fields,

3) studies of gender discrimination in markets and interpersonal interactions [2].

In addition to this, on the plus side, economists have been incredibly productive and energetic in documenting new and reliably-measured gender differences in the distributions of a broad range of traits and behaviors. There has also been a remarkable increase in economic attention to gender norms in the context of advancing gender equality. Bertrand, focusing on gender stereotypes, which tend to exaggerate differences between men and women, argues for more research (and in particular a greater willingness to publish null results) and changes in the way media, advertising, and educational materials portray gender [3].

Literature and references

1.https://repec.iza.org/dp15217.pdf
2.Andre, Peter and Armin Falk. «What's Worth Knowing? Economists' Opinions About Economics». IZA DP No. 14527, July 2021.
3.Bertrand, Marianne. «Gender in the twenty-first century.» In AEA Papers and Proceedings, vol. 110, pp. 1-24. 202

O.O. Chebotaryov
Research supervisor: V. O. Zadoia, Candidate of Economic Sciences, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

MODERN CHANGE MANAGEMENT STRATEGIES IN MECHANICAL ENGINEERING ENTERPRISES

Most of the methods for implementing changes in the Ukrainian economy have emerged recently and have been imported from developed countries that have already successfully utilized them. For instance, the concept of outsourcing originated in the USA in the 1960s but began to be actively employed in Ukraine and other countries in the 2000s. Outsourcing involves relocating employees to another company or organization under official documentation, while their actual workplace remains the former company.

Another method is outsourcing, which appeared in the USA in the 1930s but gained popularity in developed countries only in the 1980s. Outsourcing entails transferring the execution of duties or even entire types of activities to an external party on a contractual basis, defined by the service agreement's value.

A variety of outsourcing is known as "outsourcing" (translated from English, "out" - "beyond," "tasking" - "task") - the transfer by the client company of individual tasks to be performed by another organization. Unlike outsourcing, outsourcing involves only the partial delegation of tasks to an external organization, which are typically carried out by an individual employee.

Significant differences between outsourcing and outstaffing lie in the nature of the interaction between the company and the workers performing specific tasks. In the first case, the outsourcing service provider imposes certain restrictions on the competence and skills of the personnel, as well as their working methods. With outstaffing, the client company independently determines the conditions under

which the employee will work, and the intermediary company only provides services related to the formalities.

The change management process in a company involves transforming its structure, form, or methods of conducting economic activities and changing its objectives. Such transformation can take various forms, such as increasing or decreasing the company's size without altering its core essence. One of the transformation options is corporate restructuring, which includes organizational, economic, financial, legal, and technical measures to change its structure, ownership form, management, and organizational and legal form. Restructuring can involve reorganizing the structure, improving existing or implementing new business processes, changing the asset management system, and optimizing inefficient directions of activity, as well as changing the organizational and legal form of business.

Moreover, it's important to note that these change management methods are a response to globalization and rapid technological changes. They enable companies to be flexible and quickly adapt to new market conditions. These strategies allow businesses to focus on key aspects of their operations, utilizing external or internal resources more efficiently.

Such transformations in the economy contribute to the development of innovations, increase the competitiveness of companies, and promote employment growth in the labor market. Additionally, they provide companies with access to a vast pool of knowledge and skills, which are crucial for further development.

All these methods are essential tools in managing modern enterprises, helping them respond effectively to changing market conditions and achieve stability and success in the global business environment.

I.M. Ivashchenko
Research supervisor: T. V. Kuvaieva, Candidate of Economic Sciences, Associate Professor
Language supervisor: N. I. Bilan, Candidate of Philological Sciences, Associate Professor
Dnipro University of Technology

CURRENT CHALLENGES FOR SOCIAL MEDIA MARKETING

Global changes in the economic and cultural sphere caused by the digital revolution are affecting all areas of business. They significantly transform the configuration of the market environment and influence the behavior of economic entities. In this context, business representatives are increasingly aware of the benefits of using social media, viewing them not only as a means of earning money but also as an effective tool for popularizing their company. Firms seeking to establish long-term relationships with customers should analyze their activities, identifying strengths and weaknesses to assess advantages and disadvantages, and compare the data obtained with competitors. This will help to identify opportunities that the company can use in the future, improve communication with existing customers and attract new ones, contributing to increased competitiveness and profits. In the 21st century, social media marketing is becoming an essential component of successful business operations.

Social media marketing is undergoing a transformative evolution, marked by a series of distinct yet interconnected trends. The landscape is shifting towards a seamless integration of customer care with an emphasis on personalized, immediate and predictive interactions. As firms harness the power of social media for customer engagement, dedicated apps and instant messaging services, often powered by AI-driven chatbots, emerge as the new frontier.

Social media marketing effectively solves a number of key tasks, such as:

- Strengthening brand position;
- Research of the target audience;
- Maintaining customer loyalty to the company and product;
- Tracking and dealing with negative feedback;
- Increasing traffic to the website and other company resources;
- Providing information support to customers [1].

Despite the positive context of social media and technology development, there are a number of threats that marketers and businesses should consider going forward, including:

1. Data privacy. Concerns regarding privacy on social media have been persistent, with consumers expressing apprehension about data privacy and their trust in brands and platforms. Although not a novel issue, the constantly changing situation and the elusive nature of privacy definitions contribute to ongoing challenges. As a result of privacy issues, consumers are growing more critical of brands and social media platforms, even resorting to actions such as deleting their accounts. To mitigate these concerns, brands and platforms must proactively tackle the issue by implementing transparent policies and actions, thereby cultivating trust within the realm of social media [3].

2. Fake news on social media can pose various threats to businesses and brands. This can inflict significant damage to a brand's reputation leading to the loss of customer trust and loyalty. The reputational harm can have immediate financial repercussions, as evidenced by the 4% stock decline experienced by Pepsi Co in response to the spreading of the false information during the 2016 US presidential election [2]. The decline in trust and the financial consequences underscore the serious threats that disinformation on social media poses to businesses and brands.

3. Gaining and maintaining the trust of the target audience is a challenge for businesses due to the constant changes in the conditions of advertising and promotion on social media. Understanding the deep needs of the target audience becomes an important factor in this process. With a large amount of advertising, the audience may begin to react aggressively to products that are advertised too often.

4. Lack of instant results when using social media marketing. Some companies do not understand that building partnerships with customers through social media is a long-term process and stop funding this activity.

Businesses that use social technologies to simply promote advertisements and promotions may be undermining the long-term strategic goal of the enterprise if they do not take advantage of other benefits of social media. If used properly in combination with a timely response to potential threats, social media can be an excellent tool for increasing sales, attracting new customers, and growing your business.

References:

1. Ku D. The growing importance of social media marketing in 2023. PostBeyond. URL: https://www.postbeyond.com/blog/social-media-marketing-importance/ (date of access: 09.11.2023).
2. Obadă D.-R. Sharing fake news about brands on social media: a new conceptual model based on flow theory. Argumentum. journal of the seminar of discursive logic, argumentation theory and rhetoric. 2019. No. 17 (2). P. 144–166. URL: https://philarchive.org/archive/OBASFN (date of access: 09.11.2023).
3. The future of social media in marketing - Journal of the Academy of Marketing Science / G. Appel et al. SpringerLink. URL: https://doi.org/10.1007/s11747-019-00695-1 (date of access: 09.11.2023).

Nastia Kazakova
Language supervisor: T. A. Kuptsova, Cand. Sc, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

THE NATURE AND CONCEQUENCES OF ECONOMIC BUBBLES

An economic bubble is the commonly used term for an economic cycle that is characterized by the rapid escalation of market value, particularly in the price of assets [1]. The scientists point out that this fast inflation is followed by a quick decrease in value, or a contraction, that is sometimes referred to as a "crash" or a "bubble burst." Another definition is as follows: a situation in the economy where perceived asset prices and valuations are much higher than the underlying value [2]. The news of price increases lead to an increased spur of new investors which drive prices and amplifying the stories by new success stories until the market value and prices of assets are rapidly escalating. The steep price rise is then followed by a steep decrease/contraction as the bubble is bursting.

There are lot of factors that fuels an economic bubble. But the main one (in economies, securities, stock markets and business sectors) is a change in the way players conduct business. This can be a real change, as occurred in the bubble economy of Japan in the 1980s when banks were partially deregulated, or a paradigm shift, as happened during the dotcom boom in the late ‘90s and early 2000s.

During the boom people bought tech stocks at high prices, believing they could sell them at a higher price until confidence was lost and a large market correction, or crash, occurs. Bubbles in equities markets and economies cause resources to be transferred to areas of rapid growth. At the end of a bubble, resources are moved again, causing prices to deflate. Thus, there is little long-term return on those assets. Famous bubbles include tulip mania in Holland during the 17th century, when the prices of tulip bulbs reached unheard of levels, and the South Sea Bubble in Britain a century later, although there have been many others since, including the dotcom bubble in internet company shares that burst in 2000 [3]. Economists argue about whether bubbles are the result of irrational crowd behaviour or, instead, are the result of rational decisions by people who have only limited information about the fundamental value.

Even famous Keynes once mentioned that economic cycles are unavoidable and "spontaneous optimism" is a bigger driver than mathematical rules for the economy in many ways. There might be many factors leading to Economic Bubbles, and we will explain the most common types and the usual stages of these financial bubbles.

But one cannot but agree, that «bubbles promote labor and economic growth. Higher interest rate in bubbly BGP makes labor always higher, because of the positive correlation between the two. Moreover, the growth rate may increase with the bubble thanks to labor supply. Indeed, bubble has two opposite effects on growth. The first one is negative (crowding-out effect), because savings absorb the overaccumulation of capital. The second effect is positive (crowding-in effect), because higher labor supply when there is a bubble makes the marginal productivity of capital higher, which encourages firms to increase their capital investment [4]. So, when the crowding-in effect dominates the crowding- out effect, bubbles are growth-enhancing.

Literature and references:

1. https://pustaka.ut.ac.id/lib/wp-content/uploads/pdfmk/ADBI420102-M1.pdf
2. https://www.investopedia.com/terms/b/bubble.asp#:~:text=A%20bubble%20is%20an%20economic,or%20a%20%22bubble%20burst.%22
3. https://pustaka.ut.ac.id/lib/wp-content/uploads/pdfmk/ADBI420102-M1.pdf
4. https://www.researchgate.net/publication/358404233_Heterogeneity_Bubbles_and_Monetary_Policy

A.R. Khoma

Superviseure scientifique: Symonenko S.V., candidat ès sciences pédagogiques, maître de conférences du département des langues étrangères, Université d'État agrotechnologique de Tavria de Dmytro Motornyi

PROBLÈMES DE LA SUBSTITUTION DES IMPORTATIONS EN UKRAINE: POURQUOI LES PRODUITS RUSSES SONT-ILS TOUJOURS SUR LES ÉTAGÈRES DES MAGASINS UKRAINIENS?

Neuf ans se sont déjà écoulés depuis que la Fédération de Russie a envahi le territoire de l'Ukraine, a annexé la péninsule de Crimée et a occupé aussi une partie des régions de Donetsk et de Lougansk. C'est le 24 février 2022, qu'elle a lancé des opérations militaires à grande échelle qui se sont étendues à travers tout le pays. Alors, les autorités ukrainiennes ont commencé à se séparer de leur voisin agresseur fermant les frontières aux stars russes, bloquant l'importation de marchandises et limitant les exportations du pays, rompant les contrats et passant à la langue ukrainienne dans toutes les agences gouvernementales et à la télévision. Mais cela ne suffisait pas toujours, car l'Ukraine ne pouvait pas refuser le pétrole et le gaz russes. La transition était trop difficile, tout comme le fait de séparer un enfant de la garde d'un adulte. Cependant, depuis un an et demi, l'Ukraine a réussi à refuser tout ce que la Russie lui proposait, on nous dit cela. Une seule question se pose: pourquoi les produits russes se trouvent-ils encore dans les rayons des magasins et supermarchés ukrainiens?

Ici et là, en regardant les comptoirs et les étagères des magasins, on peut voir les inscriptions «Made in Russia» ou «Produit de la Fédération de Russie». De tels produits peuvent être trouvés dans presque tous les rayons de produits chimiques ménagers, d'hygiène, etc., et même pas un ou deux produits, mais un peu plus. Cela peut également s'appliquer aux biens de consommation ayant une longue durée de conservation. Bien que le boycott économique, qui visait spécifiquement le refus des produits d'origine

russe et prévoyait des conditions pour réduire la consommation de ces produits, pour une raison quelconque, il n'est toujours pas question d'un refus complet. Il ne s'agit pas non plus du fait que les consommateurs ukrainiens eux-mêmes cesseront consciemment d'acheter les produits des producteurs-occupants russes.

En quoi consiste le problème? Qui ne respecte pas exactement les règles du boycott et quelles sont les solutions de contournement en cette matière? Bien sûr, il est indiqué sur les étagères elles-mêmes que les produits ne sont pas ukrainiens, mais pas sur tous. L'origine du produit peut être trouvée sur l'emballage à l'aide des chiffres du code à barres, les trois premiers chiffres du code «460 - 469» signifient que le fabricant est la Russie. Cependant, de tels produits, ce qui est bien, sont presque impossibles à trouver. Mais on peut les trouver sous les codes-barres d'autres pays, comme la Chine, l'Estonie, la Grande-Bretagne et d'autres. Et tout cela parce que le pays agresseur pratique depuis longtemps l'ouverture de succursales et d'entreprises offshore à l'étranger. Et cela s'applique non seulement aux biens de consommation, mais aussi aux appareils électroménagers, aux vêtements et autres objets de décoration, etc.

Bien entendu, à l'heure actuelle l'utilisation de ces produits ne fait que diminuer. Par exemple, avant l'invasion, en 2013, le montant des importations de marchandises d'origine russe s'élevait à environ 23 milliards de dollars, et en 2022 il est de 3,3 milliards. Mais pour y mettre fin complètement, il faut appliquer la substitution des importations, produire des marchandises ukrainiennes ayant le même objectif ou les importer de l'étranger. Il est également nécessaire d'appliquer certaines restrictions économiques aux entrepreneurs ukrainiens exportateurs ou importateurs de produits russes, car le réseau commercial n'est qu'un lieu de vente et ne peut pas résoudre les problèmes de l'origine des marchandises. Si cela ne résout pas le problème, il faut interdire complètement l'importation de ces produits au niveau de l'État. Après tout, il existe des produits ukrainiens, et ils sont nombreux, ainsi que des produits étrangers, qui apparaissent de plus en plus dans les rayons non seulement des mégamarchés, mais aussi des supermarchés ordinaires. Et en termes de qualité, ils sont bien supérieurs aux produits russes. Par conséquent, un moyen de persuader les Ukrainiens eux-mêmes d'abandonner les produits russes pourrait être de mettre l'accent accru sur la qualité des produits et d'appeler à une transition vers des produits d'excellente production et plus variés.

Yu. V. Kuptsov
Research supervisor: V. O. Zadoia, Candidate of Economic Sciences, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

DIGITAL POTENTIAL OF THE COMPETITIVENESS MANAGEMENT OF PASSENGER RAIL TRANSPORTATION

Public transport has changed considerably over recent decades and the mobility of urban population *has* undergone a remarkable transformation. The way we live and move are influenced by digital and innovation factors and transformations affecting such global changes. Rapid advance of the digital evolution is bringing us closer to the perspective oriented towards a customer of transportation services.

Digitalization is a key trend of the modern world both in the global business processes and everyday life. Besides it is a gradual process leading to the digital business system. It comprises an increase in the usage of digital and computer technologies by any organization, industry or a country in general. In other words, digital technologies are used for:

- increasing the efficiency of information processing;
- reducing overall costs;
- increasing productivity (e.g. operation and maintenance);
- creating new business models;
- providing new opportunities of generating income and value-added chain.

Technological landscape is constantly changing, and it is obvious that public transport gains additional benefits implementing digital innovations. Moreover, new technologies have influenced public transport. The specialists must take into account these trends to ensure using the potential of the

digitalization process to provide the passengers with transport services, especially railway passenger transportation ones.

The introduction of new technologies has increased with developing of smart phones and will grow significantly with the implementation of 5G network. Passengers search information about suitable routes and service fees on real-time basis. Using advanced technologies (such as information diagnostic tools, IoT, computer training, artificial intelligence) the industry of public transport can rapidly convert data into necessary information. This fact leads to the crucial transformation of the business processes (technological planning processes, operation and technical maintenance of production fund services) increasing accessibility of assets and providing economic efficiency.

Railway industry of passenger transportation experiences the rapid introduction of modern technologies into the transportation process. To make the trips of passengers more comfortable digitalization has been widely introduced all over the world. Metro and other public transport systems have been transformed from the common transport service into the integrated suppliers of public transport. Apart from passenger transportation between the departure and destination points, these means of transport implement digitalization of such services as safety, customer services, on-line information.

Summing up, it should be concluded that digitalization not only provides transport customers with high quality services but also increases of railway transportation competitiveness of passengers ensuring efficiency, safety and innovations of public transport industry.

I.S. Lavrova
Superviseure scientifique: Symonenko S.V., candidat ès sciences pédagogiques,
maître de conférences du département des langues étrangères,
Université d'État agrotechnologique de Tavria de Dmytro Motornyi

PROBLÈMES DE L'INDUSTRIE DE LA BOULANGERIE PENDANT L'ÉTAT MARTIAL EN UKRAINE ET MOYENS POSSIBLES POUR LES RÉSOUDRE

L'industrie de la boulangerie est l'une des principales branches de l'industrie alimentaire, dont les entreprises produisent divers types de produits de boulangerie à partir de farine alimentaire. L'industrie de la boulangerie joue un rôle social et stratégique important dans la vie de la société, en tant que principal produit alimentaire. Le marché du pain de l'Ukraine est représenté à 99,9 % par des produits de la production nationale: pain à base de farine de blé, pain à base de farine de seigle, pain à base d'un mélange de farine de seigle et de blé, produits de boulangerie.

Depuis le début de la guerre en Ukraine, l'industrie de la boulangerie a été confrontée à de nouveaux défis et à un certain nombre de facteurs qui ont affecté son activité. L'industrie est un vaste réseau de boulangeries et des usines de pain qui fournissent du pain à la population. Les plus grandes capacités de production de l'industrie de la boulangerie sont généralement concentrées dans les régions où la production de farine est la plus importante, ainsi que dans les grands centres industriels. La guerre a perturbé les chaînes humanitaires, infrastructurelles et alimentaires, le nombre de migrants a augmenté et le coût de la nourriture en Ukraine et dans le monde a aussi augmenté. La situation des prix sur le marché alimentaire répond à des défis extérieurs. Pendant la période de loi martiale, l'indice des prix à la consommation a atteint 118,4%, les prix des produits alimentaires ont augmenté plus rapidement (121,2%) et ceux du pain - jusqu'à 111,8 %. La différenciation des prix du pain dans les régions d'Ukraine est déterminée par la situation du marché, les prix proposés par les producteurs qui occupent la plus grande part du marché régional et par la situation sociopolitique et militaire dans les régions.

La diminution de la production de pain au niveau de l'État, notamment pendant la loi martiale, a été causée par les facteurs suivants :

- une forte concurrence sur le marché des produits de boulangerie: une part importante de la production (environ 40 à 50 %) va à de petites entreprises privées (mini-boulangeries, productions propres des ménages et des supermarchés);
- le faible niveau d'utilisation des installations de production, certaines d'entre elles sont endommagées ou détruites;

- l’équipement technique catastrophique dans les usines de pain, le niveau élevé d'usure des équipements de production des entreprises de l'industrie (plus de 60 à 70%);

- les problèmes liés à l'approvisionnement en matières premières et ressources énergétiques, au soutien du personnel, aux impôts, aux salaires;

- les revenus de la population, taux de chômage;

- le coût (l’augmentation du coût du pain: la hausse des prix des vecteurs énergétiques, de la logistique et de la farine de qualité);

- la réduction de la population de l'Ukraine de 6 à 8 millions d'habitants à la suite de l'agression militaire de la Fédération de Russie et de l'occupation du territoire de l'Ukraine par les troupes terroristes russes;

- la structure de la consommation de pain (la ration vers une alimentation hypocalorique);

- le développement du segment des produits semi-finis de pain surgelé importés et du pain surgelé, dont la plus grande partie est importée de l'étranger (2-3%);

- l'absence d'usines de pain où seraient utilisés les investissements étrangers.

Pour surmonter les conséquences dévastatrices du secteur alimentaire causées par l'agression militaire de la Fédération de Russie, il est nécessaire de concentrer les efforts de tous les producteurs sur la restauration des capacités de production et des infrastructures dans tous les domaines de la chaîne de production et de vente «céréales - farine – pain», avec l'attrait des fonds et les opportunités des investisseurs.

Afin de survivre dans les conditions d'un marché à faible profit et réglementé par l'État, il est nécessaire de rendre cette industrie plus attractive pour les investisseurs, tant nationaux qu'étrangers:

- obtenir le soutien de l'État pour le renouvellement technologique de l'industrie;

- accorder des prêts préférentiels aux entreprises ;

- améliorer la régulation étatique des prix de la farine, le vecteur énergétique;

- utiliser des technologies de production économes en ressources, améliorer la qualité des produits;

- construire des entrepôts de céréales modernes en Ukraine, qui permettront de stocker davantage de millions de tonnes de céréales;

- élargir l'assortiment de produits de boulangerie, notamment les produits contenant des remplisseurs et des ingrédients divers (épices, noix, tournesol, sésame, grains aplatis, oignons, raisins secs, abricots secs, etc.), en réglementant les prix du pain.

K. V. Litvinenko
Ukrainian State University of Science and Technologies (Dnipro)

INCOME INEQUALITY AND SOCIAL JUSTICE IN UKRAINE

Income is a very important means of expanding human capabilities. Hence the problem of social injustice and inequality. This problem is especially acute in Ukraine. More than half of our citizens have an income below the subsistence level, at the same time there is a group of people who have huge fortunes, own expensive property. The difficult socio-political situation in the country and the transformation processes that covered all spheres of public life led to the aggravation of a number of social problems. There is a high level of unemployment, a drop in real incomes of the population, a decrease in its purchasing power, there is an outflow of highly qualified personnel abroad. This thereby determines the search for solutions to these problems in order to ensure public welfare. That is why significant social inequality requires the study of the factors affecting it and the assessment of its current state. Own vision of the essence of issues of equality and social justice outlined in his writings Plato and Aristotle. Soon scientists A. Smith, D. Ricardo and others continued.

Income of the population is an important indicator of public welfare. Distinguish between cash and in-kind income. Monetary incomes of the population include wages, income from entrepreneurial activity. Natural income consists of the products of a personal subsidiary farm. A characteristic feature of all socio-economic systems is inequality in the income of the population, that is, their differentiation. A slight differentiation of income stimulates economic development, and its high level negatively affects

its pace. To measure income for different groups of the population, the Gini coefficient (index) is used. Range of values from 0 to 100%. The interval 33-35 indicates high, 29-31 - medium, 24-26 - low. In Ukraine, this ratio in 2020 was 25, 50. Whereas according to the State Statistics Service of Ukraine, the average salary as of 2023. in the Dnipropetrovsk region is 12 100 UAH, and in Kyiv - 19 000 UAH. An important indicator of economic inequality is the income of the population. In particular, sources of household income in Ukraine are: wages, pensions, scholarships, subsidies, etc.

To solve this problem, sociality must be concrete and expressed in the optimization of social structure. Despite all the obvious expediency in practice, the solution of the problems of socialization of the economy in Ukraine has always been carried out according to the residual principle. Therefore, in order to increase the role of population savings in the growth of the national economy, it is necessary to restore public confidence in banking institutions, which would allow transforming the financial resources of citizens into investments. Attracting these funds in the form of investments in the country's economy. It is also advisable to reorient the financial assets of the population, which are mainly on deposit accounts or are directed to lending to housing construction, insurance funds and the purchase of corporate securities.

U. V. Onyshchenko
Research supervisor: S. Y. Kasian, Candidate of Economic Sciences, Associate Professor
Language supervisor: N. I. Bilan, Candidate of Philological Sciences, Associate Professor
Dnipro University of Technology

INFLUENCER MARKETING AS A TOOL TO AMPLIFY THE SUCCESS OF B2B STARTUPS

In the fast-paced world of business-to-business (B2B) start-ups, the fusion of influencer marketing with the support of business accelerators and incubators emerges as a potent formula for unprecedented success. Unlike their business-to-consumer (B2C) counterparts, B2B start-ups operate within narrower market segments, where personal relationships, business accelerators, and influencer marketing converge to redefine the landscape.

B2B startups, while dealing with smaller market segments, allocate resources judiciously, emphasizing the significance of people, sales support, and advertising budgets measured in thousands rather than millions. These main aspects contribute to building an effective marketing strategy for B2B start-ups.

To amplify success, B2B start-ups participate in accelerator and incubator programs, which in turn provide support, mentoring, resources, and a platform for collaborative growth. Thanks to these programs, start-ups receive funding, which is the basis for the implementation of effective promotion of their business in social media, by virtue of external and internal influencers. In general, start-ups as incubator and accelerator participants view these programmes have a positive effect on their success.

The support provided by business accelerators and incubators further propels B2B startups by offering guidance, resources, and a platform for collaborative growth. Resource allocation, emphasizing people, sales support, and thoughtfully measured advertising budgets, underscores the strategic approach of B2B startups. In general, startups as incubator and accelerator participants view these programmes as having a positive effect on their success [1].

In the planning phase, B2B startups, guided by the support of accelerators and incubators, meticulously select influentials based on expertise and social presence. These influencers, recognized as community experts, become instrumental in providing credible referrals and endorsements, expanding the start-up’s brand reach.

Moreover, B2B startups can actively harness the power of their own workforce by encouraging employees to become internal influencers. B2B startups can reach many audiences through their employees, and internal influentials are likely to be interested in representing their employer in a positive light [2].

In order to successfully navigate the intricate landscape of influencers, it is imperative for a company to have a well-defined understanding of its business objectives. Depending on the specific

goals a company aims to achieve, engagement with different influencer groups may prove beneficial. The transformation of influence into a business strategy necessitates influencers to skilfully balance the fine line between expressing subjective opinions and maintaining credibility. Striking this delicate balance is crucial for influencers looking to establish trust with their audience while aligning with the strategic goals of the company they collaborate with. Moreover, it is noteworthy that authenticity remains a key element in influencer marketing. Audiences today are discerning and value genuine recommendations. Companies and influencers alike should prioritize authenticity in their collaborations to ensure that the partnership resonates with the audience on a deeper level. This can be achieved by selecting influencers whose values align with the company's ethos, fostering a more organic and impactful connection with the target audience.

In conclusion, the integration of influencer marketing with the support of business accelerators, incubators, and the active engagement of employees positions B2B startups on the path to triumph. This multifaceted strategy not only amplifies brand presence but also leverages the collective influence of internal and external influencers, creating a dynamic and sustainable approach to success in the competitive B2B landscape.

References:

1. Bone J., Gonzalez-Uribe J., Haley Ch., Lahr H. The impact of business accelerators and incubators in the UK. Department for Business, Energy & Industrial Strategy. 2019. URL: https://assets.publishing.service.gov.uk/media/5da6eb24e5274a5cae34c00c/The_impact_of_business_accelerators_and_incubators_in_the_UK.pdf#page21 (date of access: 03.10.2023).

2. Cartwright, S., Liu, H., Davies, I. A. Influencer marketing within business-to-business organisations. Industrial Marketing Managementю 2022. Vol.106, P.338–350. URL: https://doi.org/10.1016/j.indmarman.2022.09.007(date of access: 09.11.2023).

E.E. Suleymanova
Language supervisor: T.V. Zhukova, Senior Lecturer
Dmytro Motornyi Tavria State Agrotechnological University

HOW TO RUN A SUCCESSFUL AGRICULTURE BUSINESS

Running a successful agriculture business requires careful planning, effective management, and a deep understanding of the agricultural industry. Before you jump in take a few minutes to define your goals. This will help you refine your business concept. It is often helpful to think about your goals in terms of the 'triple bottom line': people, profit and planet.

The conditions for successful development of agricultural business are an important aspect for successful and prosperous activity in agriculture. These conditions include such factors as access to land resources, infrastructure, financing, modern technologies, risk management, and government support.

One should begin the journey towards agricultural success with a well-structured business plan. Define your goals, target market, and the specific crops or livestock you intend to produce. Extensive research is crucial to understand market demand, competition, and the unique challenges of your chosen agricultural sector.

The location of your farm is a fundamental factor in your success. Select land with suitable soil quality, favorable climate conditions, and reliable access to water resources. Conduct thorough soil tests to determine its compatibility with your chosen crops. Proximity to markets and distribution channels is equally critical for efficient operations.

Modern agriculture relies heavily on advanced equipment and technology. Invest wisely in the right machinery, irrigation systems, and tools to increase efficiency and productivity. Embrace digital solutions for farm management, crop monitoring, and data analysis to stay competitive and informed.

Proper management of crops or livestock is essential. Follow best practices for planting, cultivation, and animal care. Implement robust pest and disease control measures to safeguard your produce. Regularly monitor growth and health to detect and address issues early, ensuring a healthy and thriving operation.

Sustainability is not just a trend but a vital aspect of modern agriculture. Embrace practices such

as crop rotation, organic farming methods, and efficient water usage to minimize your environmental footprint. Sustainable agriculture not only benefits the planet but also contributes to long-term business viability.

Sound financial management is at the core of a successful agricultural business. Create a detailed budget, track expenses meticulously, and manage cash flow effectively. Consider seeking financial assistance or grants when necessary and diversify your income sources to reduce financial risks.

Effective marketing is essential for selling your agricultural products. Develop a strong brand identity and establish a robust online presence through a website and social media. Network with local markets, restaurants, and distributors to expand your customer base. Successful marketing can significantly impact your sales and profitability.

Agriculture is subject to various external factors, from unpredictable weather patterns to evolving market trends. Be adaptable and open to innovation. Stay updated with the latest agricultural research and technology to remain competitive and resilient in the face of change.

Navigate the complex web of regulations governing agriculture. Familiarize yourself with local, state, and federal laws, ensuring strict compliance with environmental, safety, and quality standards. Avoiding legal issues is crucial to maintaining a smooth and sustainable operation.

Agriculture is a dynamic field that constantly evolves. Keep learning and improving your skills. Attend workshops, seminars, and conferences. Join agricultural associations and networks to stay connected with industry experts and absorb their insights. Continuous education is key to staying ahead in the agricultural landscape.

Recognize that agriculture carries inherent risks, including weather variability, market volatility, and disease outbreaks. Develop a robust risk management strategy that includes insurance coverage and diversification to protect your business from unexpected setbacks.

Building a successful agricultural business is not a quick endeavor. Maintain a long-term vision, set achievable goals, and remain committed to your objectives. Celebrate small victories along the way, as they are the building blocks of your ultimate success.

In conclusion, running a successful agricultural business demands a holistic approach that encompasses meticulous planning, efficient operations, sustainability, financial acumen, marketing prowess, adaptability, compliance, continuous learning, risk management, and unwavering commitment to your long-term vision. By integrating these principles into your agricultural venture, you can not only survive but thrive in the challenging yet immensely rewarding world of agriculture.

D.Y. Yevtushenko
Language supervisor: T.V. Zhukova, Senior Lecturer
Dmytro Motornyi Tavria State Agrotechnological University

NEW PUBLIC MANAGEMENT

A possible problem statement for New Public Management (NPM) could be the following:

The public sector faces increasing demands and expectations of citizens who want services response faster, more efficient and more effective. However, traditional public administration models based on hierarchy, bureaucracy and regulation are often incapable of addressing these challenges. Failure to deliver high-quality public services can lead to citizen dissatisfaction, distrust and disengagement, as well as waste of resources and loss of competitiveness. Therefore, there is a need to reform the public sector by adopting the principles and practices of New Public Management, which aims to introduce market-oriented management strategies and methods to make public services are more customer focused, more profitable and more accountable.

New Public Management is an approach that focuses on applying private sector management principles and practices to improve the efficiency and effectiveness of public sector organizations. In simpler terms, it means using business-like techniques in government to make things work better.

The end of the 20th century marked the beginning of the new public administration. In 1991, British and Australian scientists Hood and Jackson proposed new public management. During their work in the field of public administration, they introduced a new public administration system, overcame the

shortcomings of the traditional public administration system, and improved efficiency.

The system solves many of the problems arising from globalization, world conflict, and changes in industry automation in the last decade of the 20th century. New Public Management is a hybrid of business approaches consisting of a variety of tools.

Differences between the Traditional Public Administration and New Public Management are the following:

Element of Difference	Traditional Public Management	New Public Management
Regulation	Centralized and single unit conditioning and servicing.	The structure of New Public Management is based on quasi-autonomous units that allow individuals to work
Administration profile	The administrative archives are inactive and focused solely on policy development.	The executive profile is open and fully focused on achieving goals.
Financial focus	The focus on financial and accounting is stable.	Financial priorities are effectively coordinated within the system.
Approach	Hierarchical approach is followed.	Anti-hierarchical approach is followed.
Structure	The structure of this public administration is competitive to the private organization.	It is a combination of public and private systems.
Roles of admin	An admin is bound to follow the policies and the structure of the rules.	An admin is focused to achieve the target and optimum output.

Table 1. Differences between the Traditional Public Administration and New Public Management

Some advantages of New Public Management are:

- NPM forces new technologies to get maximum output from functionality. This system is driving a technological revolution
- In the transportation sector, NPM systems accelerate the movement of materials in domestic and international markets by creating competition
- Compared with the traditional system, new public management focuses on customer satisfaction and serves customers first.
- NPM system is goal-oriented and improves goal achievement rate
- NPM systems provide individual freedom of action, thereby increasing effectiveness and efficiency

The introduction of a new public management system is to overcome the limitations of the traditional public management system and improve efficiency. Following are the benefits of New Public Management.

Principles of New Public Management should be noted:

- Reorganize bureaucracy into distinct agencies.
- Increase competition by introducing a quasi-market system and a contractual system.
- Reduce expenses and increase revenue.
- Transition to greater competition in the public sector.
- NPM focuses more on private sector management styles.
- Managerialism means changing the role of managers to managers.
- Increase flexibility and fluidity in organizational structures and working conditions.
- Pay more attention to consumption. For NPM, citizens are considered consumers.
- Ensure people's participation through the decentralization process.

In order to be able to compete with the private sector at national and international levels, New Public Management relies on modern management methods. This new public management approach is

listed below:

Technical approach: The new public management system enables management to be creative. It's about implementing new ideas to achieve your goals effectively

Optimistic approach: New Public Management promotes a flexible, respectful and problem-solving public management system

Anti-hierarchical approach: This system of public administration provides freedom to individuals and makes the system anti-hierarchy

To sum up, although New Public Management was created to protest against excessive bureaucratic power, it also involves the restriction of state power and the expansion of the market system. NPM is a new approach to public sector management that attempts to enhance the efficiency and transparency of public organizations. It borrows from private sector principles and practices, including customer satisfaction, competition, decentralization, management, and innovation. Many countries have recognized NPM as a viable solution to the problems of globalization, technological advancement, and financial limitations. However, NPM also has flaws and concerns, such as the loss of public values, the erosion of democracy, the increase of corruption, and the lack of evidence of its effectiveness. As a result, NPM should be employed with care and with a specific purpose and context in mind.

.

I.E. Zherdetsky
Language supervisor: L.V. Afanasieva Lecturer
Ukrainian State University of Science and Technologies (Dnipro)

THE FUTRE OF THE GLOBAL ECONOMY: ADDRESSING THE CHALLENGES OF THE 21st CENTURY

The global economy is facing a number of significant challenges in the 21st century, including income inequality, climate change, technological disruption, and geopolitical instability. These challenges are complex and interconnected, and there is no single solution to any of them. However, by taking action to address the root causes of these problems, we can create a more prosperous and equitable world.

Discussion:

Income inequality is one of the most pressing economic problems of our time. It is caused by a number of factors, including globalization, technological change, and tax policies that favor the wealthy. Income inequality can have a number of negative consequences, including social unrest, reduced economic growth, and declining social mobility.

One way to address income inequality is through progressive taxation. Progressive taxes impose a higher tax rate on higher incomes. This can help to reduce the gap between the rich and the poor. Another way to address income inequality is through minimum wages. Minimum wages ensure that all workers are paid a living wage, regardless of their occupation or employer.

Climate change is another major economic challenge of our time. Climate change is caused by the release of greenhouse gases into the atmosphere, which trap heat and warm the planet. Climate change is already having a negative impact on the global economy, in the form of more extreme weather events, rising sea levels, and crop failures.

One way to address climate change is through carbon pricing. Carbon pricing puts a price on carbon emissions, which incentivizes businesses and individuals to reduce their emissions. Another way to address climate change is to invest in renewable energy sources, such as solar and wind power. Renewable energy sources are clean and sustainable, and they can help to reduce our reliance on fossil fuels.

Technological disruption is another challenge facing the global economy. Technological disruption is caused by the rapid development and adoption of new technologies. While technological disruption can have a number of benefits, it can also lead to job displacement and economic inequality.

One way to address technological disruption is through education and training. By investing in education and training, we can help workers to develop the skills they need to succeed in the new economy. Another way to address technological disruption is through a social safety net. A social safety

net can help workers who are displaced by technological change to transition to new jobs.

Geopolitical instability is another challenge facing the global economy. Geopolitical instability can be caused by a number of factors, including wars, revolutions, and terrorism. Geopolitical instability can disrupt trade, investment, and economic growth.

One way to address geopolitical instability is through diplomacy. Diplomacy can help to prevent and resolve conflicts peacefully. Another way to address geopolitical instability is through international institutions, such as the United Nations. International institutions can provide a forum for countries to cooperate and resolve their differences peacefully. Finally, economic sanctions can be used to pressure countries to change their behavior.

Conclusion:

The global economy is facing a number of significant challenges in the 21st century. These challenges are complex and interconnected, and there is no single solution to any of them. However, by taking action to address the root causes of these problems, we can create a more prosperous and equitable world.

References:

1. https://www.weforum.org/reports/global-risks-report-2023
2. https://www.worldbank.org/en/publication/wdr2022
3. https://www.imf.org/en/Publications/WEO/Issues/2023/10/10/world-economic-outlook-october-2023
4. https://www.brookings.edu/projects/the-hamilton-project/
5. https://www.piie.com/

O. O. Zub
Research supervisor: T. V. Kuvaieva, PhD in Economics, Associate Professor
Language supervisor: N. I. Bilan, Candidate of Philological Sciences, Associate Professor
Dnipro University of Technology

THE ROLE OF ARTIFICIAL INTELLIGENCE IN MARKETING

Artificial intelligence (AI) is a branch of computer science that deals with the creation of systems, programs and computer models designed to perform tasks that typically require the intellectual abilities associated with humans. This field includes the development of algorithms, programs and technologies that allow computers to "think" and make decisions, as well as learn from data. In business today (and in marketing in particular), AI refers to software that helps us to carry out one particular job – such as identifying where to place advertising in order to maximize efficiency or how to personalize an email to increase the likelihood of receiving a reply – and get better and better [1].

In the realm of marketing, and across various fields, the demarcation between human decision-making and computer-driven processes is undergoing a transformation. Presently, artificial intelligence is increasingly integrated into operational marketing, such as the identification of risks and management of contact center responses. Moreover, it plays a role in marketing activities, encompassing customer analysis, targeting, the crafting of tailored advertising content to align with specific customer segments, and optimizing pricing strategies to maximize individual customer returns. Looking ahead, it is anticipated that AI will play a significant role in shaping strategic decisions, including the choice of business models, strategic directions, target markets, communication and distribution channels, pricing and competitive positioning strategies [2].

Here are some examples of the ways enterprises increase their use of AI to help them achieve marketing goals [3]:

1. Content creation: The utilization of AI for content generation offers the advantage of time and cost savings for marketing teams. This technology can produce various types of content, such as blogs, marketing messages, copywriting materials, emails, subject lines, video subtitles, website copy, and more, all tailored to a specific target audience.
2. Segmenting the audience: AI empowers businesses to smartly and effectively categorize their customer base based on various characteristics, interests, and behaviors. This segmentation leads to improved precision in targeting and more impactful marketing campaigns, ultimately resulting in increased customer engagement and a boost in return on investment (ROI).

3. Automated advertising: Programmatic advertising involves the automated buying and placement of advertisements on websites and applications. AI has substantially improved organizations' capacity to execute automated advertising by leveraging customer histories, preferences, and contextual information to deliver more pertinent ads, resulting in increased conversion rates.

4. E-commerce: AI is assisting enterprises in enhancing their e-commerce initiatives and digital marketing competencies by providing a more sophisticated insight into their customers' requirements and purchasing behavior, streamlining operations, and automating tasks.

The benefits of applying AI to strategic marketing decision-making include the following:

- Increased speed of decision-making, especially in response to new data being available or competitive threats emerging, allowing companies to capture the benefits of stronger market positions earlier;
- Identification of missing data;
- Increased rationality, particularly via removal or reduction of cognitive bias by decision makers;
- Creation of a common basis for decision-making;
- Incorporation of learning from experience;
- Higher quality management of marketing projects [2].

The use of AI also has many disadvantages and challenges that need to be addressed. These include:

- Cost: Developing and implementing AI systems can be an expensive process, especially for smaller businesses which might limit access to these technologies for smaller companies.
- Data and privacy: Collecting and analysing large amounts of data for AI can raise questions about the privacy and security of customer data.
- Lack of creativity: AI equates to algorithm-based tasks, so it may be limited in its creativity and ability to generate innovative marketing ideas.
- Dependence on technology: Examples of failed AI implementations can lead to a loss of customer trust and a negative impact on brand reputation.
- Errors in decision-making: AI can make mistakes in data analysis and decision-making, which can lead to incorrect marketing strategies.
- Lack of human contact: Using AI to interact with customers can lead to a sense of lack of personal contact and human warmth, which can be negative for some customers.
- Ethical issues: The use of AI in marketing may raise ethical issues, including the collection and use of user data and the impact on consumer behaviour.

Therefore, given all the advantages and disadvantages of AI, it is important to be careful and effectively implement this technology in marketing activities, maintaining a balance between innovation and ethical issues, as well as taking into account the specifics of your business and the needs of your customers.

References

1. Bernard Marr. Forbes. Artificial Intelligence And The Future Of Marketing. URL: https://www.forbes.com/sites/bernardmarr/2022/09/09/artificial-intelligence-and-the-future-of-marketing/?sh=509e1627697f (date of access: 09.11.2023)

2. Merlin Stone, Eleni Aravopoulou, Yuksel Ekinci, Geraint Evans, Matt Hobbs, Ashraf Labib, Paul Laughlin, Jon Machtynger and Liz Machtynger. The Bottom Line. Artificial intelligence (AI) in strategic marketing decision-making: a research agenda. URL: https://www.researchgate.net/publication/340826055_Artificial_intelligence_AI_in_strategic_marketing_decision-making_a_research_agenda (date of access: 09.11.2023)

3. Mesh Flinders. AI in marketing: How to leverage this powerful new technology for your next campaign. URL: https://www.ibm.com/blog/ai-in-marketing/ (date of access: 09.11.2023)

H. V. Bilokonenko
Language supervisor: L. V. Afanasieva, Lecturer
Ukrainian State University of Science and Technologies (Dnipro)

THE REALITY OF INFORMATION IN THE FUTURE WORLD WITH THE FURTHER DEVELOPMENT OF NEURAL NETWORKS

Every day, just using our phone, or finding any information on the Internet, we unnoticed by ourselves use a new and actively developing neural network technology that analyzes the time spent in a specific application on the phone and offers us a break from time to time, like, in the first case, or, analyzes search queries and offers correctly targeted advertising, which we are more likely to click on, in the second case. In addition, many of us are already actively using different types of neural networks, finding the necessary information or generating images, all this certainly makes our life easier, but has anyone ever thought about how their further development may affect the realism of our world in the future.

Already now, as a result of constant training with the help of neural networks, it is possible to create very realistic DeepFake videos, replacing faces in the video with various actors, singers and other famous personalities. In addition, today it has become possible to replace the voice of any person with any other, almost in real time, which already calls into question most of the information received on the Internet, because no one can be sure of the reality and veracity of certain statements. Already now, through the use of these tools, a huge number of fakes are generated, which are used both for the purposes of political propaganda, in order to create a certain mood among the masses of people and use it for their own purposes, and, for example, for the purpose of humiliation or extortion, creating untruthful compromising content with various high-ranking personalities. In addition, using the voices of various musical artists to replace and integrate them into other musical works is becoming popular.

Although the creators of such content may not pursue negative goals, this leads to copyright infringement and the impossibility of making a fair profit. The use of neural networks in these scenarios already violates many of the laws familiar to today's non-adapted legal system regarding copyright, the right to freedom, privacy, freedom of action and expression, violation of confidentiality, the spread of libel and obscene media materials, and also affects fraud, blackmail and extortion. Based on the information described, we can conclude that further leaving the situation to chance will lead to further chaos in the digital space, when it will be impossible to trust at least any information, because there will be a lot of lies and fakes around, which over time can flow from the virtual into our present reality. Therefore, we need to solve this problem today, before it is too late.

Fortunately, large technology companies and governments around the world are already considering possible solutions to the problem of regulating such content. For example, the European Commission proposed obliging popular Internet services to label content generated using neural networks; at the moment, the document that provides for such labeling has already been signed by Google, Microsoft and more than 40 other companies. Now they undertake to do such marking voluntarily, but in the future, with the development and approval of a special legal framework and relevant laws, such marking will become mandatory for them. Another example is the announcement and gradual integration of the ability to tag AI content in the social network “Tik-Tok”; at the first stage, users are invited to tag such videos themselves when downloading them, but in the future, it is planned to develop an automatic system that will be able to determine relevant content and issue the necessary mark.

Of course, all the steps taken towards identifying content created by neural networks are correct and important, but, in my opinion, they do not solve the main problem - the spread of fake and compromising information, since the most popular social networks that are already introducing this kind of marking. Such videos are distributed more secretly and in a niche manner, therefore, at the moment, it seems to me, the most correct option is to bring the creators of illegal AI content to real responsibility, as well as oblige the developers of services for its creation to introduce mandatory labeling when generating

any kind of similar media files.

Despite everything, the problem of integrating unreal content created by neural networks is currently becoming larger and larger every day, and let's hope that large companies and responsible departments in different countries will be able to develop the necessary tools in time to resolve it, before everything around turns into digital chaos of fakes.

K.Y. Botvynko
Language supervisor: S.Y. Buha, Lecturer
National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

OPERATING SYSTEM AS A CRITICAL TOOL FOR "COMPUTER SCIENCE" STUDENTS

Annotation. The importance of the Windows operating system in students' education is examined. With over 100 million computers equipped with this OS, it defines the primary environment for learning and skill development among students. The study and utilization of Windows represent a crucial stage in shaping information literacy, a prerequisite for successful adaptation to the demands of the modern information society.

Keywords: operating system, Windows, Microsoft, computer science, system software, educational environment, information literacy, skill development, modern information society.

The relevance of the chosen topic is underscored by the fact that almost all student learning activities in the field of Computer Science are conducted using the Windows operating system from Microsoft. With its widespread usage, the intuitive interface of Windows provides students with a comprehensive platform not only for acquiring fundamental computer skills but also for accessing and utilizing essential educational tools and programs. The versatility of Windows allows students to seamlessly download and install various software crucial for their academic endeavors, facilitating a dynamic and enriched learning environment.

The significance of mastering the Windows operating system becomes even more pronounced as it stands as a standard in numerous work environments and business systems. Proficiency in Windows becomes a prerequisite for the successful preparation of future engineers and programmers to meet the challenges of the modern information era. The study of the Windows operating system becomes a strategic investment in the future of students, enabling them not only to become users but true professionals in their field. This allows them not only to acquire basic skills but also to refine and enhance them by working on more complex tasks related to software development and solving intricate technical challenges.

Furthermore, knowledge of the Windows operating system becomes a crucial competitive advantage in the job market, particularly in today's information-driven environment where many companies and organizations rely on Windows as their primary operating system. Therefore, students with skills in Windows operation have greater opportunities for successful entry into the professional world.

Studying the Windows operating system is an essential component of the academic and professional preparation of Computer Science students, providing them with excellent tools to improve their skills, foster creativity, and achieve success in the contemporary information society. The widespread use of Windows in educational settings further enhances its importance, offering students a platform to seamlessly access and utilize essential programs for their learning journey.

Cinclusions. In this way, analyzing the importance of the Windows operating system in the education of computer science students, we see that it serves not only as a tool for learning fundamentals but also as a key component in developing highly specialized skills. Studying Windows represents a step towards forming a deep understanding of information technologies, programming, and other aspects of computer science. This becomes crucial for students aspiring to be not just users but true professionals in their field. Incorporating Windows into educational programs becomes a strategic investment in the future of students, preparing them for successful utilization of modern technologies in their professional endeavors.

Vladyslav Harbar
Supervisor: Vita Zhuravel, Lecturer
National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

THE IMPORTANCE OF INTERNATIONAL COORDINATION EVENTS TO IMPROVE INFORMATION SECURITY DUE TO THE CURRENT GEOPOLITICAL SITUATION

In modern democratic societies, scientific and technological progress is constantly accompanied by the transformation of state institutions aimed at ensuring the safety of citizens. Various aspects of modern life are regulated by norms and procedures aimed at protecting citizens, they are closely monitored by government agencies. For example, the development of transportation has led to the establishment of traffic rules and the creation of traffic police, the development of firearms has been accompanied by the improvement of regulations regarding their acquisition and storage, and medical progress has required the introduction of prescriptions for the purchase of medications, and so on. These norms and procedures may vary significantly in different countries, but the processes of globalization are leading to their standardization.

However, it is important to note that the development of relevant rules and procedures has always lagged behind technological changes that trigger them. This delay negatively affects the safety of citizens in times when such norms do not yet exist. Therefore, the current priority for state institutions is to respond promptly to such challenges and to promptly implement the necessary regulatory measures to ensure the safety of the population in a rapidly changing technological environment.

It is also not a secret to anyone that information security plays a crucial role in the national security of countries in the modern world. This is due to the possibility of leakage of various data that there can be a negative impact on the country, including classified information. However, these are not the only issues when considering this matter from a geopolitical perspective. Such information can assist the activities of various terrorist groups and unfriendly countries aimed at undermining the country and its governance.

To protect and develop this area of security, specialized units and services have been established in various countries. For example, in Ukraine, this responsibility falls under the State Service of Special Communications and Information Protection of Ukraine (SSSCIP Ukraine), in the United Kingdom, it's the Government Communications Headquarters (GCHQ), in the United States, it's the National Security Agency (NSA), and in Germany, it's the Bundesamt für Sicherheit in der Informationstechnik (BSI). These organizations have multifaceted roles and work in various aspects of this issue, such as government communications, information protection, and more.

Taking into account the current geopolitical situation, the existence of blocks and alliances, such as NATO, for example, makes an essential part of the modern world. Interaction among them for their own security becomes an urgent part of international politics. It also involves countering disinformation and interference in domestic policies. For instance, there have been numerous cases when a user complaining from Ukraine regarding the spread of disinformation about the war with Russia were reported to the administration of Facebook, located in Russia, or to Facebook employees who are Russian citizens. Similarly, the spread of disinformation was vividly demonstrated during the elections in the United States. This is why cooperation and coordination efforts to improve information security are so necessary in the modern world.

V.V. Honcharenko
Language supervisor: O.M. Suprun, Senior Lecturer
Dmytro Motornyi Tavria State Agrotechnological University

DIGITAL TRANSFORMATION: NAVIGATING THE CHALLENGES AND OPPORTUNITIES OF INFORMATION TECHNOLOGY

In the modern world, technological progress has become not just a marker of development, but a key factor that defines the future of humanity. Moreover, these technologies are advancing at an incredible speed and in such a way that technology development itself accelerates and magnifies the

process of progress, with the rate of development increasing in geometric progression [1].

Artificial intelligence (AI) and machine learning play a crucial role in the modern world of technology. They are capable of processing vast amounts of data, making accurate forecasts, and automating routine tasks. AI finds applications in various fields, from healthcare, where it aids in disease diagnosis, to the financial sector, where it automates processes and ensures transaction security. Incredibly, in our time, artificial intelligence brings significant benefits and has substantial potential for further development and expansion of its application areas [3].

The Internet of Things (IoT) transforms ordinary objects into "smart" ones capable of collecting data and interacting with other devices. This technology opens up vast possibilities for creating smart homes cities, and optimizing industrial processes.

Blockchain is not only the foundation of cryptocurrencies but also a technology that ensures data security, transparency, and immutability. This opens up new horizons for creating secure voting systems, managing digital identities, and optimizing supply chains.

With the development of digital technologies, cybersecurity has become increasingly important. In today's information society, personal data has acquired particular significance as an independent social value and an object of legal regulation. Therefore, developing new methods to protect data and systems from cyberattacks is a crucial aspect of ensuring security in the digital world [2].

Information technologies (IT) in the modern world play not just the role of tools but also act as catalysts for fundamental changes in all aspects of human life. They have become the foundation for the development of new approaches in business, education, medicine, and many other sectors. This relentless digital revolution is transforming data into a valuable resource that can be analysed and utilized to improve productivity, innovation, and individual experience. The implementation of IT solutions, such as cloud technologies, big data, artificial intelligence, and machine learning, opens up new possibilities for more efficient and intuitive interaction with technologies, bringing us closer to an era of complete digital integration.

On the other hand, information technologies also pose new challenges for society, particularly in terms of privacy, data security, and ethics. The importance of cybersecurity is growing in proportion to society's dependence on digital systems. This requires the development of new standards and protocols to protect personal and corporate data. Moreover, the IT sector faces challenges of inequality in access to technologies, leading to a digital divide between different regions and social groups. Thus, information technologies not only open up new opportunities but also demand a responsible and ethical approach to their use and dissemination.

Modern technologies not only transform our present but also shape our future, opening up new possibilities and addressing global challenges. Their role in the contemporary world is undeniable, and this is only the beginning of their impact on various aspects of our lives.

References:

1. Барський М. В. Цифрові технології в логістиці. *Економіка країни і регіонів в умовах воєнного стану та аспекти повоєнного відновлення.* 2023. URL: https://doi.org/10.36059/978-966-397-297-8-30

2. Пашинський В. Й., Цьоменко А. В. Забезпечення захисту персональних даних громадян у контексті використання програм «штучного інтелекту». *Права людини та публічне врядування в сучасних умовах.* 2023. URL: https://doi.org/10.36059/978-966-397-314-2-62

3. Пчелянський Д. П., Воінова С. А. Штучний інтелект: перспективи та тенденції розвитку. *Automation of technological and business processes.* 2019. Т. 11, № 3. С. 59–64. URL: https://doi.org/10.15673/atbp.v11i3.1500

B. V. Isak

Research supervisor: S.D.Prikhodchenko, Candidate of Technical Sciences, Associate Professor

Language supervisor: N. I. Bilan, Candidate of Philological Sciences, Associate Professor

Dnipro University of Technology

HOW AI HELPS HUMANITY

The world has already seen the revolutionary power of artificial intelligence (AI), which is regarded to

be one of the most significant advances in human history. It should come as no surprise that some of the most advanced solutions we use on a daily basis are driven by AI-based breakthroughs.

With the help of artificial intelligence (AI), communities, governments, and organisations can now create a high-functioning ecosystem that benefits everyone on the planet. Some of the most important problems that the modern society faces are being resolved as a result of its enormous influence on human lives. These are a few social cause developments that I think are particularly noteworthy.

Artificial intelligence (AI) has several potential disruptive uses in the healthcare sector, including the discovery and development of new medications. By drawing on a vast amount of data, artificial intelligence and machine learning have been able to find various possible compounds.

A major crime against humanity and a danger to international security is human trafficking. The internet is a common tool used by traffickers to entice victims with adverts. Artificial intelligence techniques and computer vision algorithms identify things in photos to seek and examine dubious adverts. They also harvest images from various websites that traffickers utilise.

The renewable energy business has seen tremendous transformation thanks to the collaborative efforts of artificial intelligence, cloud computing, big data analytics, and the Internet of Things (IoT). Weather data and sensor data can be combined by AI programmes to optimise, forecast, and manage energy consumption in many industries.

While adoption of AI technologies is becoming more widespread, challenges remain. I consider that some of the main challenges faced by associations developing AI products for the public good include fear of threats; determining how to measure the value the outcome will bring; a lack of understanding of AI; the high cost of the technology; and ventures that lack oversight, ethics, and security. However, associations and institutions can overcome these by investing in advanced research, capital and structure, and encouraging the dissemination of knowledge about AI in society.

Associations that plan to invest in advanced AI research or implement AI for the public good should painstakingly team up with research institutions and government agencies to apply their research findings to the real-world needs. In addition, marketplaces and forums are stylish platforms where associations can gather the information they need.

Independent-living individuals with disabilities have also benefited from artificial intelligence. One of the biggest advancements in AI is voice-assisted technology, especially for persons with vision impairment or low vision. It facilitates their use of smart gadgets for communication and allows them to enjoy the visual beauty of the world.

Artificial intelligence has tremendous potential to serve society by bringing further radical inventions for humans in the future. Its problem-solving capabilities can help people and communities around the world cope with today's most complex challenges. However, we will continue to see a wide range of operations and new developments for the public good if we use them wisely.

References:

1. Artificial Intelligence For Good: How AI Is Helping Humanity, Forbes. URL: (https://www.forbes.com/sites/forbesbusinesscouncil/2021/02/09/artificial-intelligence-for-good-how-ai-is-helping-humanity/?sh=20aa89da3366**)** (date of access: 12. 09. 2023).

2. Artificial Intelligence and the Future of Humans, Pew Research Center. URL: (https://www.pewresearch.org/internet/2018/12/10/artificial-intelligence-and-the-future-of-humans/) (date of access: 25. 08. 2023).

A.V. Khaustov

Language supervisor: Muntian A. O., Candidate of Philological Sciences, Associate professor

Ukrainian State University of Science and Technologies (Dnipro)

INFORMATION TECHNOLOGY IN FUTURE

1. Advances in Artificial Intelligence (AI) & Machine Learning (ML). Information technology moves forward in many ways, but there are a few defining factors that can easily change the way in which the entire industry is viewed. In an information technology school, you will quickly learn that security is one

of the biggest challenges that the industry will be facing in the years to come. While upgrades to infrastructure and software are always a good thing, improper security is something that can have a negative impact on connectivity.

If users cannot connect due to outside interference, then we will see many frustrated and dissatisfied customers. The risks to networks today are much greater than they were in the past. With the advent of tablets, laptops, and phones, network access points are now more mobile than ever. This means network vulnerabilities can occur almost anywhere, at almost any time. The real issue with security, however, will surprise you.

Outside Threats are Still a Problem. While inside threats are certainly a looming problem, there are also threats from the outside to consider. Malicious tools are constantly being employed by individuals to steal money, obtain information, and defeat the security that protects sensitive systems. Hackers could maliciously use this information for many different reasons. For example, a disgruntled employee may wish to blackmail a boss or even one of the organization's executive officers.

Metaverse. We may have only started hearing of the "metaverse" a few months ago, but it's a quickly evolving space that is already promising to change how we work, live and play. The metaverse is a blanket term that is used to refer to the integration of Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR) into our daily lives, with early adopters claiming that it will change some industries fundamentally.

Robotics engineer. As technology continues to evolve at a rapid pace, robotics engineers are having to constantly analyse, reevaluate, configure, test and maintain the prototypes, robotic components, integrated softwares and machines they create for the manufacturing, mining and automotive service industries, among others. It is a highly technical job which requires patience and rational thinking.

Over the next few years, it's likely that we'll see a number of new and innovative ways in which modern technologies help society and business function – particularly in healthcare.

Advances in Artificial Intelligence (Al) & Machine Learning (ML). In today's world, AI and ML are already in use to automate routine tasks and improve decision-making processes. By 2025, you can expect to see significant integration of AI and ML into various industries.

Like, Grand View Research predicts that the healthcare industry will be one of the fastest-growing sectors in terms of AI adoption. With a CAGR of 44.9% from 2021 to 2028.

Here's how these technologies may be integrated into healthcare, finance, and education:

1) Healthcare: AI and ML are expected to analyze vast amounts of data for more accurate diagnosis and treatment. For example, AI algorithms may detect early signs of cancer, allowing doctors to start treatment before it progresses.

2) Finance: By analyzing large amounts of financial data, AI can identify fraudulent transactions and push alerts in real time. While ML can be used to assess creditworthiness more accurately, leading to better lending decisions.

3) Education: Technology can personalize learning experiences for students. AI algorithms will analyze student data to identify areas of struggle for targeted support. And ML can develop adaptive learning platforms, adjustable to a student's learning style.

Cybersecurity. As we approach 2025, the need for robust cybersecurity measures has never been more critical. In today's hyper-connected world, the consequences of a cyber attack can be catastrophic! from compromised personal data to stolen financial information.

But with the ever-increasing number of internet-connected devices, the stakes are even higher. According to a report by Cybersecurity Ventures, cybersecurity investments already reached USD 1 trillion between 2017 and 2021.

The Internet of Things (IoT). IoT refers to physical devices, appliances, and vehicles embedded with sensors, software, and connectivity. The impact of IoT on the world is significant and is expected to grow by 2025. And IoT devices will integrate even more into our daily lives as their numbers grow.

Also, Statista predicts that the number of IoT devices installed worldwide will reach 75.44 billion by 2025.

Literature:

1. *What Does the Future of Information Technology Look like?* ***URL:*** https://iticollege.edu/blog/future-of-information-technology/

2. Future Of IT: What the Information Technology (IT) Industry will look like in 2025?***URL:*** https://www.linkedin.com/pulse/future-what-information-technology-industry-look-like-2025/
3. *Future of Information Technology* ***URL:*** https://www.linkedin.com/pulse/what-does-future-information-technology-look-like-techplay-1c/

L.V. Khodaba
Language supervisor: T.V. Zhukova, Senior Lecturer
Dmytro Motornyi Tavria State Agrotechnological University

THE IMPACT OF ARTIFICIAL INTELLIGENCE AND BLOCKCHAIN ON THE ECONOMY:TRANSFORMING INDUSTRIES AND EMPOWERING SOCIETIES

How exactly does artificial intelligence impact the economy? The AI enchances various aspects of the economic system, the main ones being:

Automation and Workforce Transformation: AI-driven automation streamlines industrial processes, reducing operational costs and increasing productivity. However, concerns about job displacement also arise. Despite these concerns, AI opens new avenues for employment, creating jobs related to AI development, maintenance and oversight.

Data Analysis and Personalization: AI algorithms analyze vast datasets, providing valuable insights for businesses. This data-driven decision-making enhances customer experiences and tailors services, thereby boosting customer satisfaction and loyalty.

Innovation and Research: AI facilitates rapid research and development in various sectors. It accelerates innovation by automating experiments, simulations and data analysis, leading to breakthroughs in fields like materials science and environmental studies.

Blockchain is a decentralized and distributed digital ledger technology. It provides a secure and transparent way of recording transactions, ensuring immutability and integrity. Blockchain technology has gained prominence due to its applications in creating digital currencies (like Bitcoin and Ethereum) and its potential in revolutionizing supply chain management, healthcare, voting systems and more. Its decentralized nature eliminates the need for intermediaries, reducing costs and increasing efficiency.

Let`s take a walkthrough of industries that have been revolutionized by this technology and their impact received:

Enhanced Security and Trust: Blockchain`s decentralized and cryptographic features ensure the security and integrity of transactions. This fosters trust among users, businesses and governments, reducing the risk of fraud and ensuring transparent financial transactions.

Supply Chain Management: Blockchain technology enables end-to-end visibility in supply chains. Businesses can trace the production, shipment and delivery of products in real time. This transparency minimizes errors, reduces delays and ensures the authenticity of products.

Smart Contracts: Blockchain facilitates the creation of smart contracts – self-executing contracts with predefined rules. These contracts automate processes, eliminating the need for intermediaries, reducing costs and ensuring the transparent and efficient execution of agreements.

Financial Inclusion: Blockchain technology allows seamless and secure cross-border transactions, providing financial services to the unbanked and underbanked populations. This inclusion fosters economic growth and reduces poverty by providing access to global markets.

Blockchain technology is proving to be the powerhouse of the Artificial Intelligence world. The technology, through its merger with AI, is introducing a set of opportunities that can enhance the overall experience. The impact of synergy of AI and Blockchain on the economy.

Authenticated Access: Blockchain is helping AI-powered apps and platforms in getting authenticated access to data stored and managed by other entities and that too without involving intermediaries. This is eventually making it possible to deliver a personalized, accurate, secure and faster customer experience.

Decentralized AI Platforms: Integrating AI with Blockchain creates decentralized AI platforms. These platforms ensure the privacy and security of data used for AI training while allowing individuals to monetize their data. This empowerment of individuals enhances economic participation and fosters innovation.

Tokenization of Assets: Blockchain enables the tokenization of physical and digital assets. When combined with AI-driven predictive analysis, it allows for the efficient trading of these assets in global markets. This democratization of asset trading enhances liquidity and broadens investment opportunities.
Enhanced Cybersecurity: AI enhances blockchain security by predicting and preventing cyberattacks. Machine learning algorithms analyze patterns to detect vulnerabilities and potential threats in real time, ensuring the integrity of Blockchain networks. This heightened cybersecurity instills confidence in businesses and consumers, encouraging widespread adoption of Blockchain technology.

Efficient Supply Chains: The integration of AI and blockchain optimizes supply chain management. AI algorithms analyze supply chain data, predicting demand fluctuations and optimizing inventory levels. This predictive analysis, combined with Blockchain`s transparency, minimizes waste, reduces costs and ensures the timely delivery of products.

Artificial intelligence and blockchain have come a long way since their inception, with advancements in technology making it more accessible and widespread in our daily lives. However, their integration in today`s world has both advantages (figure 1) and disadvantages (figure 2) that we need to consider.

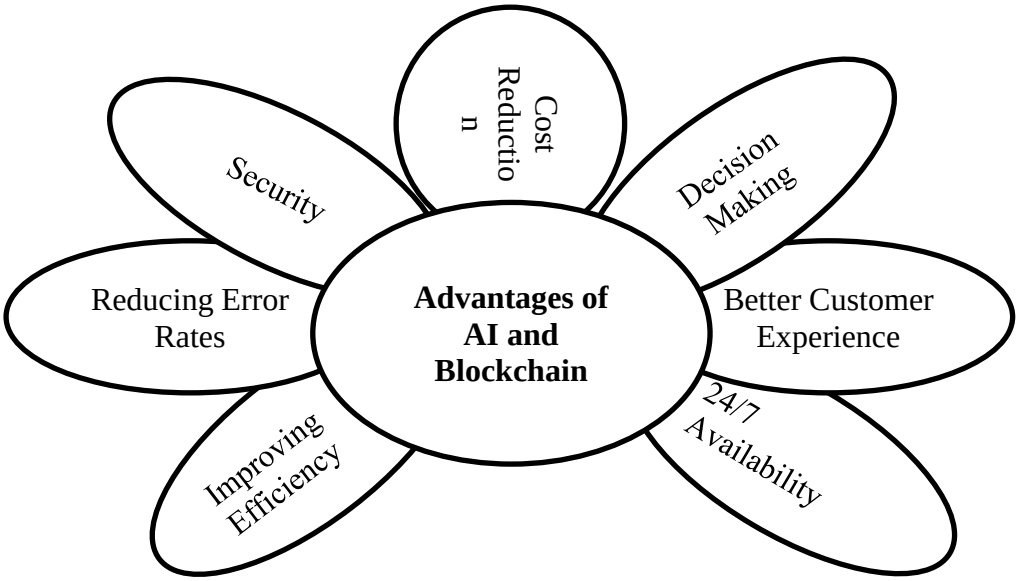

Figure 1. Advantages of AI and Blockchain

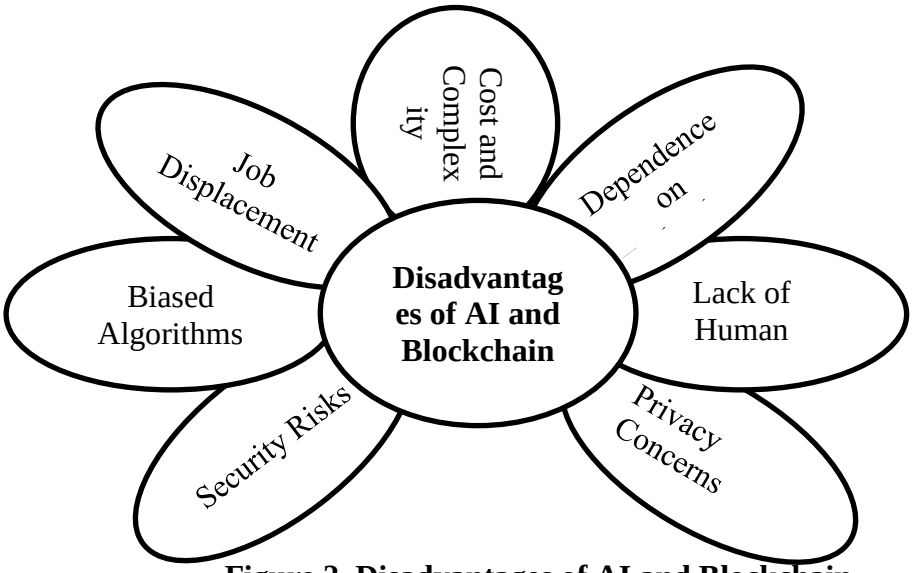

Figure 2. Disadvantages of AI and Blockchain

To sum up, artificial intelligence and blockchain have both advantages and disadvantages that we need consider as they become more prevalent in our daily lives. Their individual impacts are transformative, but it is their synergy that holds the key to unlocking unparalleled economic growth, innovation and inclusivity. As businesses and governments continue to explore and invest in these technologies, the collaborative potential of AI and blockchain will reshape industries, empower societies and drive the world into a future where economic possibilities are boundless.

Ye. A. Koval
Language supervisor: I. H. Miroshnychenko, Candidate of Philological Sciences
Ukrainian State University of Science and Technologies (Dnipro)

ANALYSIS OF CUSTOMER DATA USING DATA MINING

Lately, due to the increasing adoption of Customer Relationship Management (CRM) systems, many companies have shown interest in uncovering patterns within databases containing customer information. To achieve this objective, companies are implementing systems that utilize Data Mining methods, aimed at processing and interpreting data to identify current trends and develop optimal strategies. The initial step in addressing such challenges involves establishing a system to collect all available information from diverse sources (such as ERP, CRM, emails, Excel files, etc.) across the entire company, including its branches. This information needs to undergo verification for completeness and consistency, be standardized into a user-friendly format, and offer sufficient detail for informed decision-making.

The subsequent phase in implementing a comprehensive analytical system entails the incorporation of Data Mining methods. These methods are designed to discover previously unknown and non-trivial patterns within the collected company data. Acquiring such insights is intended to confer a competitive advantage by providing a deeper understanding of processes, trends, and risks in business operations.

The efficacy of customer relationship management hinges on data analysis activities that can unveil new business opportunities and timely alert about unfavorable trends in customer relations. The integration of Data Mining in CRM aims to elucidate the acquisition of new customers and enhance the retention and improvement of relationships with existing ones.

Data analysis methods range from simple tasks like determining when and where to contact customers to applying intricate algorithms for predicting customer behavior and optimizing marketing strategies. Segmentation and clustering are widely employed to group customers based on similar characteristics and identify patterns for shaping marketing initiatives.

Basic segmentation involves grouping customers based on easily visible and independent characteristics, such as demographic data, age, gender, and income. Clustering is employed to describe independent sub-segments based on pre-selected characteristics, including key consumer behavior indicators. Large companies often overlay geographical, demographic, social, and economic characteristics to optimize brand promotion.

Analyzing intersecting segments requires more advanced methods and involves considering consumption patterns of customers. For instance, a customer may spend significantly on one service but nothing on related services and goods. Descriptive analysis includes examining market baskets, linking products based on common purchase patterns, and analyzing action sequences, such as orders or clicks on a website.

By combining a customer information collection system, analytical reporting systems, and systems for identifying patterns in data, companies can gain a better understanding of their client base and foster more efficient relationships with customers.

The ultimate goal is to gain a competitive advantage by understanding customer behaviour, optimizing marketing strategies, and building more efficient relationships with clients. Various data analysis methods, including segmentation, clustering, and descriptive analysis, are highlighted as essential tools in achieving these objectives. The integration of these approaches allows companies to

better understand their client base and improve their overall relationship management processes.

B. T. Kushnir
Language supervisor: Antonina Muntian, Candidate of Philological Sciences, Associate Professor,
Ukrainian State University of Science and Technologies (Dnipro)

THE IMPORTANCE OF INTRODUCING FREE SOFTWARE IN THE EDUCATIONAL PROCESS OF UNIVERSITY STUDENTS

For education to be successful in transforming our global community, it must be accessible. And that is exactly what open source technologies bring to the world of learning. By definition, open source software has freely available code that can be distributed and modified without restriction. Unlike closed-source software, which does not share its code and requires a license, open-source software removes one of the most pressing barriers to education around the world: cost.

The main advantages of open source software are:

- cost;
- flexibility and adaptability;
- support;
- ability to innovate.

At the forefront of the open source education space has been Moodle™, which since its inception in 2002 has helped revolutionize the education space by providing teachers with a free tool to support learning in various forms. As of 2021, nearly 260 million users across more than 180,000 registered Moodle™ sites worldwide rely on the platform to drive their initiatives. This is exponentially more users and institutions than any other platform uses. For many, this would not be possible if it were not open source.

Open source software is flexible and adaptable at the institutional level. The open source community is a place to share innovations. Sharing, encouraging adoption and further contribution helps to ensure that the institution does not incur future costs just to support innovation.

Open source software offers additional flexibility. It can be maintained in-house, with the added resource of an active community of problem solvers. It can be supported by commercial integration specialists or hosting providers. The fact that open source provides full transparency is an important guarantee of open standards. This greatly facilitates integration efforts and makes it easier to move between systems when needed.

A 2018 survey of Fortune 2000 companies found that:

- 93% of companies use open source for non-profit or internal reasons;
- 79% use open source for commercial reasons;
- 69% distribute the code;
- 60% have created their own open source projects.

Therefore, the introduction of free software is a very important aspect for the development of Ukraine, especially education in higher education institutions.

I. O. Kryvonos
Research and language supervisor: I. A. Kryvonos, Senior Lecturer
Dmytro Motornyi Tavria State Agrotechnological University

ARTIFICIAL INTELLIGENCE IN EDUCATION: OPPORTUNITIES AND CHALLENGES

In today's world, it is customary to save your time, so people are used to looking for the easiest and fastest ways to complete tasks. In the age of digitalisation, it is always easier to ask someone online on forums than to search for specialists in the city. However, this is not the best option either, because forums and support services are object-oriented and cannot answer something that does not correspond to their specialty. What if there was something that could give you an idea, explain a statement, or complete a task for you? Not so long ago, the world was shaken by such a phenomenon as artificial intelligence (AI), which allows the user to write anything and receive a response in seconds. But the

question arises: is artificial intelligence in education a smart assistant or a tool for lazy people?

ChatGPT and Bard are the most famous and ones of the most functional applications [1]. These two applications work on the same principle - correspondence with a computer. The user has to ask a question or a task, and after sending it, AI will process your question and, based on its knowledge, namely using a large number of libraries and websites, which are very different from ordinary browser searches, give you a detailed answer. The task of Bots is to provide the most appropriate answers, advice, and solutions. If you write a lot of text in your query, browser search will provide links based on keywords, which leads to a loss of accuracy. AI, on the contrary, will provide the most correct answer if you write as many clarifying phrases, rules, restrictions, methods, etc. as possible in the query. Also, one of the most convenient functions of AI is to analyse a large text and process it into a concise and simple version, which helps to save time and not lose your mind when processing some material.

For part-time students, AI can become a new teacher. Given their absence from lectures, it is sometimes difficult to understand how to complete practical tasks without the lecturer's help. It will be inconvenient for the teacher to work with students during the time outside of classes, to retell the material, so you can ask questions to the computer in the chat room at any time, receiving a quick and clear answer.

Given its comprehensiveness and extensive functionality, users can use AI for unethical purposes. Yes, you may encounter a small part of a task that you do not understand and ask the computer for help, but no one is stopping you from making AI complete the entire task. This is already a problem and prevents people from processing information on their own and testing themselves and their knowledge. At the same time, there are almost no people who mention the use of AI functions in their work. This fact makes it difficult to evaluate robots objectively, because sometimes it is impossible to distinguish between human and computer work.

Another disadvantage of the AI is that the answers are not 100% correct, because most of the answers to questions are taken, but there is no guarantee that all of them are correct. It is also possible that there is only one public opinion and many variations of it, while the truth may be different, and there is little material. You should always check information and think for yourself.

To summarise, AI is a useful tool that allows you to quickly and at any time get an answer to a given query, but it does not guarantee accuracy and may not be able to complete tasks completely, which can be a problem both for your own learning and for using this material elsewhere.

References:

1. Іван Примаченко Штучний інтелект в освіті: можливості, виклики та перші кроки великої адаптації: website. URL: https://life.pravda.com.ua/columns/2023/08/4/255650/ (Last accessed 09.11.2023)

R.E. Kukovskiy
Language supervisor: L.V. Afanasieva Lecturer
Ukrainian State University of Science and Technologies (Dnipro)

INFORMATION TECHNOLOGY

Information technology (IT) has become an integral part of the modern world and is changing almost every aspect of our lives. This report analyzes and assesses the impact of information technology on society, business, and education. Information technologies help us to connect and share information from all over the world, thereby reducing geographical barriers and making the world more global.

This expands business opportunities in international trade and cooperation, facilitates the development of global enterprises and creates new markets. Thanks to IT, companies can collect, analyze and use data to make strategic decisions. The Internet allows companies to sell goods and services online, expanding the market and reaching new customers. Cloud services provide access to computing resources without having to invest in their own infrastructure. But at the same time, the growth of data and its processing raises serious cybersecurity issues.

Criminals use IT to attack businesses and government systems, resulting in the loss of confidential information and financial losses. Therefore, cybersecurity is becoming an increasingly important

component of information technology. Information technology has also revolutionized the education sector. They make learning more accessible and interactive. Electronic platforms and open access to knowledge facilitate self-learning and the development of new skills, such as:

1.Information literacy: The use of computers and the Internet increases students' information literacy, which is essential in a digital society.

2.Critical thinking and problem solving: In interactive learning environments, students learn to analyze and critically evaluate information.

3.Communication skills: Interacting with teachers and peers through electronic means helps develop communication skills.

Innovations in artificial intelligence are expanding the use of data and automating many processes. Artificial intelligence is used in medicine for diagnosis and treatment, in transportation for the development of autonomous vehicles, and in many other areas.

In conclusion, I would like to add that information technology has a huge impact on the modern world. They open up new opportunities, while at the same time creating challenges related to cybersecurity and ethical issues. To use information technology in the most effective way, companies must constantly analyze and evaluate its impact, develop cybersecurity strategies, and work to develop the regulatory environment.

References:

1. https://edtechmagazine.com/
2. https://cyberscoop.com/
3. https://www.zdnet.com/
4. https://www.eschoolnews.com/
5. https://www.darkreading.com/

O. I. Letuchyi
Language supervisor: A. O. Muntian
Ukrainian State University of Science and Technologies (Dnipro)

DIGITAL TWIN. PART OF INDUSTRIAL REVOLUTION 4.0

The Fourth Industrial Revolution (Industry 4.0) has brought about unprecedented technological advancements, transforming the global industrial landscape. One of the pivotal technologies driving this transformation is the concept of the digital twin. A digital twin refers to a virtual representation or a digital replica of a physical object, process, system, or entity. The main idea lies in the monitoring, analysis, and simulation of the physical counterpart in a digital environment, thereby allowing for the understanding of its behaviour, performance, and potential changes over time. Digital twins find applications across various industries and sectors, including manufacturing, healthcare, urban planning, aerospace, and more. By leveraging the power of digital twins, businesses can make data-driven decisions, enhance productivity, and drive innovation.

However, today the digital twin has disadvantages.

The cost of developing high fidelity simulations of complex systems is exceptionally high and has typically been reserved for only a few well-resourced industries that have been able to justify the expense (petrochemical, aerospace etc.).

There is a significant mismatch in the life cycle of a typical engineered asset (building, ship, factory etc.) and the software systems that would be used to manage the virtual components of the Digital Twin. The absence of standardized protocols and frameworks for developing and deploying digital twins can lead to inconsistencies in data representation and hinder interoperability between different platforms and systems. A lack of industry-wide standards may also limit the scalability and widespread adoption of digital twin technology.

Storing and managing large volumes of real-time data for digital twins can raise significant concerns about data security and privacy. Vulnerabilities in data transmission, storage, or access can compromise sensitive information, leading to potential breaches and cyber threats.

The successful implementation and utilization of digital twins require a skilled workforce with expertise in data analytics, simulation, and domain-specific knowledge. The shortage of professionals

with the necessary skills and expertise can present a significant barrier to the widespread adoption and effective use of digital twin technology.

Despite these problems, the use and development of digital twin is increasing as it becomes more affordable with technology growth. It is inevitable that this concept will be further developed to suit the needs of large technology companies.

D. V. Monakhov
National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

THE CONCEPT OF VIRTUAL PRIVATE NETWORKS

Virtual Private Networks, or VPNs, have become an essential part of the modern internet landscape, where heightened attention is devoted to safeguarding confidentiality and securing remote connections. We will explore the concept of VPNs and their role in contemporary information society. We will delve into how VPNs function, the principles underlying their operation, and the benefits they provide to both users and organizations. Additionally, we will investigate various types of VPNs and their applications in various domains, including business, education, and personal use. We will dissect the importance and functionality of virtual private networks and their impact on modern information security and communication.

The aim of this research is to elucidate the concept of Virtual Private Networks (VPNs) and understand their significance in modern information society. The primary objectives of the research are as follows: Investigate the fundamental principles of how Virtual Private Networks operate and their technical aspects, analyze well-known encryption and security methods used in VPNs and their impact on data confidentiality, examine the various applications of VPNs in different sectors, including business, education, and personal use, and determine their advantages, evaluate the influence of Virtual Private Networks on contemporary information security and their role in ensuring the confidentiality and reliability of communications, study trends in the development and utilization of VPNs to comprehend their future relevance in the information society.

Conclusion. Virtual Private Networks (VPNs) are a crucial component of the modern information environment that contributes to safeguarding confidentiality and the security of remote connections, VPNs enable the creation of secure and encrypted connections between users and networks, providing a vital tool for data protection, an important aspect of VPNs is their impact on privacy protection, especially in the online realm where personal data is becoming increasingly vulnerable, VPNs are utilized in various domains, including business (to secure corporate data and remote work sessions), education (for secure access to educational resources), and personal use (to ensure anonymity and access restricted content), it's essential to emphasize that not all VPNs are equally effective, and the choice of the right provider and configurations plays a pivotal role in ensuring VPN security and functionality.

It is crucial to underscore the importance of using VPNs to ensure security and privacy protection in the modern world, where internet connectivity is becoming increasingly vital and risky.

V. S. Nahornyi
National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

ANALYSIS OF ATTACKS ON CLOUD SERVICES

In the current information landscape, next-generation data centers blur the boundaries between physical and virtual environments, as well as between public and private clouds. This expansion of capabilities leads to a new level of complexity in the realm of information security within the context of cloud computing. Ensuring physical security becomes fundamental, characterized by rigorous control over physical access to servers and network infrastructure.

One of the main types of attacks is the use of malicious software, which includes various types of

viruses, Trojans and ransomware. The purpose of such attacks is to gain unauthorized access to data, distribute malicious code and compromise confidential information.

In addition, attacks on data include compromising confidential information and attacks on cloud databases. Attackers try to penetrate or bypass security systems to gain access to confidential information or change it, which can have serious consequences for users and service providers.

Social engineering is also an increasingly important factor in attacks on cloud services. Phishing and attacks through the human factor are effective methods of abuse of user trust to obtain credentials and other confidential information.

DDoS attacks (distributed denial of service attacks) are a serious challenge for cloud infrastructures. This type of attack is aimed at flooding network resources, servers or cloud services infrastructure with requests, making them inaccessible to legal users.

During a DDoS attack, attackers use various devices, such as computers, smartphones or botnets, to simultaneously send a large number of requests to cloud service servers. As a result, network resources and equipment are overloaded and cannot efficiently handle legitimate traffic.

The consequences of a DDoS attack on a cloud service can be dramatic. Systems with intensive requests may experience long delays in response or even a complete loss of availability. Consequences may include temporary unavailability of key services, significant business losses, and a negative impact on the reputation of the cloud service provider.

Conclusion: In order to respond effectively to potential threats, cloud service providers must develop their cybersecurity strategies. It is important to combine technical measures such as antivirus software and traffic filters with effective management of user identification and training. Only a thoughtful and comprehensive security strategy can ensure data protection, privacy and continuous availability in the face of an increasing number of attacks in cyberspace.

O. V. Rasnitska
Language supervisor: A. I. Braievska, Lecturer
National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

THE MERITS OF USING ARTIFICIAL INTELLIGENCE IN THE CREATION OF SIMULATORS FOR OPTIMIZING QUEUING SYSTEMS

Artificial intelligence has its origins in the past, but in the realm of digital technologies, its popularity and use can greatly facilitate everyday life, and can become an excellent helper in different areas of life, in different sections of the science, by optimizing already existing data, analyzing patterns and making predictions of future states. The study of queuing theory began relatively recently, at the beginning of the last century. The emergence of this section of the theory of probability was associated with the ever-increasing needs of our society. In the modern world, queuing systems are used in various fields. Queues start to form when multiple customers request the same service at the same time. The main problem is that more applications often enter the systems than they are able to serve. Queuing theory tries to solve this problem through a detailed mathematical analysis that considers many different factors.

Let's figure out the operating principle of the operation of queuing systems and ways to achieve the construction of high-quality real queuing systems based on preliminary calculations and creating simulators with artificial intelligence.

Queueing systems are simplified mathematical models to explain congestion. Let's consider how the functioning of queuing systems takes place. The source of applications, the incoming flow, the queue, the serving channels, and the outgoing flow are basic elements in each such system. The purpose of any of them is to serve the incoming stream of requests; in most cases, requests arrive randomly. In the same way, the service time of one application is usually a random variable that depends on many different factors. After the request has been served, it leaves the system and the channel is ready to process the next request. Since the incoming flow and service time are random, the system is loaded unevenly, which often leads to a situation in which either the system is overloaded, not having time to service incoming requests, or vice versa, at some time intervals there are free channels, and applications

do not arrive, in other words, the system is idle.

With the help of programming environments, it is possible to create a simulator program of the queueing system, which fully reproduces it, and allows you to analyze the real system using the example of this program.

Using artificial intelligence to create simulators has a number of advantages: dynamic adaptation that will allow simulators to adapt dynamically to changing conditions and parameters in queue systems; efficient allocation of resources that improves efficiency, latency, and overall resource use by managing servers, processing times, and queues wisely; AI techniques, such as probabilistic modeling and machine learning, can effectively deal with uncertainty, making the simulator more reliable and reflective of real scenarios.

Thanks to the use of artificial intelligence, the study and construction of simulation models, the principles of real queue systems and methods of their optimization became clearer.

Thanks to the optimization of the queuing systems, saves a lot of time, but at the moment the percentage of perfectly fulfilled requests in terms of quality, speed and time directly depends on the cost of the queue system. Due to the artificial intelligence in the construction of simulators and analytical experiments, prediction of efficiency, as well as analysis and synthesis of parameters of real queue systems, have become more accurate.

S.R. Rusakevych
Language supervisor: I. A. Koliieva, PhD, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

QUANTUM COMPUTING: REVOLUTIONIZING COMPUTATION AND SECURITY

In the realm of computing, a groundbreaking paradigm shift is underway with the advent of quantum computing. Unlike classical computers that rely on bits, quantum computers leverage quantum bits, or qubits, offering an unprecedented leap in processing capabilities. The sheer speed of quantum computation is staggering - quantum computers can be up to 158 million times faster than the most advanced supercomputers available today. In practical terms, a task that would require thousands of years for a traditional supercomputer can be completed by a quantum computer in just four minutes.

Classical computers operate with bits, processing information sequentially. Quantum computers, on the other hand, use qubits, which can exist in a superposition of both 0 and 1 simultaneously. This unique ability, known as "superposition," allows quantum computers to perform multiple computations in parallel, presenting a marked departure from the sequential nature of classical computing. Moreover, qubits can be entangled, meaning the state of one qubit can influence the state of others, regardless of their spatial separation. This phenomenon, called entanglement, contributes to the quantum effects that empower quantum computers.

While quantum computing promises remarkable advancements, it also poses a challenge to conventional encryption methods. The powerful computational capabilities of quantum computers could render current cryptographic protocols vulnerable to attacks. The race is on to develop post-quantum or quantum-resistant cryptography that can replace existing standards and ensure the security of sensitive information.

Nowadays encryption algorithm, introduced in 1977 by Rivest, Shamir, and Adelman, relies on the difficulty of factoring the product of two large prime numbers. In a process known as an asymmetric key system, individuals use their own pair of secret prime numbers to create a public key for encoding messages. Breaking such encryption with classical computers, even employing the best-known factoring algorithms, would take an impractical amount of time - millions of years. However, the scenario changes when considering the potential of quantum computers.

In the quantum realm, qubits can exist in multiple states simultaneously, exponentially increasing computational possibilities. Modern cryptographic standards use prime numbers of around 313 digits, making factoring with classical computers an immense challenge. Yet, a sufficiently powerful quantum computer could perform the task exponentially faster.

The National Institute of Standards and Technology (NIST) initiated a competition in 2016 to

find new encryption algorithms resistant to quantum computers. After rigorous testing, four algorithms were selected as part of the post-quantum cryptographic standard in 2022.

D. M. Sai
National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

RISK ASSESSMENT AND DETECTION OF SQL - INJECTIONS

In the world of rapid virtualization and the growing number of corporate databases, the issue of information system security is becoming extremely relevant. SQL - injections remain one of the most common threats aimed at exploiting software vulnerabilities.

The main goal of this study is to assess the risks associated with SQL - injections in corporate systems and develop security strategies to effectively prevent such attacks.

SQL - injection is one of the most common web attack vectors used to obtainsensitive data from organizations. Theft credit card or password lists often occur through database vulnerabilities. This network attack is a method used by intruders to inject a query into input fields and then execute it against our database.

Network attack variants have several basic forms, including the classic (In-Band or Union-based), which, although rarely detected, is considered the most dangerous, providing instant access to any data in the database. Other important types are Error-based, which uses information from the database error text; Boolean-based, which allows iterative data validation with simple true/false answers; Time-based, which is based on brute-force attacks and manipulation of the database response time; and the rare Out-of-Band attacks that exploit individual database features. These various approaches pose potential threats to data security and require effective defense strategies.

Detecting SQL - injection, a dangerous type of database attack, requires a comprehensive approach and the use of various methods. In particular, code security audits, the use of parameterized queries, monitoring error logs, the use of web fires and vulnerability testing systems can effectively detect and prevent SQL-injection attacks. It's also important to limit access rights and train staff to raise awareness of these threats.

SQL - injections are still a relevant and serious cybersecurity vulnerability used for unauthorized access to databases. A variety of attack methods, such as classical, spoofing, Boolean, timing, and out-of-band, illustrate the constant evolution of this type of threat. Ensuring effective protection involves the use of advanced strategies such as code security audits, the use of parameterized queries, systematic monitoring, and the implementation of web firewalls. Understanding the specific risks associated with different variants of SQL - injections and using specialized tools to detected and prevent them is an important task for a cybersecurity researcher.

R.I. Skorokhod
Research supervisor: M. O. Alekseev, Doctor of Technical Sciences, Professor
Language supervisor: N. I. Bilan, Candidate of Philological Sciences, Associate Professor
Dnipro University of Technology

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING: TODAY AND THE FUTURE

Artificial Intelligence is one of the most rapidly developing fields in the world of technology, with new advancements being made every day. Artificial Intelligence, or AI, is a field of computer science that focuses on creating machines that can perform tasks that typically require human intelligence, such as speech recognition, problem solving, and decision making. AI is designed to work in a way similar to that in which the human brain works: both use algorithms to recognize patterns and make predictions based on data [2].

Being a subset of AI, Machine Learning focuses on creating algorithms that can learn from data and make predictions based on that data. Machine Learning algorithms can be trained to recognize

patterns in data and use those patterns to make predictions or take actions. Some common examples of Machine Learning include recommendation systems, image recognition, and natural language processing [3].

There are three main types of Machine Learning: Supervised Learning, Unsupervised Learning and Reinforcement Learning. Supervised Learning is a method of creating artificial intelligence when the algorithm is trained on labeled data that has already been categorized or classified. Unsupervised Learning is a machine learning technique in which the algorithm is trained on unlabeled data, that has not been either categorized or classified. Reinforcement Learning is an approach to creating artificial intelligence where the algorithm learns by trial and error, receiving rewards or punishments based on its actions. Understanding these types of Machine Learning is key to developing effective algorithm [5].

There are countless applications of AI and Machine Learning in various industries. AI can be used in the healthcare sector to analyze medical data to diagnose and treat diseases. Machine Learning algorithms can be used by finance departments to detect fraudulent transactions and make predictions about stock prices. AI is crucial for transportation as self-driving cars rely on AI and Machine Learning to navigate roads and make decisions. AI boosts commerce as recommendation systems use Machine Learning to suggest products to customers based on their past purchases. AI can be used in the entertainment industry to create personalized recommendations for movies, music, and TV shows [1].

As with any new technology, there are also challenges and ethical issues to consider when it comes to AI and Machine Learning. Some of these challenges include Bias, Privacy and Unemployment Concerns. Bias problems may arise because Machine Learning algorithms can be biased if they are trained on biased data. AI systems may collect and use personal data in ways that violate people's privacy. AI and automation may lead to job loss in certain industries. Goldman Sachs confirms this assumption by stating that 300 million jobs could be affected by latest wave of AI. the Goldman Sachs economists wrote. But the Goldman Sachs economists note that “technological innovation that initially displaces workers has historically also created employment growth over the long haul” [4].

So, it is very important for researchers and developers to consider these challenges and work to create AI and Machine Learning systems that are fair, ethical, and beneficial to society [4].

The future of AI and Machine Learning is undoubtedly bright. Some of the key areas of focus for future research include Explainability, Human-machine collaboration and General intelligence. Improving the parameter of AI Explainability will result in AI systems being able to explain how they arrive at their decisions in order to be transparent and accountable. As for Human-machine collaboration, it will become increasingly important for humans and machines to work together in a collaborative way with AI getting more advanced. Finally, AI General intelligence is about the creation of AI systems that can perform a wide variety of tasks, rather than just specialized tasks [1].

In conclusion, AI and Machine Learning are rapidly developing fields with countless applications in various industries. As with any new technology, there are some problems and ethical considerations to be solved, but the future of AI and Machine Learning looks promising. As researchers and developers continue to work on improving these technologies, we can expect to see even more exciting advancements in the years to come.

References:

1. Burns Ed. Machine learning. Tech Accelerator. In-depth guide to machine learning in the enterprise. URL: https://www.techtarget.com/searchenterpriseai/definition/machine-learning-ML2 (date of access: 25. 03. 2023).

2. Chawla S. Artificial Intelligence: The future is data capture, not machine learning URL: https://timesofindia.indiatimes.com/blogs/voices/artificial-intelligence-the-future-is-data-capture-not-machine-learning/ (дата звернення: 20. 03. 2023).

3. Delony D. What are some ethical issues regarding machine learning? URL:https://www.techopedia.com/what-are-some-ethical-issues-regarding-machine-learning/7/33376 (date of access: 03. 04. 2023).

4. Toh M. 300 million jobs could be affected by latest wave of AI, says Goldman Sachs URL: https://edition.cnn.com/2023/03/29/tech/chatgpt-ai-automation-jobs-impact-intl-hnk/index.html (date of access: 15. 03. 2023).

5. Types of Machine Learning. URL: https://www.javatpoint.com/types-of-machine-learning (date of access: 25. 03. 2023).

O. Slivets
Language supervisor: I. A. Koliieva, PhD, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

FASHION COLLAPSE IN GENERATIVE ADVERSARIAL (GAN) NETWORKS

Generative adversarial networks (GANs) are unsupervised machine learning algorithms that allow for the generation of new data based on existing ones. However, during the training of GANs, there is a problem of mode collapse, when the generator outputs identical or similar data, ignoring the diversity of the original distribution. This leads to a loss of quality and realism of the generated data.

Mode collapse can be caused by various factors, such as imbalance between the generator and discriminator, suboptimal choice of loss function, insufficient regularization, or too large learning step. Many methods have been proposed to combat mode collapse, such as introducing penalties for low diversity, using different metrics for quality assessment, applying data augmentation or parameter normalization.

One such method is **Projective Gradient Descent** (PGD), which was proposed in an article. The authors showed that mode collapse is associated with the generator trying to minimize the Kullback-Leibler distance between data and model distributions, leading to a narrowing of model support. To solve this problem, they proposed projecting the generator parameters onto a norm-bounded set and using gradient descent with projection to update parameters. This allows increasing model support and avoiding mode collapse.

Another method is **Minimax Entropy** (MME), which was proposed in an article. The authors argue that mode collapse occurs because the discriminator cannot distinguish between real and generated data when they have the same entropy. To solve this problem, they proposed minimizing the entropy of generated data and maximizing the entropy of real data. This allows increasing data distinguishability and avoiding mode collapse.

Continuing from the previous discussion, let’s delve deeper into the methods to tackle mode collapse in GANs and analyze their advantages and disadvantages.

Projective Gradient Descent (PGD)

Advantages:

- PGD can effectively prevent mode collapse by ensuring a broad model support.
- It provides a systematic way to update the generator parameters, which can lead to more diverse and realistic generated data.

Disadvantages:

- The projection operation in PGD could be computationally expensive, especially for high-dimensional data.
- The choice of the norm-bound set might be tricky and could require careful tuning.

Minimax Entropy (MME)

Advantages:

- MME directly addresses the issue of indistinguishable real and generated data by manipulating their entropy.
- It can enhance the distinguishability of data and thus mitigate mode collapse.

Disadvantages:

- Estimating entropy in high-dimensional spaces is challenging and could be inaccurate.
- MME might not work well if the entropy of real data is hard to maximize due to inherent data characteristics.

In addition to these methods, **Wasserstein GAN (WGAN)** is another approach that has gained popularity. WGAN modifies the GAN loss function to use the Wasserstein distance, which provides smoother gradients and thus improves the training stability.

Advantages:

- WGAN provides more stable training dynamics compared to traditional GANs.
- It gives a meaningful loss metric that correlates with the quality of generated samples.

Disadvantages:

- WGAN requires the discriminator (or critic) to be Lipschitz continuous, which is enforced by weight clipping or gradient penalty, adding complexity to the training process.
- The choice of the Lipschitz constraint could significantly affect the performance and needs careful tuning.

In conclusion, while each method has its own merits in combating mode collapse in GANs, they also come with certain drawbacks. Therefore, choosing an appropriate method requires considering the specific requirements and constraints of the task at hand. Further research is needed to develop more effective and efficient solutions for mode collapse in GANs.

References:

1. Goodfellow, I., Pouget-Abadie, J., Mirza, M., Xu, B., Warde-Farley, D., Ozair, S., … & Bengio, Y. (2014). Generative adversarial nets. In Advances in neural information processing systems (pp. 2672-2680).
2. Arjovsky, M., Chintala, S., & Bottou, L. (2017). Wasserstein generative adversarial networks. In Proceedings of the 34th International Conference on Machine Learning-Volume 70 (pp. 214-223). JMLR. org.
3. Salimans, T., Goodfellow, I., Zaremba, W., Cheung, V., Radford, A., & Chen, X. (2016). Improved techniques for training gans. In Advances in neural information processing systems (pp. 2234-2242).
4. Zhao, J., Mathieu, M., & LeCun, Y. (2016). Energy-based generative adversarial network. arXiv preprint arXiv:1609.03126.

D.E. Uniegova
Language supervisor: A.I. Braievska, Lecturer
National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

OPERATING SYSTEMS OF THE LINUX FAMILY

Annotation. An operating system is a set of programs that provide control of computer hardware, organize work with files (including launching and controlling the execution of programs), and implement interaction with the user, i.e. interpretation of commands entered by him and outputting the results of processing these commands.

Keywords: Linux, operating systems, distributions, software.

In today's world, there is a need to use operating systems not only for personal computers and servers, but also for more specific equipment: mobile devices, household appliances, and even unmanned vehicles.

Purpose: to emphasize the relevance of using the Linux operating system.

GNU/Linux is a complex system that includes thousands of different packages: from the most common ones (such as GNU utilities, X.org, GNOME and KDE graphical environments) to distribution-specific ones. The development teams of each project differ in size, approach to work, tools used, and methods of work planning. At the same time, the Linux kernel occupies a special place among all other applications. It determines the ability of the GNU/Linux system to run on different hardware platforms and the level of support for different devices, so the characteristics of its development process can to some extent serve as an indicator for the entire GNU/Linux system.

The Linux operating system (or GNU/Linux) consists of the following main parts: User applications, O/S services, Linux kernel, hardware controllers.

Linux is a multitasking and multi-user operating system for education, business, and individual programming. Linux distributions come with a large set of application software. That is, after installation on your computer, you have a system that is completely ready to go. Linux is a very powerful and stable OS. Using it on the Web pays off, and it's not so easy to hack.

As a result of such peculiarities of its creation and development, Linux has acquired quite specific "character traits". On the one hand, it is a typical UNIX system, multi-user and multi-tasking. But on the

other hand, the flexibility of customization and use of Linux is second to none.

Since official support for Linux is not free, technical support is usually provided by other Linux users, for example: on web forums, mailing lists, newsgroups, etc.

Linux is probably the best platform for learning programming. Unlike Windows and Mac, all the code for the entire operating system is available for study and modification. There is also the largest range of tools for creating programs and, except for those that are privately licensed, all current and previous programming languages have a compatible version.

Conclusions. Thus, the Linux operating system is quite common among users, since it makes it possible to create software that suits the user's needs from scratch, and it is not a problem to use this operating system not only for a computer. But, at the same time, this is a disadvantage of this system, you need to be quite sophisticated in this direction so that everything is really as it should be.

M. V. Vietluzhskykh
Language supervisor: A. A. Muntian, Candidate of Philological Sciences, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro

QUANTUM COMPUTING AND CRYPTOGRAPHY: IMPLICATIONS AND CHALLENGES

The advent of quantum computing heralds a new era in the computational world, offering processing capabilities far beyond the scope of current classical computers. This paradigm shift, however, poses significant challenges and opportunities for cryptography, the art and science of securing communication. The intersection of quantum computing and cryptography is not only a field of rich academic interest but also of immense practical significance in the age of digital information.

Quantum computing introduces a fundamental change in computing architecture through the use of qubits. Unlike classical bits, which represent either 0 or 1, qubits exploit the principles of quantum mechanics to exist in multiple states simultaneously (superposition). This allows quantum computers to perform complex calculations at speeds unattainable by traditional computers, solving certain types of problems much more efficiently.

The power of quantum computing poses a significant threat to conventional cryptographic techniques. For instance, algorithms that would take classical computers millennia to crack could potentially be solved in hours or days using quantum computing. This capability particularly endangers widely used public-key cryptographic systems, such as RSA and ECC, which rely on the difficulty of problems like integer factorization, a task quantum computers could perform exponentially faster.

In response to these challenges, the field of quantum cryptography has emerged. One of its most promising developments is Quantum Key Distribution (QKD), which uses quantum mechanics principles to enable two parties to generate a shared random secret key, used to encrypt and decrypt messages, in a way that is theoretically secure against any computational power.

The shift to quantum-resistant cryptography is not merely technical but also logistical and strategic. It requires updating and securing existing cryptographic systems, a task complicated by the widespread and deeply embedded nature of current cryptographic standards in everything from web browsers to international banking systems.

The cryptographic community is actively engaged in developing and standardizing quantum-resistant algorithms, a task undertaken by organizations like the National Institute of Standards and Technology (NIST) in the USA. These algorithms are designed to be secure against both quantum and classical computers, ensuring a smoother transition into the quantum era.

The interplay between quantum computing and cryptography is a dynamic and rapidly evolving field, poised at the forefront of technological advancement. The necessity to adapt to quantum computing is not just a challenge but also an opportunity to rethink and reinforce our cryptographic foundations. As we venture into this new quantum era, the proactive evolution of cryptography is not just prudent but essential to safeguard our digital future.

V.V. Vietluzhskykh
Language supervisor: A. A. Muntian, Candidate of Philological Sciences, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

THE INTERNET OF THINGS: PAVING THE WAY FOR A CONNECTED FUTURE

The Internet of Things (IoT) represents a revolutionary concept where everyday objects are interconnected and communicate via the internet. It extends internet connectivity beyond traditional devices like computers and smartphones to a diverse range of devices and everyday things. This concept has evolved from the convergence of multiple technologies, including wireless communication, micro-electromechanical systems (MEMS), and the internet itself, leading to an unprecedented level of integration between the physical and digital worlds.

At its core, IoT comprises four essential elements: sensors, connectivity, data processing, and user interface. Sensors collect data from their environment, which is then transmitted through various forms of connectivity (like Wi-Fi, Bluetooth, and cellular networks) to data processing units. These units analyze and interpret the data, often using cloud computing platforms for storage and big data analytics for processing. The user interface, such as apps or web portals, enables users to interact with the IoT system, offering insights and control over the connected devices.

IoT's applications span a wide array of sectors. In smart homes, it controls lighting, heating, and security systems, enhancing comfort and energy efficiency. In healthcare, wearable devices monitor patients' health metrics in real-time, leading to more personalized care. In agriculture, IoT technologies optimize resource use and crop yields through precision farming. Industrial IoT (IIoT) transforms manufacturing processes by improving automation, supply chain management, and predictive maintenance. These applications demonstrate IoT's capability to enhance efficiency, safety, and convenience in various aspects of life.

IoT also faces significant challenges. Top among these are security and privacy concerns, as the vast amounts of data collected and transmitted by IoT devices can be sensitive. Ensuring robust security protocols and safeguarding privacy is crucial. Additionally, IoT systems must address technical challenges like interoperability between diverse devices and systems, ensuring scalability to handle growing numbers of devices, and maintaining reliable connections. Ethical considerations, such as the potential for increased surveillance and data misuse, are also critical.

Looking ahead, the potential of IoT is vast and includes advancements in artificial intelligence and machine learning, enabling more autonomous and intelligent systems. The integration of IoT with emerging technologies like 5G will further enhance its capabilities. The future IoT landscape is expected to be a significant driver of innovation, contributing to economic growth and sustainable development. However, realizing this potential requires a concerted effort to address current challenges, particularly in developing standardized protocols, ensuring robust security measures, and addressing privacy concerns.
The Internet of Things marks a significant shift in the technological landscape, offering transformative potential across various sectors. Its ability to connect the physical and digital worlds opens up new opportunities for efficiency, productivity, and innovation. As the technology matures and its adoption widens, addressing its challenges will be paramount in leveraging its full potential and ensuring it contributes positively to society.

M. Y. Vyskarka
Language supervisor: A. A. Muntian, Candidate of Philological Sciences, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro

CURRENT ETHICAL AND LEGAL CONCERNS OF ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) has become a hot topic in politics, pop culture, and the world at large in the last few years. Software developers and engineers have recently made great strides in training popular tools to create new content based on previous works on the internet, called generative AI. One major example of this is ChatGPT, which accesses written works on the internet and learns to create its own written text based on the patterns and word choices used in the writings of others. Other tools can create images, artwork, codes, video, audio, and work as chat bots for HR, customer support, and other

aspects of business and personal life.

However, we are no longer in an age of asking whether we can use AI, but rather whether we should use AI. With each new tool or patch update comes new possibilities, but also new ethical quandaries. Recently in the United States, there have been workers' strikes within the film and television industry, in part due to AI. Actors, writers, film editors, and others in the industry are facing the possibility that their jobs could be taken over by this AI technology at any time, with some companies already taking steps to use artificially generated scripts, animation, voices, and background actors. While the writers have tentatively settled on a contract with executives in the industry, many are still fearful as there are still so few regulations on companies using AI in their film-making process.

Additionally, there is a concern of whether the creation and training of AI is ethical. For an AI to learn how to create its own original content, it must consume enormous amounts of content made by other people. One of the things among others that oftentimes happens is that AI developers will use large data sets found online, which include material pirated from sites behind a paywall. These works are usually copyrighted, and the creators of the art, images, writing, and code have not consented for their creations to be used in the training of AI tools. There have been many lawsuits filed within the last year against AI companies because of the creative works they are stealing to teach their technology, whether on purpose or accidentally.

Finally, there is a concern over the environmental impact of creating and training generative AI. The expenditure of the exorbitant amount of energy needed to run generative AI models creates massive amounts of carbon emissions, accelerating climate change. Furthermore, AI produces electronic waste which, when not disposed of properly, can cause significant harm to the environment.

While AI undoubtedly has global technological benefits, the concerns explained above must be taken into consideration when deciding when and how to implement generative AI within our lives. To address the issues involved in AI training techniques, developers should investigate ethically sourced and carefully curated data sets, which can eliminate concern for stolen work and potential lawsuits. Heavily curated data sets can also be tailored for the specific types of AI being created, allowing for less data to be used and reducing carbon emissions and waste. For AI application, there should be a focus on generative AI tools made to assist workers, not take over entirely. For instance, writers can use generative AI to research topics, brainstorm ideas, name characters, and build fiction worlds, rather than having an AI device write for them. AI has unlimited potential for content creation, but developers and users must take care to ponder the ethical and legal impacts of its use before the consequences of AI overtake the benefits.

SECTION 5. ENERGY EFFICIENCY

Yu.S. Artemchuk, S.P. Filonenko
V.V. Artemchuk, *Doctor of Technical Sciences, Professor*
Zaporizhia National University, Department of Electrical Engineering and Cyberphysical Systems

INCREASING ENERGY EFFICIENCY IN VARIOUS AREAS OF LIFE USING ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) is becoming increasingly important in various spheres of life, including the energy sphere. Thanks to the development of technologies and the implementation of intelligent control systems, AI can play an important role in reducing energy consumption and reducing greenhouse gas emissions. Let's briefly consider how AI affects energy efficiency and what advantages it brings.

Monitoring and analysis of energy consumption. One of the key functions of AI is the ability to collect and analyze large amounts of data. In the energy sector, this means that AI systems can monitor energy consumption in real time and identify where losses occur. For example, large industrial enterprises can use AI to automatically monitor the operation of equipment and detect unexplained energy losses. This allows us to respond quickly to problems and reduce losses.

Optimization of heating and air conditioning systems. AI can be used to optimize heating and air conditioning systems. Smart home systems use AI to automatically control room temperature, lighting and other parameters to reduce energy consumption. For example, the system can turn off the heating or air conditioning when no one is home, or adjust the temperature according to weather conditions. This helps lower energy bills and reduce greenhouse gas emissions. If the house uses a combination of heating sources, for example, electric and gas heating, then AI can choose the most rational modes of operation of such systems.

Energy efficiency of transport. AI also affects the energy efficiency of transport. Car companies are developing intelligent car control systems that help drivers save fuel and reduce CO2 emissions. For example, speed control systems can tell drivers the optimal speed to save fuel, and automatic parking systems allow you to reduce the time of searching and parking.

Prediction of energy consumption. AI is also used to predict energy consumption. Energy companies can use data and AI algorithms to predict peak energy consumption and schedule power plant operations accordingly. This allows you to reduce the risk of power outages and save resources.

Use of renewable energy sources. AI helps optimize the use of renewable energy sources such as solar panels and wind turbines. AI systems can predict energy production depending on weather conditions and warn of possible deviations. This helps maintain a stable energy supply and lower production costs.

Thus, the use of artificial intelligence in the field of improving energy efficiency opens up many opportunities for reducing energy consumption and greenhouse gas emissions. AI allows monitoring and optimizing energy consumption in real time, automating energy system management processes and forecasting energy production using renewable sources. This not only helps to reduce your electricity bills, but also helps to preserve the environment and ensure a sustainable energy supply. Increasing energy efficiency using AI is an important step towards sustainable development and resource conservation for future generations.

V.V. Artemchuk, V.L. Kovalenko
Zaporizhia National University, Department of Electrical Engineering and Cyberphysical Systems

ENERGY EFFICIENCY: A KEY FACTOR IN SUSTAINABLE DEVELOPMENT

Energy efficiency is a critical aspect of sustainable development, impacting various dimensions of our lives. Energy is the cornerstone of modern civilization, powering our homes, industries, and transportation systems. However, the excessive consumption of energy, primarily derived from finite fossil fuel sources, has profound environmental consequences and poses a substantial threat to our planet's sustainability. Sustainable development strives to reconcile the competing interests of economic growth, environmental responsibility, and societal equity.

One of the most prominent aspects of energy efficiency is its positive impact on the environment. By reducing the amount of energy required to perform various tasks, energy efficiency directly lowers the emissions of greenhouse gases and other pollutants, mitigating the consequences of climate change. Technologies that exemplify energy efficiency include LED lighting, high-efficiency appliances, and green building designs. These innovations significantly cut carbon emissions, thus contributing to a cleaner and healthier planet.

The economic advantages of energy efficiency are compelling. Reduced energy consumption translates into lower energy bills for businesses and households, generating substantial cost savings. For industries, energy efficiency measures translate into reduced operational costs, thereby enhancing economic resilience and competitiveness.

Energy efficiency contributes to enhanced energy security by reducing the dependence on imported energy resources. When energy is used more efficiently, it can better weather supply disruptions and price fluctuations. This is particularly crucial in a globalized world where energy markets can be volatile and subject to geopolitical tensions. By decreasing energy waste, nations become more self-reliant, lessening their vulnerability to external energy shocks. Energy efficiency is a tool for addressing energy poverty and ensuring equitable access to energy resources. Energy-efficient buildings

and appliances play a significant role in providing affordable and comfortable living conditions for all members of society, regardless of income levels. This contributes to a more equitable distribution of the benefits of energy resources and promotes social inclusion. Energy efficiency is an evolving field with constant technological advancements. Innovations in smart grids, renewable energy generation, and transportation systems promise to drive energy efficiency to new heights. Smart grids, for example, enable real-time monitoring and control of energy consumption, allowing for more efficient energy distribution and utilization. The ongoing development of renewable energy technologies, such as solar and wind power, not only reduces the carbon footprint of energy generation but also offers opportunities for greater energy efficiency in a decentralized energy system.

Transportation systems are another area where energy efficiency is making significant strides. Electric and hybrid vehicles are becoming more prevalent, offering improved fuel efficiency and reduced emissions compared to traditional internal combustion engines. These developments contribute to lower energy consumption in the transportation sector, a significant contributor to overall energy use. As global populations and economies continue to expand, the efficient use of energy resources becomes a necessity for a sustainable future. By embracing energy efficiency, we can simultaneously safeguard our environment, enhance economic well-being, promote social equity, and foster technological innovation. Energy efficiency is a key factor in our pursuit of a more sustainable and resilient world, and its importance will only grow in the face of evolving environmental and societal challenges.

V. G. Gapotchenkov
Language supervisor: V. L. Afanasieva, Lecturer
Ukrainian State University of Science and Technologies (Dnipro)

ENERGY EFFICIENCY IMPROVEMENTS IN ELECTRIC DRIVES

Energy plays an important role in the technological processes of all sectors of agriculture, industry, transport and in everyday life. Today, the largest percentage, approximately 62%, of electricity is consumed by an electric drive, 12% - in electrometallurgy and electrochemistry, and 5% each is spent on electric traction and lighting. Electricity consumption by an electric motor is affected by the amount of electricity lost throughout the structural chain. Unfortunately, more than 90% of electric motors are unregulated, resulting in inefficient use of electricity, which according to experts, reaches 30% of total consumption. The key challenges to increased efficiency in systems driven by electrical machines lie in three areas: to extend the application of variable-speed electric drives into new areas through reduction of power electronic and control costs; to integrate the drive and the driven load to maximise system efficiency; and to increase the efficiency of the electrical drive itself. In energy efficiency advances will occur, with new types of power electronic devices that reduce switching and conduction loss.

There are the following ways of energy saving in the electric drive:

1. First of all - is a competent choice of electric motor for heating and power. After all, most errors are made at this stage of the development of the electric drive, when the ED load factor is about 50% and less.

2. It is also modernization of the design and materials of the electric motor, as well as an increase in the amount of active materials, which allows a significant increase in the efficiency.

3.Switching to frequency-controlled electric drive.

4. Improving the structure and algorithms of frequency control systems - adjustable electric drive.

Scalar or relay-vector systems are mainly used as basic control systems for electric drive, on the basis of which energy-efficient algorithms are later implemented.

Switching from unregulated to regulated electric drive. This transition is a global energy saving initiative that has the greatest impact in terms of savings and other process indicators.

For this purpose, a complementary element, an electric energy converter, is incorporated into the power channel, supplying a voltage with a adjustable amplitude and frequency to the asynchronous mover. As a result, the required capacity is supplied to the final consumer and exclude large losses in the latch. It should be emphasized that in this case, along with the main effect - a significant reduction of losses in the machine operated by the electric drive and in other elements of the power channel, a number

of additional, often equally important effects are achieved: rationalization of the mechanical engineering process, saving of other resources, increase the service life of the main equipment, reduce noise etc.

Energy efficiency can be considered with the example of energy saving mode in electric drives with semiconductor scalar controlled frequency inverter. Optimization of the magnetic current is a means of additional energy saving, which allows to slightly reduce the power consumption by reducing the voltage level when working in a fixed pressure. Nominal flow control should be used in transition modes. The aim is to determine the frequency and voltage amplitudes at a given moment of load and the specified speed of the rotor in such a way that the engine loses as little as possible.

If you compare the power consumed in this mode before and after the introduction of optimization, the resulting savings will be 40%.

V.E. Kukovskiy
Language supervisor: L.V. Afanasieva Lecturer
Ukrainian State University of Science and Technologies (Dnipro)

THE PROBLEM OF ENERGY EFFICIENCY NOWADAYS

Energy efficiency is an important aspect of modern society, as it affects many different aspects of our lives, including the economy, environment, and social amenities. In this report, we will look at the key aspects of energy efficiency and its impact on the modern world.

A key aspect of energy efficiency is the efficient use of energy. Energy savings can be achieved by optimizing processes in manufacturing, transportation, lighting, and other areas of life. This helps to reduce fuel consumption, CO2 emissions and electricity costs. The use of renewable energy sources, such as solar, wind and hydroelectric power, contributes to energy efficiency. This helps to reduce dependence on coal energy and other harmful sources.

Technological advances, such as LED lighting, energy-efficient heating systems, and energy-efficient cars, are helping to improve energy efficiency across sectors. Energy efficiency can bring significant economic benefits, including lower energy costs for domestic businesses and consumers, contributing to increased competitiveness and job creation. In addition, reducing emissions of CO2 and other harmful substances contributes to environmental protection and the fight against climate change. Energy efficiency is a key factor in achieving global goals to reduce environmental impact.

Therefore, it is necessary to maximize the development of the main areas of energy efficiency:

1. Construction of energy efficient buildings: An important aspect of energy efficiency is the creation and modernization of buildings with high levels of thermal insulation and efficient heating and cooling systems. This will significantly reduce energy costs for domestic and commercial installations.

2. Increase energy efficiency in transportation: Transportation is one of the major energy-intensive sectors. The development and implementation of technologies that reduce fuel consumption, such as electric vehicles and high-efficiency engines, are necessary to reduce environmental pollution and save resources.

3. Public awareness campaigns: Citizen participation in energy efficiency efforts is essential. Energy efficiency information and education campaigns can help change consumer habits and raise awareness of the environmental impact of energy efficiency.

4. Legislation and incentives: Governments can introduce legislation and financial incentives to support energy efficiency projects. This may include tax breaks, subsidies, and other measures to encourage businesses and individuals to invest in green technologies and practices.

Finally, I would like to add that the increased attention to energy efficiency demonstrates the importance of this issue for modern society. Investments in reducing energy consumption and improving the efficiency of production and consumption are promising in all areas of the economy and life. Further development and implementation of technologies, as well as promoting changes in consumer habits, can help create a sustainable and efficient future for the whole world.

References:

1. https://www.energystar.gov/
2. https://www.energy.gov/
3. https://www.ase.org/
4. https://www.aceee.org/

5. https://www.nrel.gov/

Kuramshin Y.O.
Language supervisor: A. O. Muntian, PhD, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

ENERGY EFFICIENCY DETERMINATION OF LOADING-BACK SYSTEM OF ELECTRIC TRACTION MACHINES

Electric traction machine acceptance post-repair tests are carried out on loading-back stands, which lower the total power expenses for the testing. In these loading-back systems, external power sources are only required to compensate for the power losses in the electric machines that are being tested. One of the top priorities for companies that repair the traction rolling stock of mainline and industrial vehicles is reducing power consumption for acceptance post-repair testing of electric traction machines.

The most energy-intensive part of the overall test program is thermal testing of electric traction machines on a test bench with a reverse load. Energy consumption for this type of testing can be reduced both by increasing the energy efficiency of the reverse loading system and by optimizing the load mode of electric traction machines. At the moment, various circuit solutions of reverse load systems for electric machines are known, but their energy efficiency cannot be calculated. This, in turn, complicates the choice of rational options.

The ratio of the total power losses in the electric traction machines under study, which meet the requirements of the selected load mode, to the total power consumed by the power sources of the reverse load system from the network, represents the energy efficiency of the reverse load system. The given universal scheme of energy transformations can be used to determine the nature of the dependence of this indicator on the structure of the reverse load system. This scheme is comprehensive and considers all alternatives for compensating power losses in certain electric machines. Using electrical and mechanical energy converters, respectively, the scheme predicts variations in electrical and mechanical energy transfer in the main power conversion loop.

To solve the problem of choosing a rational scheme of stands for acceptance tests of electric traction machines of highway and industrial transport, it is possible to apply the proposed methodology for evaluating the energy efficiency of the reverse load system. The efficiency of power sources, converters and the efficiency of indirect methods of covering losses determine the energy efficiency of the reverse load system. Losses in the studied electric drive depend on the share of a specific type of loss in the total power loss. It is possible to reduce the amount of electricity spent on testing electric traction machines by optimizing the structure of the reverse load system, as well as by choosing rational load modes. Reducing the number of successive power conversions in auxiliary devices or eliminating such conversions can minimize the total energy consumption for traction machine tests.

References:

1. Afanasov A.M. Energy indicators of compensation mechanical method of electric losses in traction motors at their mutual load. Bulletin of Dnipropetrovsk National University of Railway Transport named after Academician V. Lazaryan, 2010, issue 35, pp. 69-73

2. Loza P.O., Dubynets L.V., Ustymenko D.V. Determination of equivalent current load under traction electric motors tests for heating without ventilation. Bulletin of Dnipropetrovsk National University of Railway Transport named after Academician V. Lazaryan, 2008, issue 25, pp. 26-29.

O. S. Pushkar
Language supervisor: A. O. Muntian, Candidate of Philological Sciences, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

ENERGY EFFICIENCY OF GREEN ENERGY USE IN UKRAINE

We live in a big and fast-growing world. Every year the demand for energy resources only grows.

In modern countries, the importance of energy efficiency in the transmission and storage and utilization of the planet's energy resources began to be thought about more than fifty years ago. But, what about Ukraine?

To this day, Ukraine cannot boast of great indices in this sphere. Outdated heat and electricity networks, old non-energy efficient house constructions, as well as low interest in this area on the part of the majority of people only contribute to this situation. Nevertheless, the willingness of people to install and distribute green energy production is making quite a difference.

Along with the idea of producing energy right at home, people interested in green energy started to think about how to use and store the generated energy as efficiently as possible. This has led to a strong increase in demand for energy efficient houses and various other energy efficiency measures. And along with the recent events, called a "blackout", when millions of people were deprived of the opportunity to freely use electricity and were partially deprived of heating their own homes, the demand for their own solar power plants and solar collectors has increased many times over. In particular, solar collectors have a strong impact on energy efficiency, because it is on the production and maintenance of heat in homes, every year, the most energy is spent, unfortunately it is the transmission of this heat through outdated communications leads to the loss of a large amount of energy. Installing just one solar collector can significantly reduce energy consumption for home heating as well as heating water for daily needs.

The importance of solar power plants for energy efficiency is difficult to assess, as they are most effective when located directly next to a consumer requiring significant power, such as factories. It is this location that has the greatest impact on the energy efficiency of the entire electricity system, as it significantly reduces consumption during the most difficult time for the electricity grid, the working day. A similarly efficient use of solar panels is to install them in areas away from the urban grid, when the cost of building power grids for a small consumer will be much higher than the premium of green energy.

A.A. Roshchina
Language supervisor: O.M. Suprun, Senior Teacher
Dmytro Motornyi Tavria State Agrotechnological University

THE ROLE OF ENERGY EFFICIENCY IN COMBATING CLIMATE CHANGE

Climate change poses one of the most pressing challenges of our time, with far-reaching environmental, social, and economic consequences. To address this global crisis, we must reduce greenhouse gas emissions. One practical and often underestimated tool in the fight against climate change is energy efficiency. In this article, we will explore the pivotal role of energy efficiency in combating climate change and why it should be at the forefront of our efforts to create a sustainable future.

Energy efficiency refers to using less energy to accomplish the same tasks. It involves optimizing the energy consumption of various processes, devices, and systems. By reducing energy waste and increasing the efficiency of energy use, we can significantly cut down on greenhouse gas emissions.

The reduction of greenhouse gas emissions is closely connected to energy efficiency and climate change. When we use energy more efficiently, we consume fewer fossil fuels, such as coal, oil, and natural gas, which are primary sources of carbon dioxide emissions [1]. By doing so, we mitigate our contribution to the greenhouse effect, a significant driver of global warming.

Energy-efficient technologies and practices can lower the overall energy demand. This means we don't need to produce as much energy, which often involves burning fossil fuels. Reduced energy demand can lead to less pollution and, consequently, fewer climate-altering emissions.

Energy efficiency plays a pivotal role in transitioning to clean, renewable energy sources such as wind, solar, and hydropower [2]. By optimizing energy use, we make it easier to meet our energy needs using these sustainable sources, further reducing greenhouse gas emissions.

Buildings account for a substantial portion of energy consumption globally [3]. Energy-efficient construction and retrofitting, as well as the use of efficient appliances, can lead to significant energy

savings. By implementing better insulation, double-glazed windows, and smart thermostats, energy waste and emissions can be reduced.

The transportation sector is another major contributor to climate change. Electric vehicles and more fuel-efficient cars are excellent examples of energy-efficient transportation options that help combat emissions.

Industry consumes a significant amount of energy. By implementing energy-efficient technologies and practices in manufacturing and production processes, emissions can be substantially reduced.

Energy efficiency not only contributes to climate change mitigation but also has a number of other advantages: cost savings (energy-efficient practices often lead to reduced energy bills for individuals and businesses, saving money in the long run); job creation (the energy efficiency sector has the potential to create numerous jobs in technology development, manufacturing, and construction); energy security (educing energy consumption lessens dependence on fossil fuels, enhancing energy security and resilience).

Energy efficiency is a powerful tool in the battle against climate change. By reducing emissions, lowering energy demand, and facilitating the transition to clean energy sources, it addresses one of the root causes of global warming [4]. As individuals, businesses, and governments worldwide embrace energy-efficient practices, we can significantly reduce our carbon footprint and move closer to a more sustainable, climate-resilient future [5]. To combat climate change effectively, energy efficiency must remain a core element of our strategies and actions.

References:

1. Energy Efficiency: Buildings and Industry. *Energy.gov.* URL: https://www.energy.gov/eere/energy-efficiency-buildings-and-industry (date of access: 09.11.2023).

2. Energy Efficiency. *Environmental and Energy Study Institute*. URL: https://www.eesi.org/topics/energy-efficiency/description (date of access: 09.11.2023).

3. Gaspodini A. Green IT: Saving the Planet One Byte at a Time. *Innovative Solution for Decision Making.* URL: https://www.mapegy.com/blog/green-it (date of access: 09.11.2023).

4. The Link between Energy Efficiency and Climate Change. *India's Stuffs*. URL: https://www.indiasstuffs.com/the-link-between-energy-efficiency-and-climate-change/ (date of access: 09.11.2023).

5. Why fighting climate change must embrace cultural and economic diversity. *Green Justice Coalition.* URL: https://greenjusticecoalition.org/2022/01/25/why-fighting-climate-change-must-embrace-cultural-and-economic-diversity/ (date of access: 09.11.2023).

K. M. Serdiuk
Research supervisor: Struzhko I.S., Early Stage Researcher
Leferink F., Professor, Doctor of Technical Sciences,
University of Twente, the Netherlands
T.M. Serdiuk, Candidate of Technical Sciences, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)
Language supervisor: Muntyan A.O., Associate Professor, Candidate of Philological Sciences
Ukrainian State University of Science and Technologies (Dnipro)

“DIRTY” ELECTRICITY

The development of modern technology has led to a large number of high-frequency harmonic components in the electrical network. They can have a negative impact both on the operation of various equipment and on human health. The solutions presented in the market, according to the manufacturers, allow to measure the level of this impact and significantly reduce it. In this study, we investigated the features of two devices for measuring “dirty” electricity and filters for its “cleaning”. As a result, it was shown that the readings of the devices do not give an unambiguous representation of voltage quality, and the use of filters significantly increases the strength of the magnetic field emitted by the wires.

There are many problems in today's world, in many different walks of life. There is no denying that many "problems" are more closely intertwined with each other than we might imagine. Faced with

electricity every day, do you wonder how it affects your well-being? There is a theory that interference in the network has a negative effect on health. So, to speak, "dirty" electricity has a literal effect on the human body. The electrical grid is full of interference, it can aggravate diseases, but according to Magda Havas и Ralph Frederick, in his paper, these interferences can be easily and simply eliminated with special filters at home. These interferences in the network are found not only in the domestic application but also in office buildings, enterprises and even in trains. Taking into account that interference also has a negative impact on the quality of the devices, their durability and the readings of the meters, it would be appropriate to use these devices everywhere. But to assess the real performance of the filters, and their impact on the network, we will have to conduct a series of studies, which was the subject of this study.

The GS-meters measure the level of "dirt" in the GS-units. Connecting this device to the network gives a number that evaluates the level of interference. If the level is high, then accordingly the values increase, up to a permissible limit (2000 GS-units). At the same time, this manufacturer also offers the use of GS-filter, also plugged into the network, and significantly reduces the performance of the devices. How does it really affect the network? And will it really help to unload your network? Research data shows that the answer is no. Because it will have a more negative impact on the network than no filter at all.

To verify this, a series of studies have been conducted using different types of loads: resistors, water pump, and two types of lamps, LED and fluorescent lamps. The research was also carried out with different power sources: a generator as well as the local grid of the University of Twente. Different equipment, volt- and ampere-meters and a device for inspecting the magnetic field strength were used.

The researches were carried out which gave an understanding of the behaviour of change of readouts of the GS meters at different amplitudes and frequencies of the polluted signal. The results showed that GS units, increase both with increasing frequency and with increasing voltage, but the frequency affects more. It was shown that the use of the proposed filters leads to a significant increase in the current supply and respectively to an increase in the strength of the magnetic field around the wires, the negative impact of which has already been identified and proven scientifically. Further research should concern finding of equations describing changes of GS units value depending on the amplitude and frequency of harmonic components, including several ones. As well as finding the degree of influence of these indicators on the operation of various electrical equipment, particularly metering devices.

S. K. Shykhov
Research supervisor: O. O. Aziukovskyi, Candidate of Technical Sciences, Ph.D., Associate Professor
Language supervisor: N. I. Bilan, Candidate of Philological Sciences, Associate Professor
Dnipro University of Technology

DC RECTIFIERS AS A PART OF CATHODIC PROTECTION SYSTEMS OF UNDERGROUND STEEL GAS PIPELINES

Since a huge number of devices, both household and those used in industry, consume constant voltage, devices that convert alternating voltage from the network to constant voltage were called rectifiers and became widespread. They can be presented as a separate device, part of large systems, or be a part of finished products.

In modern systems of cathodic protection, rectifiers play the most important role of constant voltage source. The operation of DC rectifiers is the most important factor that affects the operation of the entire cathodic protection system. A significant number of technological solutions and schemes of rectifiers have been developed. Each of them has its own advantages and disadvantages. As a result, understanding the structure and operation of the most popular rectifier’s schematics is key to successful development of cathodic protection algorithms.

A single-phase half-wave rectifier consists of a single semiconductor diode that conducts current only during the positive half-wave of the alternating voltage. Due to the extreme simplicity, such rectifiers are used if the output power does not exceed 10 W and a high ripple coefficient is allowed. The disadvantages of this solution are the low frequency of pulsation of the rectified output voltage (equal to the frequency of the input alternating voltage), low efficiency and irrational use of the transformer,

which significantly affects the weight and dimensions of the rectifier.

Center tap full-wave rectifier is two combined single-phase half-wave rectifier circuits powered by two secondary windings connected in series, with common output point of these windings. This scheme is usually used with an output power of up to 500 W. It is possible to use ready-made diode assemblies and a common diode radiator for this scheme. In this circuit, both half-waves of alternating voltage are used for voltage rectification, which positively affects its efficiency in comparison with the half-wave rectifier circuit. The frequency of the output voltage ripple is equal to the power supply frequency doubled. The disadvantages of this scheme are the complex design of the transformer, which makes the implementation of this solution too complicated and the high reverse voltage on the diodes.

A single-phase bridge circuit uses a single transformer winding to rectify both half-waves of an alternating voltage. This is achieved by turning on one of the two pairs of semiconductor switches (VD1 - VD3 and VD2 - VD4). In comparison to the center tapped full-wave rectifier circuit, the bridge circuit has a simpler transformer design with a similar output voltage shape and ripple frequency, as well as lower diode reverse voltage. Such scheme is widely used in a significant power range, since it has a higher efficiency. The rational usage of the transformer allows reducing its estimated power and dimensions. The disadvantage of the bridge rectifier is a larger number of diodes.

All the above-mentioned schemes are uncontrolled rectifiers, since they were made on the basis of semiconductor diodes. However, controlled rectifiers are also able to perform regulation (stabilization) of the average rectified voltage on the load. The simplest schemes of controlled rectifiers are made on the basis of non-controlled ones by full or partial replacement of rectifier diodes with controlled switches: thyristors, triacs, transistors. In such rectifiers, the adjustment of the average value of the rectified voltage is achieved by using a control circuit that creates an adjustable turning on delay of the switches. This delay is performed by shifting the phase of the switch control pulses relative to the phase of the alternating voltage and is called the control or ignition angle α. By adjusting the control angle in the range from 0 to 180, it is possible to reduce the average rectified voltage from the nominal value to 0.

When the bridge rectifier operates on an inductive load and the control angle is greater than 0, the key current is tightened due to the EMF of the inductance. To exclude tightening, a zero switch VD0 is introduced into the circuit. As a result, the circuit has a higher power factor and a greater number of semiconductor switches, which is not always desirable.

Since DC rectifiers are the source of DC voltage for most modern cathodic protection stations, understanding their basis and operation principles is very important for future researches.

D. S. Yatsyna
Research and language supervisor: I.A. Kryvonos, Senior Lecturer
Dmytro Motrnyi Tavria State Agrotechnological University

LOSSES AND ACQUISITIONS OF SOLAR ENERGY DURING THE WAR IN UKRAINE

The development of renewable energy sources (RES) and acceleration of the energy transition will allow Ukraine to strengthen the country's energy security, while the state's debt to RES producers for electricity supplied to the country's Integrated Power System (IPS) is growing. Thus, industrial solar power plants (SPPs) are now located not only in the south of the country. By 2022, the leaders in terms of total SPP capacity were the following regions: Dnipropetrovsk region - 290 MW; Odesa - 240 MW; Vinnytsia - 230 MW; Kherson - 100 MW.

For comparison, the capacity of the destroyed Kakhovka hydroelectric power plant was 335 MW.

Before the war, there were about 10 thousand individual (household) and 2 thousand industrial SPPs in Ukraine. Due to the hostilities, some of the SPPs were damaged or ended up in the occupied territory.

Ukraine and many other countries introduce "green" tariffs that are much higher than usual to stimulate electricity production. Investors incentivized by this tariff built power plants in Ukraine, but the state, using various pretexts, does not pay them in full for the electricity supplied to the IPS. This was the case for several years before the war, and the situation has not improved. The level of payments varies from company to company, with an average of just over 50%.

Problems with electricity payments and the war have significantly reduced investment in green

generation. According to Energy Map, in 2022, investments in renewable energy in Ukraine decreased to 258 million euros from 982 million euros in 2021.

It should be noted that Ukraine's geographical location is favorable for the development of solar energy projects. For example, Ukraine's insolation rates (the amount of solar energy reaching the earth's surface) are higher than in Germany, the leading EU country in terms of solar energy production [1].

Last autumn and winter, the Russians deliberately destroyed electricity transmission systems, which prevented the transfer of electricity from one region to another. The development of renewable energy sources will decentralize electricity generation and thus increase security of supply.

According to Valerii Moiseiev, renewable energy generation is reaching record levels in Europe. In the summer of 2023, wind and solar generation in Germany, Belgium, France, Italy and the UK reached a record average of 45 GW [1].

Meanwhile, in the US state of California, the new NEM 3.0 solar policy officially came into effect on April 15, 2023. This new policy marks a significant change in the way rooftop solar is compensated in the state, moving from net metering to net metering with a 30% reduction in credits [2].

The main change in NEM 3.0 is the shift from net metering to net energy metering, which allows utilities to pay solar customers a wholesale rate for excess energy returned to the grid. This will not only lower electricity bills for solar customers, but also reduce the load on the grid during the evening peak demand period.

According to the California Solar Energy Association, this new policy is part of California's plan to achieve 100% clean energy by 2045 and shows the state's commitment to transitioning to a sustainable and clean energy future [2].

Ukraine has a long way to go towards a clean energy future!

References:

1. Моісеєв В. Нова Політика Фотоелектричної Енергії В Каліфорнії: website. URL: https://ua.jingsun-power.com/news/photovoltaic-new-policy-in-california-usa-67286087.html (Last accessed 07.11.2023)

2. Що втратила та придбала сонячна енергетика за час війни в Україні: website. URL: https://thepage.ua/ua/economy/sonyachna-energetika-v-ukrayini-u-2023-roci (Last accessed 08.11.2023)

SECTION 6.
ECOLOGICAL SAFETY

K. Kokoriev
Language supervisor: L. V. Afanasieva, Lecturer
Ukrainian State University of Science and Technologies (Dnipro)

ECOLOGICAL SAFETY IN UKRAINE

Ukraine is dealing with a big problem: keeping its environment safe. This means taking care of the air we breathe, the water we drink, the trees in our forests, the animals that live here, and making sure our country develops in a way that doesn't harm nature.

One major issue is dirty air and water. Factories and old pipes pollute the air and water, which can make people sick. To fix this, we need better rules for factories and cleaner ways to get energy and treat water.

Another problem is that we cut down trees too much. Forests are important because they help fight climate change and give a home to many animals. We need to stop cutting them down too quickly, protect the forests, and make sure people don't cut down trees illegally.

Saving animals and plants is also essential. Ukraine has a lot of different creatures and plants, but many are at risk because their homes are disappearing, or people hunt them illegally. We need to teach people about the importance of protecting these creatures and make sure they're safe from harm.

Lastly, we need to find ways to grow our country's economy without harming the environment. Using clean energy and technology can help us do this while also protecting our planet.

Despite the challenges, Ukraine has made some positive steps toward ecological safety. The

government has started recognizing the importance of environmental issues and is working on implementing stricter regulations. Additionally, there is a growing awareness among the public about the need to protect the environment. Community initiatives, tree-planting campaigns, and clean-up events are becoming more common.

Education plays a crucial role in addressing ecological safety. By integrating environmental awareness into school program and organizing public awareness campaigns, we can ensure that future generations understand the importance of sustainable living. Teaching responsible environmental practices from a young age fosters a sense of responsibility and a commitment to preserving the beauty and diversity of Ukraine's natural landscapes.

In conclusion, while Ukraine faces significant ecological challenges, there is hope for a better future. Through a combination of strong government policies, community involvement, and education, we can work together to create a more environmentally sustainable and ecologically safe Ukraine. It is a collective responsibility to protect our natural heritage for the well-being of current and future generations.

S.A. Kryshchuk
Language supervisor: L. V. Afanasieva, Lecturer
Ukrainian State University of Science and Technologies (Dnipro)

ENVIRONMENTAL SAFETY IN THE TRANSORT SPHERE NOWADAYS

Abstract Railways play a major role in the global transportation system. Furthermore, railways are presently being promoted by several governments thanks to their economic and environmental advantages relative to other means of trans-portation. Although railways have clear advantages, they are not free of environ- mental problems. The objective of this book is to review, assess, and provide solutions to the impacts of railways on wildlife. We have divided the impacts of railways on biodiversity into four main topics: mortality, barrier effects, species invasions, and environmental disturbances, with the latter ranging from noise to chemical pollution. Railways share several characteristics with roads and with power lines when the trains are electric. Therefore, much can be learned from studies on the impacts of roads and power lines, taking into account, however, that in railways, the two are often combined. Besides the similarities with roads and power lines, railways have specific characteristics. For instance, railways have lower traffic intensity but trains usually have much higher speeds than road vehi- cles, and the electric structures in railways are typically lower than in most power lines. Thus, railways pose specific challenges and require specific mitigation measures, justifying calling the study of its impacts on biodiversity “railway ecology.”

As a result of environmental protection measures taken over the past five years, the volume of harmful emissions into the atmosphere from the activities of Ukraine's railways has decreased by 15-20%, as reported by UNIAN in the press center of the State Administration of Railway Transport ("Ukrzaliznytsia").

"In 2012, Ukrainian railway enterprises carried out electrification of rail routes, wastewater treatment, soil protection from pollution, and reduced noise and vibration impact. Compared to 2011, the railways reduced emissions of pollutants into the atmosphere by 16%," the press center clarified.

According to "Ukrzaliznytsia," the railway industry contributes an average of up to 5% of the total national volume of environmental protection investments.

The need to reduce the negative impact on the environment is outlined in legislation and the National Environmental Action Plan for 2011-2015. Therefore, starting from October 1, 2012, the "Ukrzaliznytsia" established the Environmental Safety Department.

"Ukrzaliznytsia" actively explores innovative and investment proposals for the modernization of its production complex, while also attracting the attention of financial institutions, manufacturers, and developers to environmental safety issues," the agency's press center stated, adding that an exchange of experience in environmental conservation activities will take place in the near future as part of the "Environment for Ukraine - 2013" international forum scheduled for April 23-25, 2013.

As reported by UNIAN, Ukrainian railways invested nearly UAH 645 million of their own funds in state programs for the development of railway infrastructure in 2012.

The annual funding requirement for railway track infrastructure is UAH 6.8 billion, and the total annual

investment needs of the railways amount to around UAH 23 billion.

The largest real estate developer in the capital city, the holding company "Kyivgorstroy," plans to build a plant in Kyiv for the production of prefabricated structures for industrial housing construction.

As reported by a UNIAN correspondent, the Chairman of the Board and President of "Kyivgorstroy," Igor Kushnir, made this announcement to journalists after a meeting of the holding's shareholders.

According to him, the holding intends to hold negotiations with the German company "Ebau" at an exhibition in Munich from April 12 to 17 regarding the construction of a plant that will produce large-panel prefabricated structures for "Kyivgorstroy."

It is planned that the plant will be built on the basis of the "Plant for Finishing Materials," which is part of "Kyivgorstroy." The construction of the plant may take up to half a year.

I. Kushnir noted that "Kyivgorstroy" will be the investor in the construction, and the German company will provide the technology.

As reported by UNIAN, in July 2012, the Prime Minister of Ukraine, Mykola Azarov, announced that starting in 2013, Ukraine would implement a program for building industrial housing with a cost per square meter below 5,000 hryvnias.

On February 27 of this year, the Vice Prime Minister of Ukraine, Oleksandr Vilkul, reported at an expanded meeting of the Cabinet of Ministers that in Ukraine, this year, in addition to the activation of existing state housing programs, construction of housing through industrial methods would begin.

UNIAN Background: The holding company "Kyivgorstroy" is the largest construction company in Ukraine. 80% of its shares belong to the territorial community of Kyiv and are under the administration of the Kyiv City State Administration.

The holding includes 40 public joint-stock companies, in which "Kyivgorstroy" owns between 26% and 30% of the shares, as well as 6 subsidiary enterprises and 51 enterprises as associate members.

In 2012, the company put 240,000 square meters of housing into operation in Kyiv and the Kyiv region.

In 2012, "Kyivgorstroy" increased the volume of attracted investments by 69.2% compared to 2011, reaching 2.2 billion hryvnias. The company's net profit in 2012 amounted to 144.655 million hryvnias.

Conclusions

We provided one of the first documentations of wildlife railway-use through motion-triggered cameras. Our study revealed the presence of a significant proportion of the resident medium-to-large mammalian fauna on the railway in the course of one year, and extensive non-uniform seasonal use of the railway as a travel corridor by some species. Railways have been in place for a long time and are treated by animals as another habitat feature; however, little is known about the variable effects of railways on wildlife species. Large knowledge gaps still exist with respect to railway ecology. A greater understanding of wildlife–railway interactions could assist with collision prevention and other mitigation strategies, providing insight as to the effects of different linear landscape features on wildlife population dynamics, especially for species at risk. We highly encourage further research of all aspects of wildlife–railway ecology.

References:

1. https://www.unian.net/economics/transport/774533-jeleznyie-dorogi-ukrainyi-sokratili-vrednyie-vyibrosyi-v-atmosferu.html
2. "Railway Ecology" by Luigi Boitani and Raffaella Cencetti
3. "Wildlife on the Rails: Exploring the effects of railways on wildlife and landscapes" by Ian D. Rotherham

A. Y. Parkhomenko
Language supervisor: I. H. Miroshnychenko, Candidate of Philological Sciences
Ukrainian State University of Science and Technologies (Dnipro)

TACKLING THE CHALLENGE OF MEDICAL WASTE DISPOSAL IN UKRAINE

Ukraine faces a growing concern in the realm of healthcare that extends beyond patient well-

being — the challenge of proper medical waste disposal. As the healthcare sector experiences increased demand and advances in medical technologies, the need for effective waste management becomes paramount to safeguard public health and the environment.

Medical waste in Ukraine encompasses a range of materials, including used syringes, contaminated dressings, and biomedical equipment. The hazardous nature of these materials necessitates specialized handling to prevent potential environmental contamination and public health risks. Unfortunately, inadequate disposal practices can lead to detrimental consequences for both local communities and the ecosystem.

One of the primary obstacles in medical waste disposal in Ukraine is the sheer volume generated by healthcare facilities. Hospitals and clinics produce substantial amounts of waste daily, straining existing waste management systems. Insufficient infrastructure and outdated disposal methods can result in improper incineration or landfilling, contributing to pollution and soil degradation.

Improper disposal not only poses environmental threats but also directly impacts public health. Communities residing near poorly managed waste disposal sites may face contamination of water sources and air pollution, leading to increased health risks. Furthermore, healthcare workers involved in waste handling without adequate precautions may be exposed to infectious agents, heightening the risk of occupational hazards.

Addressing the medical waste disposal problem in Ukraine requires a comprehensive strategy involving regulatory measures, technological advancements, and public awareness initiatives. Stringent regulations and guidelines should be implemented to govern the proper segregation, packaging, and disposal of medical waste. Healthcare facilities must invest in modern waste treatment technologies to ensure the safe sterilization of waste before its final disposal.

Public awareness campaigns can play a pivotal role in educating healthcare professionals, waste management personnel, and the general public about the importance of responsible waste disposal practices. Additionally, fostering collaboration between healthcare institutions, waste management authorities, and regulatory bodies is essential to develop and implement effective, localized solutions that align with Ukraine's unique challenges.

Exploring sustainable alternatives, such as waste-to-energy conversion and recycling initiatives, can further mitigate the environmental impact of medical waste disposal. By adopting a holistic approach that combines regulatory frameworks, technological innovations, and community engagement, Ukraine can navigate the complexities of medical waste management, promoting a healthier and more sustainable future for all.

Collaboration between healthcare institutions, waste management authorities, and regulatory bodies is essential to create comprehensive and effective strategies that balance the needs of healthcare services with environmental sustainability.

In conclusion, the proper disposal of medical waste is a critical issue that demands immediate attention and concerted efforts from all stakeholders involved. Through responsible waste management practices, the healthcare industry can minimize its environmental footprint, protect public health, and contribute to a more sustainable and resilient future.

V.E. Pletnev
Language supervisor: L. V. Afanasieva, Lecturer
Ukrainian State University of Science and Technologies (Dnipro)

ENVIRONMENTAL SAFETY IN UKRAINE

Environmental safety is a crucial aspect of a nation's well-being, ensuring the sustainable development of its natural resources and the overall health of its citizens. In the context of Ukraine, environmental safety is of paramount importance, given the country's rich biodiversity, fertile lands, and diverse ecosystems.

Natural Resources and Biodiversity Ukraine is endowed with abundant natural resources, including fertile soils, diverse flora and fauna, and significant water bodies. The preservation of this biodiversity is essential for maintaining ecological balance and supporting various ecosystems.

Protecting these resources is vital for the country's environmental safety.

Environmental Challenges Despite its natural wealth, Ukraine faces numerous environmental challenges. Pollution, deforestation, habitat loss, and industrial emissions threaten the delicate balance of its ecosystems. Addressing these challenges is crucial to ensuring a safe environment for current and future generations.

Government Initiatives The Ukrainian government has taken several initiatives to promote environmental safety. Legislation and policies have been implemented to regulate pollution, promote renewable energy sources, and conserve biodiversity. International collaborations and agreements also play a significant role in shaping Ukraine's environmental policies.

Public Awareness and Education Raising public awareness about environmental issues is fundamental in ensuring a sustainable future. Educational programs, awareness campaigns, and community engagement efforts are essential to inform citizens about the importance of environmental conservation and encourage responsible behavior.

Conservation Efforts Conservation efforts in Ukraine involve the establishment of protected areas, wildlife sanctuaries, and national parks. These areas serve as havens for diverse flora and fauna, contributing to the preservation of the country's natural heritage. Additionally, reforestation programs and sustainable agricultural practices are being promoted to mitigate environmental degradation.

References:

1. https://mon.gov.ua
2. https://academic.oup.com
3. https://www.andersoneng.com

SECTION 7.
MODERN TECHNOLOGIES IN BUILDING

V.V. Artemchuk
Doctor of Technical Sciences, Professor
Zaporizhia National University, Department of Electrical Engineering and Cyberphysical Systems
I.A. Arutunan
Zaporizhia National University, Department of Industrial and Civil Engineering

INNOVATIONS IN THE CONSTRUCTION INDUSTRY

Construction has always been an important branch of human activity, and in today's world, this branch is developing rapidly due to the introduction of the latest technologies. Modern technologies in construction not only make the work of builders easier, but also change the way we plan, execute and manage construction. Below are some of the innovative technologies in the construction industry.

Internet of things (IoT) in construction. This technology is used to collect and analyze data from construction sites. Thanks to sensors and sensors located in different parts of the building, builders and management companies can receive real-time information about the state of the building, air quality, temperature regimes, energy consumption and other parameters.

Construction using drones. Drones are becoming an important part of the construction process. They are used for conducting aerial photography of construction objects, inspection of construction sites, as well as for quality control of work performance. Drones allow construction workers to obtain high-quality images and data, which simplifies visual monitoring and helps identify potential problems in time.

Building materials of a new generation. Modern technologies make it possible to create new types of building materials that have improved characteristics in terms of strength, thermal insulation and resistance to environmental influences. For example, airgel is a material that has very low thermal conductivity and is used to increase the thermal insulation of buildings. Without exaggeration, the development of "flexible" concrete can be considered a breakthrough technology. Also, building materials are being developed, which are made from secondary and environmentally friendly materials.

Construction with the help of robots. Through robots and automation of the construction process, productivity can be significantly increased and risks for workers can be reduced. Robots are already being used for routine tasks such as loading and unloading materials, as well as for more complex tasks such as welding and painting. This allows you to increase the speed of construction and reduce costs.

Integrated building management software systems (BIM). These systems have become a standard in modern construction. They allow you to create virtual models of buildings that include information about all stages of construction - from design to operation and maintenance. BIM helps improve collaboration between different parties in the construction process, reduce design errors, and increase productivity and quality of construction work.

3D printing systems in construction are constantly evolving, and this technology has great potential for the future. The ability to quickly and precisely create building elements or even entire buildings from various materials, including concrete, metal and plastic, allows you to realize the most daring architectural concepts. 3D printing reduces construction costs by reducing labor and shortening project lead times. In addition, this technology allows you to reduce the waste of building materials and improve the energy efficiency of buildings, as well as makes it more affordable and efficient.

Thus, modern technologies in construction are evolving, making construction more efficient, environmentally friendly and safe. These innovations help to improve the quality of construction projects and reduce costs, which is important for the sustainable development of the industry. With the help of modern construction technologies, it is possible to create more energy-efficient and sustainable buildings that meet the modern requirements and needs of society.

P. S. Mishchenko
Language supervisor: L. V. Afanasieva, Lecturer
Ukrainian State University of Science and Technologies (Dnipro)

LATEST TECHNOLOGIES FOR CONSTRUCTION

Building games. With the help of 3D computer models, every architect or builder can review and make modifications to their project with a few clicks of the mouse. The creation of three-dimensional models of future buildings is reaching a new level thanks to 3D gaming technology. Modern computer programs allow you to walk around your project as if you were traveling through a computer game, marking problem areas and completing the building. Project team members have the opportunity to travel through the computer universe together in real time, distributing tasks among themselves. Group work with the help of computer innovations saves about 40% of paid time, because mistakes are easier to spot and correct.

Drone Technology. As companies improved their construction operations, they looked for a way to continuously collect information to make quick adjustments, and that's when the drone came into their hands. Drones have made a significant contribution to the success of modern construction. Drones provide accurate topographic data, which is then used to create 3D models on the BIM platform. When working on difficult terrain, drones come to the rescue like never before, whether it's ravines or hills, they scan the site safely and efficiently. The main task of unmanned aerial vehicles during the work is to fly over and take photos that inform about the current state of the work and allow updating 3D models to coordinate the work.

Modular construction. Modular construction is the erection of residential buildings from integral blocks - modules. One such module consists of walls, floor and ceiling. The main advantage of modular technologies over traditional capital construction is the short timeframe for the construction of such buildings, their relatively low cost and autonomy. They are mainly used where it is not possible or unreasonable to build capital structures.

3D printing. 3D printing is one of the most widespread and newest technologies in the construction industry, just like BIM. Its mechanism is the creation of three-dimensional buildings from digital models, first used in 1995. In 2023, the current trend is to create three-dimensional models using 3D programs. 3D printing as a construction technology can mix material sources. In prefabricated

construction, materials for a project can be printed and then delivered to the construction site, ready for immediate use. This makes it possible to obtain materials faster and optimize the process. One of the current challenges associated with the implementation of this technology is the limitations of mass production. While some 3D printers can produce on a larger scale, they are expensive.

References:

1. https://www.bbc.com/ukrainian/science/2016/10/161027_building_technology_rl
2. https://store.quadro.ua/bim-ta-droni-v-budivnitstvi-yak-bim-ta-droni-dopomagaut-na-budivelnomu-maydanchiku/
3. http://pbp.if.ua/modular-building/
4. https://www.intellectsoft.net/blog/8-emerging-construction-technology-trends/

A.V. Sherstii
Research supervisor: F.D. Shylo, Candidate of Technical Sciences, Associate Professor
Language supervisor: L. V. Afanasieva, Lecturer
Ukrainian State University of Science and Technologies (Dnipro)

MODERN TECHNOLOGIES IN CONSTRUCTION

Modern technologies in construction have become a necessity in our time, as the construction industry is undergoing a true revolution thanks to innovations. The information and digital era has opened up endless possibilities for improving the efficiency of construction projects, reducing environmental impact, and enhancing the quality of life within buildings.

The contemporary technologies discussed in this text encompass a wide range of innovations, from the use of the Internet of Things and 3D printing to artificial intelligence and the utilization of renewable energy sources. These technologies are transforming the construction sector, making it more resilient to climate change, environmentally friendly, and productive.

In our discussion, we will explore these innovations and their impact on construction, as well as reveal how they contribute to the improvement of life quality and resource utilization within buildings. Let this text be a source of information and inspiration for all those interested in the future of construction.

1. **Integration of IoT and Smart Homes**: The use of the Internet of Things enables the creation of "smart homes" where automation systems for heating, lighting, security, and energy conservation work together, enhancing the comfort and safety of residents.
2. **3D Printing and Complex Constructions**: Utilizing 3D printing in construction allows for the rapid and efficient creation of complex and customized architectural structures.
3. **Artificial Intelligence and Optimization**: The application of artificial intelligence and data analytics helps optimize all aspects of construction, including planning, resources, and work quality.
4. **Green Building and Sustainability**: Green building practices, incorporating the use of renewable energy sources and eco-friendly materials, contribute to reducing CO2 emissions and the development of climate-resilient structures.
5. **Modular Construction and Robotics**: Modular designs and the use of robots expedite construction projects and reduce costs.
6. **Virtual Reality and Visualization**: The use of virtual reality and augmented reality enhances project visualization and enables effective quality control.
7. **Drones for Monitoring**: Drones are employed for aerial photography, inspections, and monitoring of construction processes, improving safety and productivity.
8. **Automation and Unmanned Technologies**: Automation and the use of unmanned vehicles enhance safety and efficiency on construction sites.
9. **Innovative Materials and Nanotechnologies**: The utilization of innovative materials, such as graphene and nanotechnologies, allows for the creation of lightweight and durable building structures.
10. **Blockchain for Security and Management**: The implementation of blockchain technology in the construction industry ensures transparency, data security, and effective project management.

Ihor Sikora
Language supervisor: T. A. Kuptsova, Cand. Sc, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

ECO-REVOLUTION IN THE CONSTRUCTION INDUSTRY

Historically construction materials have been designed to meet a fixed specification and material degradation has been viewed as inevitable and mitigated for through expensive maintenance regimes. Material scientists have recently begun developing materials which have the ability to adapt and respond to their environment, drawing on their knowledge and familiarity of biological systems. This fundamental change in material design philosophy has resulted in the creation of a whole host of 'smart' materials, including self-healing materials [1].

It is interesting to mark that even a small crack in a concrete structure can develop into a much bigger, more expensive problem. According to CityLab, materials scientists have recently found a novel way of using living spores to help concrete mend itself when cracks occur!

The solution involves small, water-permeable capsules that can be mixed into wet concrete. Once the concrete sets and dries, the spores exist in suspended animation – just like packets of dry yeast. When a crack opens in the concrete and fills with water, though, they begin to grow and produce calcite, a crystalline form of calcium carbonate found in marble and limestone. The calcite fills the cracks in the concrete and hardens, preventing the crack from getting any wider.

Self-healing concrete presents great interest in modern construction industry as it could help buildings, tunnels, bridges, and other structures to last longer without significant repairs or replacement. Moreover the money that would be saved over the long run is difficult to calculate, as is the reduction in carbon emissions. That said, the costs right now are significantly higher than for regular concrete, and if they don't come down, this may only be an option for projects that have to last a long time.

Much attention is also given to air Cleaning Bricks. Carmen Trudell, assistant professor at Cal Poly San Luis Obispo's school of architecture and founder of Both Landscape and Architecture, has invented a passive system that makes use of the bricks on the outside of the building to filter out the heavier particles in the air as it enters the space. The concrete bricks funnel air into an internal cyclone filtration section that separates heavy elements and drops them down into a hopper at the base of the wall. Clean air is then pulled into the building, either mechanically or passively, and maintenance can simply remove and empty the hopper on a periodic basis.

In tests, the system removed about a third of fine particulate matter and 100 percent of coarse particles. Better still, Besides Trudell's system is inexpensive relative to alternative options, and she envisions using them in developing countries [2].

To the advantages of Pollution Absorbing Bricks the scientists refer:

- 1) the energy used in the production of this system is less as it does not use any mechanical components;
- 2) it is inexpensive in comparison with the mechanical air filtration techniques used in large scale. It is environment friendly and is sustainable;
- 3) there is no requirement for skilled labourers to construct the system, making it cost-effective.

But there are also some disadvantages of Pollution Absorbing Bricks:

- 1) breathe bricks passive filtration system is that the exterior wall takes as much as double the original space, which leads to contraction of the Interior space;
- 2) pollution Absorbing Bricks cannot be used in load-bearing structures than two-storeys.

The alternate material like breathe bricks, serves as a potent aspect for a greener tomorrow. It is beneficial in areas with the heavy particulate outdoor matter. It can mostly be used in regions with poor air quality [3].

It is obvious that in the modern construction industry, great advancement is being made to be part of the eco-revolution. Many alternate materials are being developed with conventional materials.

Literature and references:

1.https://www.icevirtuallibrary.com/doi/10.1680/coma.900051?gclid=Cj0KCQjw8eOLBhC1ARIsAOzx5cGoHkjCqvZ3aqRYdieRgHUlh6ndvIDNCzUuTN1XHt3SnVunCwoiuYEaAhj7EALw_wcB
2. https://aquicore.com/blog/10-new-materials-changing-commercial-construction/
3. https://civilwale.com/pollution-absorbing-bricks

Artem Vidanov
Language supervisor: T. A. Kuptsova, Cand. Sc, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

FUTURE INNOVATIVE CONSTRUCTION TECHNOLOGIES

There is nothing eternal in this world, just like technology, each technology has its own lifespan, just like media storage, it goes from floppy disk, CD, DVD, HD-DVD, and now Blu-ray. The advantage of new technology is that it comes with the adding features to make our life easier.

A good example of this is mobile technology, which isn't just for games anymore. Apps are becoming more of the norm in construction, and for good reason. The increased portability of tablets and smartphones allows for greater communication and the ability to work from anywhere. Integrating this type of technology into your current processes can be much simpler and require a smaller upfront investment while still providing major benefits and boosting productivity in your day to day operations, moreover technology can help save time and keep your project moving forward faster by providing real-time updates and making information available between the job site and the office.

We can't help mentioning drones, which are the most widely used emerging construction technology. They can conduct site surveys more quickly and accurately than a crew on the ground and are cheaper than aerial imaging. Their high resolution cameras and the data collected can create interactive 3D or topographical maps and models, and take volume measurements. Another benefit of using drones is the ability to inspect hard to reach places such as bridges or around tall buildings, and to do it safely. You can also use them to monitor progress on a job site and see how people are working.

Building Information Modeling (BIM) is similar to CAD (computer aided design), but not exactly the same. It is software for 3D design to digitally model what will be built. But it's capabilities don't stop there: "It doesn't just create a visually appealing 3D model of your building - it creates numerous layers of metadata and renders them within a collaborative workflow. It captures things in a way that paper just can't. The researchers estimate, that 32.7% of builders are currently using BIM/CAD software. Besides, the use of BIM provides space for better collaboration because each person and expertise area can add their piece to the same model, instead of broken out onto multiple versions of a 2D paper drawing. This way, the model evolves immediately as people contribute, streamlining the process and increasing efficiency. BIM also helps with problem solving in the design and planning stages of a project, by automating clash detection and providing a more complete picture of the project.

Wearables are a construction technology that will have an impact on job site safety and risk management. The Daqri smart glasses, though still in the early stages, are one example. The glasses have an augmented reality display, wide-angle camera, depth sensor and other features that allow workers collect and see data based on their environment. The glasses give workers the information and instructions they need to complete a task right on the display, getting the job done faster and with less room for error.

The implementation 3D printing as a construction technology has the potential to change material sourcing. For prefabrication, materials for a project can be printed and then transported to the job site, ready for use immediately. This can allow you to get materials faster and streamline the process by removing extra steps in the middle. According to the U.K. Green Building Council, around 15% of materials delivered to construction sites end up in landfills, and the American Institute of Architects believe that building-related waste makes up between 25% to 40% of America's solid-waste stream, reports Fortune. With 3D printing it will even be possible to print materials right on site, reducing waste and further saving on transportation and storage costs. But, one of the current challenges with adoption of this technology is limitations with mass production. Although some 3D printers can produce on a larger scale, they are expensive.

Besides, the construction industry is already seeing implementation of artificial intelligence on the job site with the use of robotics for tasks like bricklaying and autonomous equipment that can operate and complete tasks without the need for human interaction.

In the conclusion, it should be underlined that predicting the future is hard and risky. But predicting the future in the computer industry is even harder and riskier due to dramatic challenges to innovations.

A. O. Vlasenko
Language supervisor: V.V.Lemeshchenko-Lagoda, Senior Lecturer
Dmytro Motornyi Tavria State Agrotechnological University

BENEFITS AND CHALLENGES OF USING LASER SCANNING TECHNOLOGY IN THE CONSTRUCTION INDUSTRY

The principle of a modern market-based economy assumes a constant increase in competition among companies in the construction industry. Therefore, companies have a need to optimize processes, reduce costs and correctly assess risks.

In the process of construction and reconstruction, the need for precise measurement and mapping of certain areas of space regularly arises. Classical measurement method for obtaining metric information about spatial objects does not allow the formation of a detailed three-dimensional model of the object, does not exclude the risk of errors as a result of the human factor, is very labour-intensive and, in some cases, can be dangerous to life and health. A promising alternative to the classical measurement method is laser scanning [1, 2].

Laser scanning is a method of using laser beams to capture and map spatial dimensions and objects. The result is a detailed and highly accurate 3D representation of the entire construction project or site, known as a point cloud. The scanner fires multiple 360-degree lasers that hit every object in the scanned space. When the laser pulse hits objects, the scanner estimates the angle and energy of the beams, and this information is used to model the space. The whole process is fast and extremely accurate [1, 2].

Laser measuring system is a quick solution for all site measuring tasks. A Laser Measuring System is an equipment that comprises of a laser distance meter and a software that allows you to see the reconstruction of a space onto your computer screen. This equipment can be placed manually or with the help of remote control at the required position and then with the help of a laser beam the measurements of the space can be taken down [3].

The main benefits of using laser scanning technology:

– it allows to record internal and external parts with an accuracy of up to 1 mm, helps to minimize the number of errors in the construction project;
– many times higher speed compared to manually measurement;
– ability to take measurements in areas potentially hazardous to people;
– three-dimensional visualization during the scanning process [2].

It is also important that all these advantages reduce the overall costs of the construction project. At the same time, this technology has a number of disadvantages, including:

– If there is a need to scan outside the line of sight and coverage area of the scanner, it is necessary to bind the scanner to the coordinate system with geodetic tools.
– Inability to scan glass and perfectly smooth surfaces.
– Weather conditions and environmental factors may adversely affect the performance of the scanner [2].

To sum it all up, laser scanning can be characterized as an extremely promising and revolutionary technology with some limitations in use. There is no doubt that laser scanning will continue to evolve and will eventually be used everywhere.

References:

1. Laser scanning in construction. URL: https://www.bigrentz.com/blog/laser-scanning-in-construction
2. Planning for Scanning in Construction. URL: https://core.ac.uk/download/pdf/80683453.pdf

3. Лемещенко-Лагода В.В., Кривонос І.А. Notes on Basic Geodesy and Land Surveying. Навчальний посібник. Мелітополь: ФО-П Однорог Т.В., 2020. 168 с., іл.

SECTION 8. HUMANITIES AS THE COMPONENT OF THE PROFESSIONAL TRAINING

L. R. Chopyk
Research supervisor: I. M. Syrko, Candidate of Philological Sciences, Associate Professor
Drohobych Ivan Franko State Pedagogical University

STRUCTURAL AND SEMANTIC PECULIARITIES OF THE ENGLISH POPULAR BALLADS

Among the issues generally under scrutiny in the investigation of the popular ballad, the following are of great importance: the origin of the ballad form, the origin of the ballad stories, the audience to which this poetry is addressed, the characters of the ballads, the plot.

Ballads are short narratives in stanzas of two or four lines, that tell their stories in a highly characteristic way; they are dramatic, using a high proportion of dialogue and presenting the story in a series of rapid flashes, that may be compared with the technique of the cinema. They are free from the rhetorical devices of most 'learned' poetry but possess a rhetoric of their own, using repetition, in threes (*'He hadna gone a mile, a mile, A mile but barely three'*), or in sevens (*'For in will come my seventh bauld brither'*), stock phrases (*'the gold so red', 'the wan water'*), and a stylized description of heroes and heroines.

The special narrative technique of the ballads under analysis in this work carries a folk-view of life, an ironic acceptance of tragedy, and a rich background of popular myth: of ghosts and fairies. The result is often poetry of a high order, well known to many from the great anthology pieces like “Clerk Sounders, Edward, and Sir Patrick Spens”.

Most of the popular ballads are impersonal in their attitude, but not as entirely as one is often led to believe. The ballad "I" may not often refer to the individuality of the author, but the "I" of the singer or reciter is frequently present, as in the well-known ballad “The Twa Corbies” (*As I was walking all alane, // I heard twa corbies making a mane*). In this type of poetry the author avoids asserting his own peculiarities and tastes, hence there is little comment or moralizing.

In their form the ballads are uncomplicated. The story is divided into clearly defined stanzas and makes much use of repetitions and refrain. In its simplest form, a ballad may be built up of a series of almost identical verses in which the changing of no more than a single phrase in each is the means of leading to a climax (*O where hae ye been, Lord Randal, my son? // O where hae ye been, my handsome young man? // I hae been to the wild wood; mother, make my bed soon, // For I’m wi hunting, and fain wald lie dow*). A number of ballads have irrelevant refrains, which produce a striking poetic effect: the violence and cruelty of the story is ironically contrasted with the peaceful continuity of Nature (*She laid her back against a thorn // Fine flowers in the valley, // And there she has her sweet babe born // And the green leaves they grow rarely*). These refrains show that the original pattern of the ballad stanza was the non-narrative carole, to which at a later stage narrative words were attached.

The simplicity of the ballad form implies the simplicity of language and of syntax, as well as an economy of expression. Few ballads are longer than a page or two of print (“Clyde Water”, “Tam Lin”, “Sir Aldingar”, the cycle of Ballads of Robin Hood and his Meiny). Those that exceed this limit are generally historical narratives with a simple story-line. Since ballads were intended to be understood by a broad audience, they could not make use of sophisticated imagery. In their structure there are no complicated sentences of the written lyric. The ballads make use of "and" clauses (there are no "though" or "it” clauses), with successive statements, and statement followed by qualifications (*And when you come to the castle, // Light on the bush of ash, // And sit you there and sing our loves, // As she comes from the mass*).

The structural and semantic organization of the English popular ballads is determined by the

specificity of their genre genesis on the one hand, and on the other hand, by the peculiarities of the artistic semantics employed in these poetic works.

Oksana Hilchuk & Bohdan Kotovskyi
Research supervisor: Nataliia Mykhalchuk, Doctor of Psychology, Professor
Language supervisor: Ernest Ivashkevych, PhD in Psychology, Associate Professor
Rivne State University of the Humanities

THE IMPORTANCE OF SCIENTIFIC RESEARCHES OF THE PERSON'S MEMORY

Psychological researches of memory have to be included into the context of different scientific paradigm, but we have our own point of view. At the same time, it is proof, that a person is the subject of study either as a product of biological development or as an ordinary individual with his/her own genetic program. However, it is not easy to compare the knowledge obtained during the study of the phenomena of "memory". Also, we've to study how mnemonic abilities influence and such complex processes as learning and teaching. However, the level of memory itself has played the dominant role from the birth of the person. Without diminishing the importance of basic factors, we've to note that children are born with different mnemonic abilities, of high and low levels. But not the last role is played by the specially created environment in the family, by public and educational establishments.

The development of a child's main cognitive processes, including memory, in preschool age can be spontaneous and controlled, organized and disorganized, and the level of intelligence having been achieved by a child up to 6-7 years old, as well as the degree of his/her readiness to study at school, depends significantly on how much information or informative frames in preschool institutions was perceived out during the previous three or four years. These years make a significant contribution to the cognitive development of children. It is no coincidence that the leading type of the person's activity at this age is a game, which is complemented, of course, by other types of activity that affect the child's development, including the process of communication.

In the early age children have great opportunities for improving cognitive processes, primarily perception through the formation of sensory actions, consciously regulated by the aim of transforming perceptual activity in order to build adequate images of it. In conjunction with the development of perception in preschool age there is a process of improving the child's memory. But if the possibilities for the development at this age are more or less limited than perception, they are much wider or more global than memory is. Its improvement is for children the most important, because preschoolers can proceed simultaneously along several different characteristics. The first characteristic is actualizing the processes of memorization of the person. The second one is the transformation of the child's memory from direct to indirect scripts. The third characteristic shows the development of means and techniques of both memorization and attention.

By the end of preschool childhood, the person's memory is separated into a special independently controlled mental function of the child, which he/she can control from one degree to another one. In the elder preschool age, due to the presentation of special mnemonic tasks to other children, the transition of psychic processes to arbitrary memory takes a place. The more tasks preschoolers display, depend on their communication, the activities. The faster their memory turns from involuntary to voluntary, the more developed the mnemonic sphere of the person is. At the same time, mnemonic actions are separated into some special groups among other types of actions, which are performed in the connection with the implementation of this or that productive activity. Mnemonics are actions, which have the aim of memorizing, saving and reproducing different types of information. For the development of the child's voluntary memory, it is important to catch in time and make the most degree of the person's desire to remember or recall something.

The process of improving children's memory is connected with the use of mental operations of analysis, synthesis, comparison, generalization, establishment of meaningful connections in the processes of memorizing and reproducing material. We can say that the improvement of the child's memory occurs simultaneously with the improvement of his/her mental activity. In such a way it directly dependents on it.

A. S. Korzh
Language supervisor: I. H. Miroshnychenko, Candidate of Philological Sciences
Ukrainian State University of Science and Technologies (Dnipro)

ENGLISH LEARNING PERSPECTIVES IN UKRAINE

According to data from the International Educational Centre Education First, English is considered the most influential language globally and is increasingly viewed as an essential skill for the global workforce. Moreover, a country's economic development is closely linked to the proficiency of its citizens in English. Ukraine, in this context, is ranked 41st in the Worldwide English Proficiency Rating and 24th out of 26 European countries. Notably, the female population of Ukraine tends to have better English proficiency compared to males.

Work.ua surveys reveal that 43% of Ukrainian university students are confident in their English skills, making them the most self-assured group overall. Additionally, 75% of Ukrainian IT professionals possess English skills beyond the intermediate level, demonstrating its significance in various sectors, including maritime jobs, consulting, and management. According to a TNS survey, while 89% of respondents claim to have some knowledge of English, only 18% of them are proficient in the language at a higher level

According to the research conducted by the Kyiv International Institute of Sociology, 88% of survey participants believe it is crucial for Ukrainians to acquire proficiency in English. Recognizing the significance of English as an international communication tool for Ukraine's EU aspirations, efforts have been initiated to elevate its status. The President of Ukraine has launched the Future Perfect national program, aimed at generating a demand for the English language among Ukrainians. Coordinated by the Ministry of Digital Transformation, the Ministry of Education and Science, and the Ministry of Culture and Information Policy, this initiative aims to enhance the competitiveness of Ukrainian business, science, education, innovation, and governance.

The primary objective of the Future Perfect project is to establish English as the official language of international communication in Ukraine. This strategic move is anticipated to unlock new avenues for professional and personal development for all Ukrainians, fostering global competitiveness and higher earning potential. The program provides free access to four English courses, covering General English, Business English, English with TV series, and Travel English. The Promova language learning platform, an integral component of the Future Perfect program, offers grammar and vocabulary lessons, pronunciation training using machine learning, and adapted classics in English literature. Ukrainians can choose between explanations in Ukrainian or English for an immersive learning experience.

Promova, as one of the pioneering products under the Future Perfect national English language promotion program, aims to facilitate language learning through its application and web version. Free Premium access is available for Ukrainians, allowing them to pursue self-study courses and attain their language learning goals.

Ukraine should engage foreign professionals and native English speakers in English language education, streamline their entry into the country, and their stay. Furthermore, the government should implement a gradual certification process for foreign language teachers in alignment with European language education recommendations to determine their proficiency levels and establish appropriate wage differentiations.

Additionally, there are plans to introduce TV and radio programs for English language learning targeting various segments of the population and to showcase movies in English with Ukrainian subtitles. As per the decree, it is imperative to assess the English language proficiency of public servants and provide language courses for their development. English learning should be incorporated into the training programs for public servants and local government officials.

Sofia Opanasiuk & Liza Kondratiuk
Research supervisor: Nataliia Mykhalchuk, Doctor of Psychology, Professor
Language supervisor: Ernest Ivashkevych, PhD in Psychology, Associate Professor
Rivne State University of the Humanities

HOW TO STUDY VISUAL NARRATION AT THE ENGLISH LANGUAGE LESSONS AT SECONDARY SCHOOLS

The study of visual narration has lately been of interest in the academic world. What makes the study of visual images challenging is the fact that the visual experience is described first and foremost with language; the visual meaning is verbalized and narrativized through language. One of the great early masters of comic books, Will Eisner was one of the first to demand comics the respect they deserve, both as an art form as well as an object worthy of serious academic study. His book, *Comics and Sequential Art* (1985), is despite its twenty-plus years' age still a valid aid when analyzing the very basic elements of comics, such as imagery, timing and framing, all of which are crucial in understanding and comprehending the building blocks of comics as a narrative medium. When one examines a comic book feature as a whole, the deployment of its unique elements takes on the characteristic of a language. Comics communicate in a "language" that relies on a visual experience common both to creator and audience. The format of the comic book presents a montage of both word and image, and the reader is thus required to exercise both visual and verbal interpretive skills. The regimens of art (eg. perspective, symmetry, brush stroke) and the regimens of literature (eg. grammar, plot, syntax) become superimposed upon each other.

Despite the fact that Eisner produced his fundamental work twenty-seven years ago, this statement holds firm today. Comic book experts still continue to stress the unique nature of reading abilities comics require, and the union of word and image has become even more centralized in the modern study of comics. Comics are seen as a language, even though the grammar of this language is far from the completeness of the grammar rules of written language. Comic book narration includes aspects such as the composition of each page, which in turn affects the contents of that page. This creates an interplay between the content and the form, and the elements that are used to create comic book narration are so various that they do not create such limitations to the form as does the strictly written text. In the structural analysis of *Watchmen* and its narratological levels, this thesis will apply some of Eisner's observations on the "grammar" of comics. It should also be pointed out that languages within this grammar alter greatly, and serve various different purposes – there exists no unified and single language within comics any more than in reality.

Another "structuralist" approach that continues Eisner's ideas on the study of comics is Scott McCloud's acclaimed *Understanding Comics – The Invisible Art* (1993), in which McCloud attempts to develop comprehensive tools for comic book analysis, discussing the various ways and multiple levels comics work at. McCloud's work is quite unique (and what can i say, it inspired me the most to break the official requirements to research papers), narrated completely in comic book form, with McCloud's drawn alter ego illustrating the various problematic aspects related to comics with different visual examples. One that still works remarkably well is his demonstration of the power of the "gap" or the "gutter", the white line between the panels that requires active participation from the reader to construct the events taking place in the timelessness of the white void. *Watchmen* actually puns with the term gutter right at its beginning: "…the gutters are full of blood" (Moore & Gibbons, 1987: I; 1) writes the vigilante Rorschach in his diary, while blood is indeed washing into the street gutter in the accompanying panel – but the panel edges close off the blood from the white "gutter", in which the only blood is the one the reader's imagination puts into it. The gutter is the place where the real action happens, and the metaphorical blood will seep back into the panels throughout the story, shading the panels with bloody pink. As Scott McCloud describes it, the gutter brings us the notion of closure, "the relation between the shown and the not shown, the stated and the implied, the articulated and the suggested" (McCloud, 1993: 67).

The single panel has traditionally been seen as the basic component of comic book narratives, and the action traditionally takes place from panel to panel. These transitions can be *temporal*, which include a clear transition and usually very little closure.

K.S. Pantileienko
Dniprovskiy State Agrarian and Economic University

MAIN BENEFITS OF INTERPERSONAL COMMUNICATION FOR PUBLIC ADMINISTRATION SEEKERS

Subscribers to Harvard Business Review rated the ability to communicate number one as the most important contributor in making someone promotable. They rated it above ambition, education, and hard work.

Public administrators serve a variety of people and will often find themselves working in groups throughout their careers. In addition to coursework, a Public Administration major must cultivate good communication skills so that the administrator can do the following five things.

Build Trust. In the past, leadership was about making difficult decisions and giving directives. Today's effective leaders practice transparency and consensus building. They have high emotional intelligence, and they win the confidence and trust of others. Possessing superior interpersonal communication skills will help today's public administrators earn the trust of those who they work with and serve.

Identify Barriers. By employing stellar communication skills and creating an atmosphere of trust, public administrators are able to identify barriers to their work. Creating an environment that supports open discussion and sharing of opinions reduces the surprises behind projects. When adults are able to communicate openly and effectively, they are more honest in their concerns and more apt to share ideas and the team benefits from it. This also applies to special interest groups. Having assertive communication skills when dealing with those bent on influencing decisions on rules and legislation will help curtail them.

Build Consensus. Someone with good interpersonal communication skills understands the impediments to efficient work because they listen for them. Administrators who recognize concerns and hesitations in the team or audience are better able to build consensus in support of the project because they know the obstacles.

Leaders with good communication skills are able to make everyone feel included and involved in the process, even if they aren't directly. Good communicators encourage participation, which goes a long way to building consensus. Administrators with good communication skills will help people be solution-minded and not get derailed by differences.

Strengthen the Team. Team members emulate what they see in leadership. If they witness effective communication being used, they will strive for the same. Communication must be a source of information and inclusion.

Understand the Most Effective Medium. In today's world of personalization and connecting with the audience on their preferred terms and methods, using interpersonal communication skills to understand the most effective approach and communication tools for the message is essential to a successful career in public administration.

Since disseminating information is at the crux of good communication, finding the right method will get the message across in an efficient and palatable way. Good communication is about more than what is said; the power is also in how it's delivered. In 2008, the Internal Revenue Service mailed an informational letter to all U.S. taxpayers outlining the stimulus package, what taxpayers would receive, and when they would receive it. Today, some of that communication may have also taken place online to maximize the number of people exposed to the message.

Developing good communication skills is about more than just voicing an opinion in a professional way. People communicate even through silence. For public administrators who will spend their lives serving, effective communication is essential to success.

Y. R. Romashchenko
Research supervisor: Votintseva M. L. Associate Professor
Oles Honchar Dnipro National University

ROLE OF THE TRANSLATOR: “SHADOW OR CO-AUTHOR”?

The influence of the translator's personality on the quality of translation plays a significant role, and the individual approach directly affects the final result. The study analyzes how translators treat issues of style and form in the translation process and how this affects the reproduction of the original work. Comparative analysis of translations of the same work is necessary to identify differences in style, form, and general approach of translators. The psychological aspect of translation, namely the relationship between the translator's personality and his or her attitude to the text, has an impact on the choice of style and form of translation.

The study determines whether the translator acts as a "shadow" trying to leave his or her mark as little as possible, or as a "co-author" adding his or her own style and interpretation to the translation. Translators who choose the role of "shadow" are usually guided by the principle of reproducing the text as accurately and impersonally as possible, avoiding their own interpretations and stylistic features. The role of the "shadow" may be necessary in cases where adherence to the literary canon, accuracy, and impersonal reproduction of the text are the main requirements. In such cases, the translator should not stand out and leave his or her mark, but should give preference to the most accurate translation possible. This is especially true in the case of scientific, technical, or legal texts. Co-author translators try to have more influence on the text by introducing their own stylistic decisions, interpretations, and nuances. They are more inclined to artistic and literary translations, where personal style can be a key factor in a successful translation. Translators who choose the role of "co-author" can be more innovative and creative in their translation. They can add allegories, metaphors, and other artistic devices that were not present in the original to enhance the text or adapt it to a new audience. It is important to keep in mind that in some cases, a translator can combine both roles, reproducing the original text as a "shadow" but adding their own accents and interpretations in certain fragments as a "co-author". This can create a more multifaceted and interesting translation. The question of "shadow or co-author" is relevant in the context of cultural adaptation and intercultural communication. Translators who choose the role of "co-author" can be more effective in reproducing and conveying cultural nuances and peculiarities.

The impact of the translator's role on the final text is determined not only by style and form, but also by the context and purpose of the translation. It is important to consider each case separately and take into account the needs of the audience. The study of the translator's role as a "shadow" or "co-author" is important for understanding the translation process and its impact on the preservation of authenticity and the transmission of information, as well as for the development of methods and approaches to translation in various fields and genres. The translator's personality, experience, and professional qualities determine their ability to choose between the roles of "shadow" and "co-author" and achieve the desired result in a particular translation task.

M. P. Ryzhuk
Language supervisor: O. O. Kravets, Senior Lecturer
D. Motornyi Tavria State Agrotechnological University

ELECTORAL PARTICIPATION OF YOTH IN ELECITONS

The participation of young people in presidential elections is a critical component of any functioning democracy. In many countries, including Ukraine, the youth demographic constitutes a significant portion of the population, and their engagement in the electoral process can profoundly impact the nation's political landscape. Voting is a civic duty that every eligible citizen should exercise. It is important to participate in elections as it plays a significant role in shaping of a nation's future.

The aim of our work is to analyze the activity of young people in the recent elections.

We would like to highlight the main reasons to vote according to the poll of our youth. Firstly, voting is one of the main aspects of a democratic society. It enables people to have their voices heard and express their opinions. It also gives you a say on important issues that affect you - from building roads and recycling, to education and climate change.

Secondly, when we vote, we have the power to elect leaders who has similar values and works for the better future of society. Furthermore, by taking part in the elections, we send a message to politicians that we are active citizens.

Moreover, voting provides fair representation and equal opportunities for all members of society. If people don`t vote, politicians won`t be motivated to listen to them because their positions aren`t at risk. This indifference may cost a lot to the citizens in future.

Unfortunately, many people don`t vote because they believe their one voice doesn`t matter. The reality is that elections are often decided by very close margins. If everyone realized their vote matters, goverments would be more representative.

According to the data of "Ukrainian Pravda" (https://www.pravda.com.ua/columns/2019/03/28/7210391/) in Ukraine, the share of the young population, who participated in the elections in 2019, was only 40 %. This is 4% less than the turnout of young people in the 2014 presidential election. It means that only 2.3 million of the 18.5 million voters who took part in the election, according to the Central Election Commission's website. Moreover, 60% of young people, i.e. 3,450,000 (almost two-thirds!) of millennials, ignored the elections. If we compare the results with 2014, we can see that 44% of young people participated in the 2014 presidential election. The trend is threatening. According to the investigation of the New Europe Centre (http://neweurope.org.ua/wp-content/uploads/2017/11/Ukr_Generation_ukr_inet-2.pdf) Ukrainian youth are mostly uninterested in politics. The most interesting for Ukrainian youth is the policy of Ukraine at the national level: those who are very interested and rather interested - 13% of all respondents. Being politically active is important only for only one in five Ukrainians. As for political leaders, the level of distrust in them among young people is at a record high: three quarters of young people in (74%).

Summarizing the all above said we can come to the conclusion that a low percent of young people is ready to take part in the elections and vote, which shows their indifference to the social and political processes in the country and now we can observe the awful consequences of their passivity.

In conclusion, voting is an important aspect of democracy. This guarantees that citizens have a voice and a stake in the decision-making process. Therefore, we believe that it is important to vote in elections to shape a future that reflects the values and aspirations of its citizens.

Anna Savchuk & Anna Melnyk
Research supervisor: Nataliia Mykhalchuk, Doctor of Psychology, Professor
Language supervisor: Ernest Ivashkevych, PhD in Psychology, Associate Professor
Rivne State University of the Humanities

PSYCHOLOGICAL PECULIARITIES OF THE FORMATION OF SOCIO-CULTURAL COMPETENCE OF HIGH SCHOOL STUDENTS AT THE LESSONS OF THE ENGLISH LANGUAGE

The thesis analyzes the state of the studied problem in the philosophical, psychological and pedagogical literature, describes the essence and content of the concept of "socio-cultural competence", "socio-cultural approach". The current level of formation of socio-cultural competence of high school students in English lessons is determined. The experimental model "Peculiarities of formation of sociocultural competence of high school students in English lessons" in the structure of English lessons in 10 classes is theoretically substantiated and developed. The effectiveness of the formation of socio-cultural competence of high school students in English lessons has been developed and experimentally tested.

The scientific novelty of the obtained research results is determined by the fact that for the first time the peculiarities of formation of sociocultural competence in English reading in English lessons are theoretically substantiated, approaches to determining the purpose and content of formation of

sociocultural competence in English reading in English lessons are improved. the model of formation of sociocultural competence in English reading in English lessons is substantiated, the theoretical substantiation of criteria of selection of English country texts as a component of the content of teaching reading of senior pupils for the purpose of formation of sociocultural competence is formed, the subsystem of exercises reading in English lessons.

The practical significance of the research results lies in the selection of educational local lore texts from modern Internet sources, the development of sets of exercises combined in the subsystem, the conclusion of guidelines for organizing and conducting relevant training that can be used by foreign language teachers in practice. and teaching English in a specialized school in particular.

Studying a foreign language contributes to the integration of the individual into the system of world and national cultures, because graduates of a specialized school must be able to perceive and understand not only a foreign language, but also the culture of the country whose language is being studied, be ready to quickly adapt to the modern intercultural space and actively interact in it. When selecting topics of a cultural nature, it is not just about the systematic presentation of country studies knowledge about the country whose language is being studied, but about the need to teach students to perceive another culture from the standpoint of socio-cultural sensitivity (sensitization) and intercultural tolerance. Otherwise, the accumulation of factual country-scientific material can confuse rather than prepare for intercultural communication.

The existing contradictions determine the relevance of the problem of creating a methodology for the formation of high school pupils' sociocultural competence in reading in English classes. The relevance of the problem of the formation of sociocultural competence in high school pupils in English lessons is due to the need to create an appropriate teaching methodology in the conditions of a social order for the preparation of a competitive graduate of a secondary school capable of intercultural dialogue, and the urgent need to reform the content of foreign language teaching in a secondary school.

The cultural approach to teaching English in a modern secondary school assumes in the educational process a close interaction of the language and the culture of its speakers, the inseparability of the linguistic and cultural picture of the world that exists in the mind of the pupil, in his worldview, created on the basis of his educational experience of learning the language through the prism of cultural phenomena and explanation of cultural features through their embodiment in language.

A.V. Semeniuk
Language supervisor: O. O. Kravets, Senior Lecturer
D. Motornyi Tavria State Agrotechnological University

COMPARATIVE ANALYSIS OF DIGITAL STATE PLATFORMS "DIIA" AND "DIIA.PL"

In the modern world, digital initiatives in public administration have become essential tools for enhancing the accessibility of government services. They play a crucial role in improving citizen identification. Ukraine and Poland have implemented two advanced digital platforms, "Diia" and "Diia.pl."

This study conducted a comparative overview of these applications based on a scientific approach to assess their effectiveness and societal impact.

The "Diia" platform is an interactive virtual portal offering various government services. It serves as a platform where citizens can access services conveniently from any location at any time, praised for its accessibility in delivering government services. On the other hand, the "Diia.pl" platform is an innovative tool that provides a document confirming the legality of the stay of individuals who have received temporary protection in Poland due to the war in Ukraine. This document enables citizens to cross the borders of the European Union and the external borders of Poland. Our research methodology included an analysis of official sources of both platforms and surveys of users, including 43 students residing in Poland after the events in Ukraine.

Analyzing the function of document storage, we have to note that "'Diia' allows Ukrainian citizens to store electronic copies of important documents, such as passports and other identification papers, promoting convenient and secure management of personal data. "Diia.pl" also provides the opportunity to store documents, including identification papers for Ukrainian citizens who have crossed

the border into Poland. This feature is particularly important for individuals in temporary protection status in Poland.

As for the document processing and service access it was noted that "Diia" provides access to a variety of government services, including the ability to obtain prescriptions and driver's licenses, making the interaction with the state as convenient as possible for citizens. Diia.pl' allows Ukrainian citizens to store their PESEL (Personal Identification Number). This document enables individuals to legally stay in Europe and access various services. Speaking about accessibility and speed we can see that "Diia" is accessible to all Ukrainian citizens and continually evolves to enhance the accessibility and speed of service delivery. On the other hand, " Diia.pl' operates efficiently, but users are required to go through an authentication process each time they use the platform. Documents obtained through 'Diia.pl' are subject to specific rules. According to these rules, a citizen can move freely within Europe without losing their temporary protection status only if their stay in Ukraine does not exceed 30 days.

The results of our research confirm the important role of both the "Diia" and "Diia.pl" platforms in the implementation of digital innovations. Each has its unique features that serve to specific user needs, especially in the areas of document storage and access to government services. Based on our research, it was found that for students residing in Poland after the events in Ukraine, the "Diia.pl" platform is perceived as more convenient and practical in providing a legal means of crossing borders and identifying in the European Union. Thus, our research underscores the vital role of both platforms in facilitating the lives of citizens residing in Poland and in need of legal identification and government services.

K. M. Serdiuk
Research supervisor: Malivskyi A.M. Professor, Doctor of Philosophical Science
Language supervisor: Muntyan A.O., Associate Professor, Candidate of Philological Sciences
Ukrainian State University of Science and Technologies (Dnipro)

TECHNOLOGY AND MORALITY

What can be said about morality in the context of the impact of scientific and technological progress? In today's world, scientific progress fills up all of a person's free time. Do you have any objections? Why did you read this text? What made it possible for us to share our thoughts with you? Many everyday things were not natural in the time of Socrates, but now they are.

A phrase that may undermine your standard perception of the "independence" of technology and morality: "I heard my teacher say that someone who acts mechanically will have a mechanical heart. If there is a mechanical heart in the chest, then the original purity will be lost, and when the original purity is lost, the life spirit will not be calm... ". (Zhuangzi) The problem of the "mechanical" heart befell us long before automation came into our lives. And how can morality develop where culture has become a secondary concern and the "smog of factories" absorbs all free space.

Asian countries have long talked about the negative impact of technological progress on life: "Damn you to live in the age of change" - this expression has a double meaning. As we know, we are not living in the Stone Age, but in the age of digital and nanotechnology.

There is no progress without regression, but we need to be sober about what we can gain and what we will lose. Our generation has preferred breakthroughs in science and technology, but who will think about culture, morality, ethics and other comprehensive personal development? While in the mid-20th century, morality was above all else, this concept is now being lost. It is possible to combine the development of the spiritual and not lose touch with modern trends in science and technology, but a large younger generation will prefer a smartphone to a book, a laptop to a trip to the theatre, and searching for a particular concept on the Internet to studying science in general. But devices can be used in different ways, as the philosopher A. Bitov said: "And in any case, the progress that saves people from hunger and disease cannot contradict the preservation of the beginnings of active goodness, which is the most human in man. I believe that humanity will find a reasonable solution to the difficult task of making grand, necessary and inevitable progress while preserving the human in man and the natural in nature."

Perhaps we are too concerned with the development of technology, and so much neglect our personal growth. The question is how to use the knowledge gained correctly and competently, how to direct it in the right direction, for the benefit of ourselves, people, and the homeland. At the same time, we can talk about an arms race between Russia, America and China. An arms race of this magnitude is unlikely to lead to anything positive. Investments in military forces are much greater than in education, medicine, and cultural heritage. This means that the leading countries of the world are absorbed in a game among themselves, rather than in the development of the morality of their people.

The scale of scientific and technological progress should not exclude the development of the people in all areas. It is necessary to promote the rational distribution of funds, time, and effort, relying not on one discipline but on a complex, not forgetting to think about the "essence of human life".

After all, philosophy is the mother of all sciences, meaning that without thought, there will be no progress! That is why the philosophy of technology emerged as a result of a critical assessment of our civilisation. After getting acquainted with O. Spengler, we can note: "Technology should not be interpreted in terms of tools. It is not how a thing is made that matters, but what can be done with it... It is always purposeful activity that is important, not things."

The conclusion from the above is the following thought: "It is important to develop correctly and rationally in all directions, not fully succumbing to progress or regression, while remaining a Human: a personality, and a respected one at that." A human being sounds proud. It is true that this status should sometimes be proved by our humanity. But our future lies in progress, and the future lies in people, in intelligent people who have not lost their morals and have retained the most important thing - a living heart.

V.V. Striukova
Language supervisor: M.L. Votintseva, Candidate of Philological Sciences, Associate Professor
Oles Honchar Dnipro National University

STAGES OF TRANSLATION OF POETRY

Literary translation is a kind of reflection of cultures, languages and peoples, which is the core of the national literary process and illuminates it in all its inherent richness. Today, one of the largest areas of translation theory is literary translation of poetry. The fact that a huge number of studies carried out by linguists are devoted to the problems of artistic translation is an undeniable proof of how multifaceted this phenomenon is and what a wide range of problems it illuminates. Poetry is a literary phenomenon. Since that fact a translator has to have an accurate plan how to cope with this complex task. There is a number of stages that the translator must go through in order to achieve the desired result - an adequate translation and, if possible, an equivalent one. L. Novikov considered all literary texts as formations with a complex organization, distinguishing the following text levels:

1) the level of aesthetic ideas, or ideology, identical to the content of an artistic work, serving as an artistic interpretation of the displayed reality, embodied according to the author's intention;

2) the level of genre and composition represents the poetics of the artistic text in its general interpretation. The level is formed by the compositional specificity of the artistic text, the aspects of which are the content-genre affiliation of the work, the system of artistic images with a high degree of interaction, plot development, placement and proportionality of artistic details;

3) the language level, or the aesthetic speech system, includes all figurative language means that express the ideological and aesthetic essence of a literary work. The language level is formed due to separate levels, such as: lexical or semantic, grammatical (morphonological and syntactic), word-forming, phonetic, etc.

In terms of translating poetic works, it is essential to draw attention to the whole translation process. The step every translator must do from the very beginning is to analyze the source language text from various angles. It covers all above mentioned levels. The translator forms an idea about the content of a poetic work, highlights key images, stylistic divices, with the help of which the author's idea was conveyed. The translator also determines the genre and system of images in the work. The next is making an interlinear - literal translation of each line, using which the translator will be able to form an

idea about the future translation. Searching for images, rhymes, transferring stylistic devices from the target language, etc. requires special attention. The task of the translator is not just to convey the idea, but also to express it in such a way that the reader understands and perceives all the means by which the author tried to express it. The concept of rhyme and rhythm should not be forgotten too. The translational problem here arises in the dilemma of their preservation or loss. The next stage of the translation of a poetic work consists in creating a translation itself, taking into account all the previous acquisitions obtained during the analysis. Upon completion of this stage, the translator moves to the editing stage. Here his task is to eliminate all printing errors and check the soundness of the translation, if necessary, select and replace certain elements of the translation. After that, the translation can be presented to the reader.

In conclusion, the main task that must be faced by a translation specialist is the intelligibility and adequacy of conveying the message in the most accurate form to its consumers in all possible ways. For the implementation of which it is necessary to use a clear algorithm, to have a sufficiently large amount of knowledge in various fields of both languages, the ability to preserve, if possible, the rhythm, verse size of the original and to get out of any situation by using the above necessary translation qualities.

Y.S. Semrak
Research supervisor: A.M. Malivskyi, Doctor of Philosophy, Professor
Language supervisor: A.O. Muntian, Candidate of Philological Sciences, Associate Professor
Ukrainian State University of Science and Technologies (Dnipro)

WHY IT'S IMPORTANT TO KNOW YOURSELF?

Most of the people don't know themselves. Such pessimistic at first sight constatation has been indisputable for quite a long time, starting from the era when philosophical thought was born, and ending with modernity. A lot of people usually think about everything and everyone but forget to stop for a moment and ask themselves: "What am I doing? Why do I have to do this?" and "What am I supposed to do at all?".

Such questions especially should be sharpened today, in times of war. When the old world and ideals collapse, a person, sooner or later encounters himself and it's very important to be prepared for this. At this time, it's important to have patience and courage, so you can answer on the most fundamental question for yourself: "How and for what reason should I live?".

Despite the overall drama of the above, philosophers at all times have been finding the strength and opportunity to point us to the way out of this situation. We all know the circumstances of the first actualization of the self-knowledge principle in European philosophy. It's associated with the ancient Greek thinker Socrates, who proclaimed: "Know yourself!". It's essential for us that the question: "How should I live?" was fundamental in Socrates' philosophy, but at the culmination of Socrates' life, this question was transformed into another: "What should I die for?". As is known, Socrates was facing the death penalty and he was able to defend himself in court. However, Socrates, clearly aware of the possible consequences, chose for himself a completely unusual for the Athenians defense tactic. He didn't abdicate his philosophy and convictions even for a moment, for which he was sentenced to death. But even before execution Socrates demonstrated the truth of his philosophy and drank a cup of hemlock without the slightest hesitation, saying that he was not afraid of death, since he knew nothing about it.

Socrates' experience and philosophy are indisputably important to us in our search of ourselves. And like Socrates, the first step on our path to self-knowledge is the simple admitting that we know nothing about ourselves. It might make sense to put ourselves under a big question mark. We should also understand what we should focus on in life, what to do and what should we live for. This is mostly the answer to the question "How should I live?".

In addition, for many of us there is a big problem in choosing those occupations that we should devote our lives to. And in this problem self-knowledge will be the solution. Grigory Skovoroda, our "Ukrainian Socrates", focused a lot of his attention on the problem of happiness. In his opinion, one of the ways to achieve happiness is precisely "congenial work". Such work "makes the necessary simple, and the complex - unnecessary." A person should listen to his heart and choose the work that is allocated to him by nature.

In such difficult times, it’s very important for us, Ukrainians, to answer the fairly simple and at the same time difficult question: “How well do we know ourselves?”. It’s important to understand what is our own freedom, our happiness, and what is the meaning of our existence. Every person, having such a valuable gift as life and freedom, must answer the question of how and for what he should live.

Ye.V. Steshenko
Language supervisor: I. H. Miroshnychenko, Candidate of Philological Sciences
Ukrainian State University of Science and Technologies (Dnipro)

CULTURAL FACTORS IN INTERCULTURAL COMMUNICATION

Cultural factors profoundly shape our perceptions and interpretations of others in intercultural communication, influencing our understanding of behaviour, values, and social norms. Language nuances, varying communication styles, and nonverbal cues specific to different cultures contribute to the complexity of intercultural interactions, impacting how we comprehend the intentions and emotions of individuals from diverse backgrounds.

This report explores the characteristics of intercultural communication, with a primary focus on cultural factors that influence our understanding of others. Typically, our heuristic for navigating this terrain revolves around the concept of culture. We engage with literature, articles, or blog posts about cultural differences, gaining insights into how individuals from diverse backgrounds, such as Germans, Chinese, or Italians, may differ in their thinking, behaviour, or expression of emotions. This process often gives us a sense of preparedness.

Cultural context plays a crucial role in determining the appropriateness of certain expressions, humour, or gestures, affecting the way we interpret and respond to communication cues in intercultural settings. Social hierarchies, power dynamics, and the importance of individual versus collective identities within a culture contribute to differing communication expectations, influencing our ability to navigate and comprehend intercultural interactions effectively.

Cultural biases, ingrained through upbringing and societal norms, often lead to subconscious preconceptions and stereotypes that can shape our initial perceptions of others, affecting the overall quality of intercultural communication.

However, the challenge arises from the questions we pose to ourselves, the most common being, "What culture does this person come from?" While this question is not irrelevant, it's essential to recognize that individuals within the same culture may respond differently due to their unique individuality. Nevertheless, national cultural differences do hold significance.

Effective communication across cultures is intricate, as each culture operates with implicit rules that its members consider inherent. Our cultural biases, imprinted from an early age, often go unnoticed, as much of this cultural information is absorbed subconsciously. Various types of cultures exist, including High-Context and Low-Context. High-context cultures, such as Mediterranean, Slavic, Central European, Latin American, African, Arab, Asian, and American-Indian, often leave messages unspecified, relying on context, nonverbal cues, and between-the-lines interpretation. Conversely, low-context cultures, prevalent in most Germanic and English-speaking countries, expect explicit and specific communication.

Another cultural distinction lies in the concepts of Sequential and Synchronic time orientation. Some cultures perceive time as a linear commodity to "spend," "save," or "waste" (Sequential), while others view it as a constant flow to be experienced in the moment, with past, present, and future interconnected (Synchronic). Synchronic cultures, including South America, southern Europe, and Asia, envision time as a circular flow, where past, present, and future are interrelated. Furthermore, cultures differ in their orientation to the past, present, and future. Americans, for instance, believe in personal efforts influencing the future, but due to the uncertainty of distant variables, they often favour a short-term perspective. In synchronistic cultures, the emphasis is on understanding the present to prepare for the future.

Sofia Tarasiuk
Research supervisor: Nataliia Mykhalchuk, Doctor of Psychology, Professor
Language supervisor: Ernest Ivashkevych, PhD in Psychology, Associate Professor
Rivne State University of the Humanities

AUTHENTIC FUND OF THE ENGLISH LANGUAGE AND ITS IMPORTANCE FOR PSYCHO-LINGUISTICS

Authentic fund of the language is a treasury of folk wisdom, which includes the most apt, capacious, artistically expressive words-observations that touch upon all the most essential spheres of life and human activity. This fund is an open system, because it is constantly replenished at the expense of well-known aphorisms of public figures, artists, writers and scholars who so often use these figures of speech in the media and everyday communication, which eventually lose their authorship and become a national heritage. Acquiring aphorism for the proverb's status is not only, and not in a large degree, due to its direct meaning. In such a way the teacher has to take into account the way of expression of thoughts, the form that serves as a mean of embodying new semantic meanings. The latter gives for the language of folklore poetic speech, which, according to classical expressions, represents "the best words in their best order". Each proverb is, to our mind, a miniature of artistic product, the content and aphoristic force of which are generated by its condensed imagery and peculiarities of the rhythm-based structure.

Recently in psychological researches the interest to authentic fund has increased, because the scientists show their reflections of deep myths and archetypes of human consciousness that can be manifested both in ancient folk structures and in contemporary hints stamps of mass consciousness (advertising, ideological texts, PR-technologies, etc.). Also, authentic fund reflects the totality of thoughts made by the people as a linguistic and cultural community, and makes it possible to identify significant mental values of any ethnic group. A large number of studies of authentic fund show the constant interest of scientists to this phenomenon. As the integral part of a spiritual culture, proverbs and sayings, with all their versatility, are manifested in a great number of languages a certain specificity of verbalization, due to the subjectivity inherent to the speakers of the interpretation of a surrounding reality, which continues to cause interest. Capacity and informativeness are the essential qualities of a linguistic sign, which underlies its most important functions along with communicative and cumulative functions. The language is as a link between generations, it is so called "repository" and a means of transferring extra-language collective experience.

First of all, the vocabulary reflects fragments of social experience, due to the main activities of people. The existence of these ones or other lexical units is explained by practical needs of a teacher. The connection of the history and culture of people with the language is particularly pronounced at a phraseological level. A large number of proverbs and sayings reflect specific national traits, their roots go deeply into the history of people, their lives, customs and traditions. In psycho-linguistics the development of the theory of asymmetrical dualism of a linguistic sign is seen in a promising direction, according to which a plan of expression and a plan of contents sometimes violate the principle of a one-to-one correspondence between denotatum and syndicate.

Carefully selected vocabulary and the structure of the statement forms not only the content but also the perception of the event. So, well-used vocabulary of feelings allows us to look into the inner psychic world not only of the depicted person with his/her feelings and emotions, but also shows the personality of the author. An empirical reality is infinitely diverse, and, therefore, the structure of proverbs and sayings is equally mobile and unpredictable. That's why proverbs and sayings was the material of our research, such as authentic material and authentic tasks for pupils at the English lessons at a contemporary secondary school.

We believe that the isomorphism of proverbs and sayings is manifested in the genesis of their formation, representation, paradigmatic relational and expressive-emotional saturation. The sense also manifests itself in the presence of archaic elements in the texture of proverbs and sayings, in the formation of a special paradigms (synonymy, antonymy), in figurative and concise realization. The significance of the differences of the notion of authenticity of materials and authenticity of tasks is

represented at the level of their deep structures, which express a complete / unfinished opinion.

Ya. M. Zashko
Language supervisor: I. H. Miroshnychenko, Candidate of Philological Sciences
Ukrainian State University of Science and Technologies (Dnipro)

SOME DISADVANTAGES OF E-LEARNING

E-learning holds immense importance in today's educational landscape, providing flexible and accessible learning opportunities for individuals across geographical locations and diverse schedules. It fosters lifelong learning, enabling students and professionals to acquire new skills, stay updated in their fields, and adapt to evolving knowledge sphere. There are a number of benefits in spreading this form of teaching and self-education. On the other hand, it is obviously that there are some disadvantages too. In this paper we have tried to highlight them in a brief way.

Engaging in online courses demands a considerable level of self-discipline and motivation over time. Managing the distractions becomes crucial for a productive learning experience. While some students are initially motivated in the early months of online courses, many experience a decline in motivation over time, potentially leading to course abandonment or poor grades. Online courses are most suitable for individuals with high self-discipline.

While online courses offer various advantages, a notable drawback is the often limited individual support they provide. In contrast to traditional university courses where in-person queries are readily addressed, online learners may encounter delays in receiving responses, potentially hindering their comprehensive understanding of course materials.

Many online courses entail exams as part of the completion requirements, necessitating effective time management for exam preparation. Inability to manage time appropriately may lead to inadequate preparation and, consequently, an increased likelihood of exam failure.

The ease of losing motivation for self-study contributes to higher dropout rates in online courses compared to traditional college lessons. In a traditional setting, teachers actively motivate students, but the lack of external motivation at home may lead to increased dropout rates.

Interactions with fellow students, a significant aspect of traditional university attendance, are restricted in online courses. While occasional online chats are possible, the robust connections formed in physical classrooms are often absent.

Networking, a crucial element of university attendance, is notably lacking in most online courses. Establishing connections on campus often translates to valuable connections with various companies, providing a potential advantage in the job market—a networking aspect absent in online education.

Securing financial aid for online courses is challenging in many countries, as scholarships typically do not cover online education costs. Talented individuals eligible for university scholarships may find joining traditional universities more financially viable.

Online courses often face lower overall acceptance and reputation. Many companies prefer graduates from conventional universities, potentially resulting in limited job opportunities and lower salaries for those with online degrees.

It can be concluded that while online courses offer a convenient means to enhance education, they come with downsides. Prospective learners should carefully evaluate the quality and reputation of online courses before enrollment to ensure a worthwhile investment. Properly informed decisions can make online courses a valid alternative to traditional education.

GERMAN LANGUAGE SECTION

I.S. Shynkariuk
Wissenschaftliche Betreuerin: T.V. Bodnarchuk,
Kandidatin der pädagogischen Wissenschaften, Dozentin

DER EINSATZ VON MODALPARTIKELN IM DAF-UNTERRICHT: ANALYSE UND BEISPIELE DER ÜBUNGEN

Modalpartikeln sind Wörter, die in einem Satz hinzugefügt werden, um die Stimmung oder die Einstellung des Sprechers auszudrücken. Sie verändern die Bedeutung eines Satzes, indem sie Nuancen hinzufügen. Erst in den letzten Jahrzehnten sind die Modalpartikeln ins Interesse der Sprachwissenschaft gerückt. Sie kommen besonders häufig in der gesprochenen Sprache vor und sind dort keineswegs, wie früher angenommen, unnütze Füllwörter. Sie drücken sehr differenziert Einstellungen, Annahmen, Bewertungen und Erwartungen des Sprechers bezüglich des geäußerten Sachverhalts, teilweise auch seine Erwartungen an den Hörer aus. Der Grammatik der deutschen Sprache von Zifonun zufolge umfasst die deutsche Modalpartikelklasse einen Kernbereich von 16 Wörtern (aber, auch, bloß, denn, doch, eben, etwa, halt, ja, mal, man (regional), nicht, nur, schon, vielleicht und wohl) sowie einen Randbereich von 6 Wörtern (eh, eigentlich, einfach, erst, ruhig und überhaupt).

Die Verwendung von Modalpartikeln kann komplex sein, da sie nicht immer eine klare und feste Bedeutung haben, sondern stark von Kontext und Intonation abhängen. Für den modernen, kommunikativen DaF-Unterricht sind die Modalpartikeln nämlich äußerst relevant, denn sie tragen dazu bei, die Sprache gut zu beherrschen. Im DAF-Unterricht ist es wichtig, die Modalpartikeln zu identifizieren und zu verstehen, wie sie in verschiedenen Situationen eingesetzt werden. Es ist wichtig, den Schülern zu erklären, wie Modalpartikeln die Bedeutung von Sätzen verändern können und wie sie in verschiedenen Kontexten eingesetzt werden. Der Einsatz von Beispielen, Übungen und Dialogen ist eine effektive Methode, um das Verständnis und die Anwendung von Modalpartikeln zu fördern.

Während des Praktikums haben wir versucht, in den Deutschstunden an den Modalpartikeln zu arbeiten. Wir haben viele Übungen vorbereitet, die verschiedenen Aspekte der Sprache in der Stunde üben. Das sind, zum Beispiel, die Lückentexte, in die die Schüler entsprechende Modalpartikel aus einer Liste auswählen und einsetzen sollen, die Diskussionen zu verschiedenen Themen führen und dabei Modalpartikeln verwenden. Oder eine interessante Aufgabe für kreatives Schreiben: eine kurze Geschichte zum Thema „Ein geheimnisvoller Besuch“ (mindestens 150 Wörtern) zu schreiben und dabei die Modalpartikeln, wie z.B. "ja," "doch," "mal," "wohl“, "eben" zu verwenden, um die Stimmung der Geschichten zu betonen.

Außerdem ist es wichtig, auf die subtilen Unterschiede zwischen Modalpartikeln hinzuweisen und wie sie die Bedeutung eines Satzes beeinflussen können. Die Schüler sollten lernen, wie Modalpartikeln in verschiedenen Gesprächssituationen und Stilen verwendet werden, sei es informell, formal oder höflich.

Insgesamt sind Modalpartikeln ein faszinierendes und vielseitiges Element der deutschen Sprache, das im DAF-Unterricht sorgfältig behandelt werden sollte, um den Schülern ein tieferes Verständnis der Sprache und bessere kommunikative Fähigkeiten zu vermitteln. Es ist wichtig, den Schülern zu vermitteln, dass die Verwendung von Modalpartikeln subtil und nuanciert ist, aber dennoch eine entscheidende Rolle bei der Bereicherung der deutschen Sprache spielt. Der Gebrauch von Modalpartikeln ist eine wichtige Fähigkeit im Erlernen der deutschen Sprache. Im DAF-Unterricht ist es entscheidend, die Verwendung von Modalpartikeln zu analysieren, zu verstehen und anzuwenden. Durch gezielte Übungen und Aufgaben können Deutschlernende ihre Fertigkeiten im Umgang mit Modalpartikeln verbessern und ihre sprachlichen Fähigkeiten weiterentwickeln. Modalpartikeln sind ein integraler Bestandteil der deutschen Sprache und verdienen daher besondere Aufmerksamkeit im Unterricht.

O. R. Osadcha
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

NEUE TECHNOLOGIEN IM BAUWESEN

Eine „klimaneutrale Gesellschaft“ ist kein abstraktes Ziel, sondern konkrete Ideen für unsere Zukunft und einen nachhaltigen Alltag. In einigen Bereichen wird dies unser Leben radikal verändern, in anderen Bereichen werden wir jedoch weiterhin so leben können wie bisher. Die Grundbausteine dieses Alltagslebens sind bereits sichtbar.

Der Bau von mehrstöckigen Gebäuden ist ein komplexer, zeitaufwändiger und verantwortungsvoller Prozess. Bauunternehmen versuchen, Gebäude so zu bauen, dass sie warm, zuverlässig und schalldicht sind und gleichzeitig zu möglichst geringen Kosten errichtet werden. Zu diesem Zweck setzen die Bauherren beim Bau von mehrstöckigen Gebäuden zunehmend neue Technologien ein.

In den letzten 10-20 Jahren sind im Bauwesen eine Vielzahl von Technologien und Lösungen entstanden, auf die Entwickler häufig zurückgreifen. Schauen wir uns einige der innovativen Veränderungen an, die heute von ukrainischen Bauherren aktiv genutzt werden und von denen vor zehn Jahren in der Ukraine fast nichts bekannt war:

Beim Building Information Modeling handelt es sich um ein Informationsmodellierungswerkzeug, mit dem sich die Rentabilität eines Projekts bewerten lässt. Dank des Programms kann der Bauherr schnell die erforderlichen Unterlagen erstellen und den Gewinn berechnen, den er durch den Bau erzielen wird.

Der Einsatz von 3D-Druckern im Bauwesen. Nur fortschrittliche Bauunternehmen verwenden Drucker, um einige Elemente eines Hauses herzustellen. Aber es gibt bereits mehrere Häuser in der Welt, die ausschließlich mit einem 3D-Drucker gebaut wurden. Die Schwierigkeit beim Einsatz dieser Technologie sind ihre hohen Kosten.

Immer mehr Unternehmen nutzen grüne Energie, um ihre Gebäude mit Strom zu versorgen. In den meisten Fällen ist es nicht möglich, den Strombedarf der Bewohner vollständig mit Sonnenkollektoren zu decken, aber es ist möglich, dies teilweise zu tun. Ein solches Projekt gibt den Bewohnern die Möglichkeit, von der zentralen Energieversorgung der Stadt einigermaßen unabhängig zu sein. Darüber hinaus haben die Paneele eine lange Lebensdauer.

Drohnen können eingesetzt werden, um Luftaufnahmen zu machen, den Umfang der Bauarbeiten zu beurteilen und Problembereiche zu finden. Die Drohne hilft auch dabei, die Infrastruktur in der Nähe zu beurteilen und schöne Werbefotos für Investoren zu machen. Diese Geräte werden auch für Sicherheitszwecke eingesetzt. Wenn es sich um eine große Anlage handelt, ist es für das Sicherheitspersonal ziemlich schwierig, sie zu umrunden, daher sind Drohnenpatrouillen rund um die Uhr eine gute Lösung.

Der Einsatz neuer Technologien im Bauwesen macht es möglich, auch Metallkonstruktionen frost- und hitzebeständig zu machen: Dank der speziellen Konstruktion von thermischen Profilen sind Rahmenkonstruktionen hinsichtlich ihrer Wärmeleitfähigkeit mit Konstruktionen aus natürlichen Materialien vergleichbar.

Ortsfeste Schalungen als neue Technologie im Bauwesen tauchten zuerst in den USA auf, wanderten dann nach Europa und wurden schließlich auch von Bauunternehmen in den GUS-Ländern eingesetzt.

Dieser Entwicklungszyklus bedeutet, dass sich die Fixschalung als neue Technologie im Bauwesen unter verschiedenen klimatischen Bedingungen als äußerst effektiv erwiesen hat. Die Technologie beruht darauf, dass die zur Herstellung monolithischer Stahlbetonkonstruktionen verwendete Schalung nach dem Aushärten des Mörtels nicht entfernt wird, sondern als Hohlraumfüller und Wärmedämmmaterial dient.

V.V. Wasyliskin
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

DAS IT-MANAGEMENT HEUTZUTAGE

Die Bewältigung der aktuellen Herausforderungen der digitalen Transformation erfordert erhebliche

organisatorische, verfahrenstechnische, personelle und kulturelle Veränderungen. Einige Unternehmen reagieren bereits auf aktuelle und zu erwartende zukünftige Veränderungen. Allerdings ist oft noch sehr unklar, in welche Richtung sich IT-Unternehmen entwickeln sollen.

Die Informationstechnologie ist in den meisten Unternehmen bereits heute ein wichtiger Produktionsfaktor. Allerdings wird es oft nicht als strategisch wichtiger Wettbewerbsfaktor angesehen. Wir gehen davon aus, dass sich die Situation durch die digitale Transformation deutlich ändern wird. IT-Know-how wird im gesamten Unternehmen notwendig sein. Der Einsatz von IT bezieht sich nicht mehr nur auf Geschäftsprozesse, sondern zunehmend auch auf die angebotenen Produkte und Dienstleistungen. Damit wird IT zur überlebensnotwendigen Ressource; Der Zeitraum vom Systemausfall bis zur Unternehmensinsolvenz wird radikal verkürzt. IT wird viel umfassender, vernetzter, autonomer und vor allem kreativer genutzt. Für erfolgreiche Unternehmen der Zukunft sind bestehende Geschäftsmodelle oft nur der Ausgangspunkt für die weitere Geschäftsentwicklung. Dementsprechend werden die IT-Lösungen in Zukunft noch schneller benötigt. Je schneller sie definiert, umgesetzt und in Betrieb genommen werden, desto besser können Unternehmen Märkte erobern und sich eine Wettbewerbsposition sichern. Durch diese Entwicklung wird aus der heutigen Kombination von Business und IT eine Verschmelzung von Business und IT.

Die klassische Unternehmens-IT zeichnet sich typischerweise durch ein relativ statisches Plan-Build-Do-Paradigma aus, das Routinen und Prozesse innerhalb der IT-Organisation strukturiert und auf Effizienzsteigerung ausrichtet. Feste Strukturen in der IT ermöglichen effiziente Arbeitsabläufe und fördern die Automatisierung, stoßen jedoch beim Vorantreiben von Innovationen an ihre Grenzen. Doch gerade diese innovativen Aktivitäten, die zu neuen oder veränderten IT-gestützten Geschäfts- und Wertschöpfungsmodellen führen, sind die entscheidende Herausforderung der digitalen Transformation. Daher schlagen wir ein neues Paradigma vor. Im Mittelpunkt stehen die Fähigkeit zur Innovation durch größere Agilität und Flexibilität, die kundenorientierte Fähigkeit, IT-Lösungen für bestimmte Zwecke zu entwickeln, und die transformative Fähigkeit, die aus der Digitalisierung resultierenden Veränderungen voranzutreiben und umzusetzen. Durch den angestrebten Paradigmenwechsel werden klassische IT-Aufgaben wie die Entwicklung und der Betrieb von Anwendungssystemen in den Hintergrund gedrängt und durch neue Kompetenzen ergänzt. Viele IT-Projekte werden heute von Unternehmensabteilungen initiiert und anschließend von IT-Organisationen umgesetzt. Aufgrund relativ langsamer Abstimmungs- und Implementierungsprozesse sowie langer Entwicklungszyklen sind die resultierenden IT-Lösungen oft nicht innovativ und selten bahnbrechend. Die Unternehmens-IT wird eher als langsamer Dienstleister denn als kreativer Innovator wahrgenommen.

Durch den gestiegenen Veränderungsdruck der Digitalen Transformation werden die Fachbereiche in zunehmendem Maße im Hinblick auf IT-Lösungen selbständig und ohne Einbindung der Unternehmens-IT aktiv. Die Folge dieses distanzierten Verhaltens ist das Phänomen des sogenannten „Tailoring“ oder „Schatten-IT“, das insbesondere im Hinblick auf Compliance, Sicherheit und Architekturanforderungen als problematisch angesehen wird. In diesem Zusammenhang fragt man, ob eine solche organisatorische Trennung von IT und Business vor dem Hintergrund der Digitalisierung überhaupt sinnvoll ist. Die IT-Innovationen idealerweise dort entstehen sollten, wo sie künftig zum Einsatz kommen.

D.A. Tscherewertschenko
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

DAS WACHSTUM DES INTERNETS UND PERSPEKTIVEN DES INGENIEURWESENS

Der rasante Anstieg der Computerintensität und Fortschritte in der Computertechnologie haben die Verarbeitung und Analyse großer Datenmengen ermöglicht und zu Durchbrüchen auf dem Gebiet der künstlichen Intelligenz und des maschinellen Lernens geführt.

Das Wachstum des Internets und die Schaffung globaler Kommunikationsnetzwerke haben zu einer Revolution in der Kommunikation, in sozialen Netzwerken und im elektronischen Handel geführt.

Verschiedene medizinische Geräte ermöglichen die Diagnose genetischer Krankheiten und die Entwicklung personalisierter Behandlungen.

Automobil-, Luft- und Raumfahrtindustrie. Diese Branchen spielen eine führende Rolle bei modernen technologischen Fortschritten, indem sie Transportmittel bereitstellen und die Grenzen unserer Möglichkeiten zur Weltraumforschung erweitern.

Die Entwicklung erneuerbarer Energiequellen wie Solar- und Windenergie verringert die Abhängigkeit von fossilen Brennstoffen und trägt zur Bekämpfung des Klimawandels bei.

Die Entwicklung effizienter Energiespeichermethoden und Netztechnologien ermöglicht eine effizientere Nutzung erneuerbarer Energiequellen.

Die Erschöpfung der natürlichen Ressourcen. Eine wachsende Bevölkerung und die intensive Nutzung natürlicher Ressourcen wie Öl, Gas und Metalle stellen Nachhaltigkeitsherausforderungen dar und erfordern die Suche nach alternativen Quellen.

Der steigende Energieverbrauch im Zuge der Stadterweiterung und des technologischen Fortschritts wirft Fragen zur Nachhaltigkeit von Energiesystemen auf.

Veränderung des Klimas. Der Klimawandel bedroht Ökosysteme und führt zu häufigeren und heftigeren Naturkatastrophen, die technische Lösungen zur Anpassung und Eindämmung erfordern.

Der technologische Fortschritt bringt auch Bedrohungen in Form von Cyberangriffen und möglichen Unfällen mit automatisierten Systemen mit sich, was eine ständige Verbesserung der Schutzmethoden erfordert.

Herstellungsprozesse erzeugen oft große Mengen an Abfall und stellen Ingenieure vor die Herausforderung, effektive Entsorgungs- und Recyclingmethoden zu entwickeln.

Industrielle Prozesse und die Nutzung von Transportmitteln führen zu einer Verschmutzung der Atmosphäre, der Wasserressourcen und des Bodens.

Die Einführung von Technologien wie künstlicher Intelligenz und Biotechnologie wirft ethische, sicherheits- und datenschutzrechtliche Bedenken auf.

Die ungleiche Verteilung der technologischen Entwicklung zwischen den Ländern führt zu Herausforderungen beim Zugang und der Übernahme fortschrittlicher Technologien zur Lösung lokaler Probleme.

Technische Perspektiven.Erneuerbaren Energiequellen. Eine weitere Verbesserung der Solar- und Windenergietechnologien wird den Übergang zu umweltfreundlichen Energiequellen ermöglichen.

Fortschritte auf dem Gebiet der Gentherapie eröffnen neue Perspektiven für die Behandlung genetischer Krankheiten und die Verbesserung der menschlichen Gesundheit.

Die Entwicklung der Weltraumtechnologie und die Erforschung anderer Planeten ermöglichen es uns, unser Wissen über den Weltraum zu erweitern. Es werden Möglichkeiten erwogen, Weltraumressourcen wie Asteroiden für die Gewinnung von Mineralien und Materialien zu nutzen.

N. O. Rondow
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

KRÜMMUNGSRADIUS FÜR DIE ZULÄSSIGE GESCHWINDIGKEITSBEGRENZUNG

Der Kurvenradius bei Eisenbahnen auch oder Krümmungsradius genannt, ist ein wichtiger Parameter für die zulässige Geschwindigkeitsbegrenzung in einer Kurve auf einer Straßen- oder Schienenstrecke. Enge Kurvenradien bedeuten mehr Zentrifugalkraft, höhere Geschwindigkeiten erfordern daher eine Strecke mit breiteren Kurven.

Auf der Schnellfahrstrecke Nürnberg-Ingolstadt verkehren zwei ICE-3-Züge parallel, die eine Geschwindigkeit von 300 km/h erreichen können. Die beiden Kurven mit einem Radius von 4085 m und einer Höhe von 160 mm ermöglichen eine Fortbewegung mit dieser Geschwindigkeit. Zwischen ihnen befinden sich zwei jeweils etwa 500 m lange Übergangsbögen, die durch eine etwa 120 m lange Gerade verbunden sind. In diesem Bereich muss auf die Verbindung von Verkehrswegen zwischen der Eisenbahn und der wesentlich schmaleren Autobahn verzichtet werden.

Seit etwa 100 Jahren werden Verkehrswege so angelegt, dass gerade Abschnitte nicht direkt in Kurven übergehen, sondern dazwischen Übergangsbögen liegen. Daher werden Klothoiden häufig verwendet, sodass der Kehrwert des Kurvenradius, beginnend bei 0, linear zunimmt. Bei einem Auto

entspricht dies einem gleichmäßig zunehmenden Drehwinkel des Lenkrads.

Ein bestimmter Wenderadius und eine bestimmte Geschwindigkeit erfordern auch einen geeigneten Wendeauftrieb, um den Fahrzeugen ausreichend Neigungswinkel und Haftreibung zu bieten.

Auch dieser Überschuss muss von 0 auf der Geraden bis zum aktuellen Wert am Kurvenscheitelpunkt in angemessenem Maße ansteigen, um eine gute Fahrdynamik zu gewährleisten. Die Klothoide wird auch für den zunehmenden Straßenbau verwendet, die kubische Parabel hingegen für Eisenbahnstrecken.

Dies bringt jedoch insbesondere auf Bahnstrecken erhöhte Schwierigkeiten bei der Anpassung der Trasse an das Gelände mit sich. Bleibt die maximal zulässige Krümmung einer Bahn- oder Straßentrasse merklich unterhalb der Geländekonturen, entstehen erhöhte Kosten für den Bau von Baugruben und Dämmen.

Der kleinste Wenderadius für Straßenbahnen der Normalspur 1435 mm beträgt 17,5 m für Graz und 20 m für Wien, in Ausnahmefällen 18 m. Auch die Münchner Straßenbahn hat einen engen Wenderadius, unter anderem 14 m von 1908 bis 2012. Der Mindestradius der Wiener U-Bahn auf der Linie U2 beträgt 100 m.

Lokale Bergbahnen haben einen minimalen Wenderadius von 50 bis 100 Metern, z. B. Berninabahn 45 m, Wengernalpbahn 60 m, haben eine überregionale Bedeutung mit einer höheren Ausbaugeschwindigkeit von beispielsweise etwa 200 m. B. Semmeringbahn 190 m. Für die Schmalspurbahn Lissabon 900 mm ist ein Mindestradius von 9 m vorgeschrieben.

Im Schienenverkehr liegen typische Radien zwischen etwa 30 Metern und mehreren Tausend Metern, beispielsweise bei neuen Hochgeschwindigkeitsstrecken. Im Grenzfall wird eine Kurve gerade, wenn ihr Radius alle Grenzen überschreiten darf.

Wird die Strecke von Zügen ohne Kipptechnik befahren, ist bei einer Geschwindigkeit von 300 km/h eine maximale Wankabweichung von 100 mm zulässig. Ausgehend von diesem Wert und einer maximalen Höhe von 180 mm als Basiswert ergibt sich beispielhaft folgender minimaler Bogenradius: 3799 m für 301 km/h; 10536 m für 500 km/h

Auf Straßen findet man die kleinsten Radien häufig in Serpentinenkurven oder in städtischen Umgebungen, beispielsweise beim Abbiegen an einer Kreuzung oder beim Umfahren einer Gebäudeecke.

E.O. Tyshchenko
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

WEITERENTWICKLUNG VON TRANSPORTTECHNOLOGIEN

Künstliche Intelligenz und maschinelles Lernen sind in vielen Branchen fest etabliert und stehen auch in der Verkehrstechnik an vorderster Front. Diese Implementierungen verbessern die betrieblichen Fähigkeiten und damit die Effizienz erheblich und ermöglichen es den Unternehmen der Branche, unglaubliche Produktivitäts- und Geschwindigkeitssteigerungen zu erzielen.

Diese beiden Technologien arbeiten nicht nur Hand in Hand mit Big-Data-Analysen, um Daten zu sammeln und zu verarbeiten, sondern sind auch entscheidend für die Gewährleistung einer gleichbleibenden Servicequalität. Sie sorgen für einen effizienten Gütertransport durch die Planung optimaler Transitrouten und -netzwerke; Verbesserung der öffentlichen Sicherheit durch vorausschauende Berechnung und Risikoeliminierung; bieten sogar schnellen und effektiven Kundensupport über alle Interaktionskanäle hinweg.

Mit zunehmender Verbesserung der Verkehrsnetze wünschen sich die Verbraucher ein nahtloses Reiseerlebnis. Near Field Communication, kurz NFC, macht dies möglich. Durch die Schaffung integrierter Ticketsysteme, die mehrere öffentliche Verkehrsmittel unterstützen, können Reisende ein reibungsloseres und besser organisiertes Reiseerlebnis genießen.

Diese innovative Integration ermöglicht es Millionen intelligenter Geräte auf dem Markt, als kontaktlose Fahrkarten oder Transportkarten zu fungieren und nahtlos mit öffentlichen Verkehrsmitteln

und Mobilfunkbetreibern zusammenzuarbeiten. Dadurch wird sie sowohl die Benutzerfreundlichkeit der Technologie als auch das gesamte Reiseerlebnis revolutionieren.

Die Kombination aus künstlicher Intelligenz, maschinellem Lernen und Automatisierung hat der Fracht- und Speditionsbranche ein leistungsfähiges Mittel an die Hand gegeben, um dem Komfort eine neue Bedeutung zu verleihen. Selbstfahrende oder autonome Fahrzeuge, die in der Lage sind, waren fast völlig unabhängig zu transportieren, sind nicht mehr nur eine Vision, sondern bereits Realität.

Die rasante Entwicklung kontaktloser Lösungen ist für viele Hersteller zu einem drängenden Thema geworden. Dies war der Beginn der Einführung automatisierter Fahrzeuge in die Massenproduktion. Und seit Beginn dieser Entwicklung erkennen immer mehr Unternehmen das Potenzial und die Notwendigkeit des Einsatzes autonomer Fahrzeuge. Unternehmen in der gesamten Branche erkennen die Vorteile dieser Integration, von reduzierten Arbeitskosten und nahtlosen Lieferzeiten bis hin zu optimierter Routenplanung und betrieblicher Genauigkeit.

Auch die Blockchain-Technologie hat in den letzten Jahren in der Branche an Popularität gewonnen. Durch die Fähigkeit, große Mengen wertvoller Informationen aufzuzeichnen und zu verschlüsseln, sorgt dieses digitale Transaktionssystem für Betriebssicherheit und Transparenz und trägt so zum Schutz logistischer Prozesse bei.

Dieser Trend, der vor allem von niederländischen Unternehmen wie DHL erfolgreich genutzt wird, trägt dazu bei, Dokumentenbetrug, Hackerangriffe auf Datensysteme und sogar Produktdiebstahl zu verhindern. Und das alles unter Wahrung der Organisation und Integrität der Aufzeichnungen.

Da rudimentäre Arbeiten im Lagerbetrieb immer häufiger vorkommen, konzentrieren sich immer mehr Unternehmen auf die Automatisierung der manuellen Arbeitsabläufe. Immer mehr Unternehmen sind bestrebt, tägliche Prozesse zu automatisieren, um manuelle Arbeit einzusparen und die Kontrolle, den Empfang und den Versand von Produkten im Lager zu verbessern.

Einige hervorragende Anwendungsbeispiele finden sich beim deutschen Logistikriesen DHL.

W.W Uschakow
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

KLASSISCHE BAHNBAUPROJEKTZIEHLE

Bei komplexen Schienennetzbauprojekten rückt die Einhaltung von Terminen zunehmend in den Vordergrund der klassischen Projektziele „Qualität, Kosten und Terminplan“. Zur Koordination der Aktivitäten der Projektbeteiligten dient das Tool „Verpflichtende Koordinierungsanweisungen“, abgekürzt BKA.

Der reguläre Schienenverkehr ist in mehrfacher Hinsicht beeinträchtigt, wobei insbesondere Bauarbeiten zu Verzögerungen und zusätzlichen Betriebskosten führen. Die Aufgabe der Bauplanung wird praktisch formuliert: „Die Bauplanung steht im Schnittpunkt dieser Belastungszone, deren Aufgabe grob gesagt darin besteht, die Folgen für alle Betroffenen zu minimieren“, heißt es. Damit allen am Bau Beteiligten klar ist, dass es zunächst einmal darauf ankommt, die festgelegten und im Zeitplan berücksichtigten langfristigen Bauplanungsfristen einzuhalten. Sämtliche Störungen, verspätete Meldungen und Änderungen der vereinbarten Betriebsgrenzen stören die ausgewogene Verteilung der Bauarbeiten auf dem Schienennetz erheblich. Darüber hinaus gebe es „politisch notwendige“ Termine, deren Verschiebung völlig ausgeschlossen sei. Bei diesen Projekten können selbst geringfügige Verzögerungen in der Planungsgesetzgebung, den Bauvorschriften oder der Finanzierung zwangsläufig zu dringenden Bauarbeiten führen.

Zu Beginn einer gezielten Bauplanung werden Maßnahmen, die den Betrieb des Eisenbahnverkehrs beeinträchtigen können, identifiziert, minimiert und vereinbart und welche Störungen im Betrieb des Eisenbahnverkehrs grundsätzlich möglich sind. Im nächsten Schritt wird das Baukonzept entwickelt und mit allen Beteiligten abgestimmt. Dabei handelt es sich um einen iterativen Prozess zwischen Interessengruppen und einen Kompromiss zwischen Störungen, die aus bahnbetrieblicher Sicht möglich sind und denen, die aus bautechnischer Sicht notwendig sind. Bei planungspflichtigen Maßnahmen ist eine Planung für die Bauphase zwei Jahre vor Beginn der Umsetzung erforderlich.

Bei der verbindlichen Koordinierungsanweisung handelt es sich um ein tabellarisch strukturiertes Dokument mit den Inhalten der Spalte „Stelle, einzelne Tätigkeit/Prozess, Verantwortung, Start- und Enddatum sowie Anmerkungen“. Verantwortlichkeiten und Fristen werden detailliert und verbindlich festgelegt. VKA ist ein rein operatives Tool, das die Protokolle von Besprechungen darstellt, die in der Regel alle 14 Tage mit allen Projektbeteiligten in den entsprechenden Phasen stattfinden. VKA empfiehlt sich insbesondere für Bauprojekte, die zeitkritisch sind, politische Fristen haben oder in einen Zeitplan eingebaut sind. Schließlich ist die VKA auch ein wichtiger Baustein bei der Steuerung komplexer Eisenbahnnetzbauprozesse für nicht-eisenbahntechnische Kunden, die an Eisenbahnprojekten beteiligt sind. Bei der Erstellung eines AVC in der Planungsphase werden die technischen und zeitlichen Bedingungen aller Planungen in allen Abteilungen und damit verbundenen Aktivitäten ermittelt. Auch die Planungszeitpläne von der Entwurfsplanung bis zur Vertragsvergabe müssen berücksichtigt werden. Die Bedingungen, Einschränkungen und Anforderungen der am Projekt beteiligten Designer und professionellen Dienstleister werden definiert. In jedem Projekt werden im Einvernehmen mit der Projektleitung Koordinatoren benannt. Generell sollten alle Projektbeteiligten zu Beginn der Planungsphase in eine gemeinsame Vision eingebunden werden. Eine strenge Planung, die Einhaltung von Fristen und die Überwachung des Fortschritts in Kombination mit genauer Planung und Kostenkontrolle sind wesentliche Voraussetzungen für den Projekterfolg. Ein auf den Umfang und die Anforderungen des Projekts zugeschnittenes Reportingsystem sorgt für die nötige Transparenz.

R. I. Buchrejew
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

DAS INTERESSE AN NEURONALEN NETZEN

In den letzten Jahren ist immer mehr von sogenannten neuronalen Netzen die Rede, die nach Schätzungen und Prognosen von Experten bald selbstbewusst in der Robotik, im Ingenieurwesen und in anderen völlig anderen Bereichen menschlicher Tätigkeit zum Einsatz kommen werden.

Neuronale Netze sind eine der Forschungsrichtungen im Bereich der künstlichen Intelligenz, die auf dem Wunsch basiert, das menschliche Nervensystem nachzuahmen. Neuronale Netze basieren auf dem primitiven biologischen Modell des Nervensystems.

Künstliche Neuronen sind elementare miteinander verbundene Einheiten. Ein künstliches Neuron ist dasselbe biologische Neuron, nur deutlich vereinfacht. Wenn es sich bei einem biologischen Neuron um ein äußerst komplexes System handelt, das neben seinem Hauptzweck auch lebenserhaltende Aufgaben erfüllt, dann nutzt ein künstliches Neuron für seine Arbeit nur den Algorithmus eines biologischen Neurons.

Eine Synapse ist eine Verbindung zwischen Neuronen, die zum Senden und Empfangen von Informationen zwischen Neuronen dient. Signal – aktuelle Informationen für die Übertragung. Die Entwicklung solcher neurobiologischer Modelle könnte in Zukunft zur Entwicklung wirklich intelligenter Computer führen. „Einfache“ neuronale Netze, die bereits von ST Neural Networks entwickelt wurden, sind heute leistungsstarke Werkzeuge im Arsenal eines Spezialisten, beispielsweise für angewandte Statistik.

Die Untersuchung künstlicher neuronaler Netze basierte auf der Analyse der Informationen, die Benutzern des World Wide Web zur Verfügung standen. Die Geschichte der Entwicklung neuronaler Netze in Wissenschaft und Technik reicht bis zu den frühesten Computern oder Computern zurück. Im Jahr 1943 erstellten McCalla und Pitts ein vereinfachtes Modell einer Nervenzelle – ein künstliches Neuron.

Es handelt sich also um ein sehr einfaches Modell. Darüber hinaus schlugen sie vor, ein Netzwerk dieser Elemente aufzubauen, um logische Operationen durchzuführen. Aber vor allem haben Wissenschaftler bewiesen, dass ein solches Netzwerk lernfähig ist. In den späten 1940er Jahren. Donald Hebb entwarf den neuronalen Netzwerkmechanismus, der die Regeln des Computerlernens festlegte.

Die weitere Chronologie der Ereignisse war wie folgt. Der erste praktische Einsatz neuronaler Netze in Computern erfolgte im Jahr 1954. 1958 entwickelte Frank Rosenblatt einen Algorithmus zur

Mustererkennung und mathematischen Annotation. Nach der Veröffentlichung von Artikeln von Minsk und Papert zum maschinellen Lernen ließ das Interesse an der Entwicklung neuronaler Netze etwas nach. Sie entdeckten erhebliche Rechenprobleme im Zusammenhang mit der Computerimplementierung künstlicher neuronaler Netze. Eines der Hauptprobleme war die schlechte Leistung der Computer zu dieser Zeit, die es ihnen nicht ermöglichte, eine große Anzahl von Berechnungen für große neuronale Netze effizient zu verarbeiten. In den 1980er Jahren erwachte das Interesse an neuronalen Netzen wieder.

Ende 2022 und Anfang 2023 kam es zu einem regelrechten Popularitätsboom neuronaler Netze. Wir sehen, dass künstliche Intelligenz zunehmend Teil des Alltags wird: in der Fertigung, in der Medizin, im Transportwesen, in der Wirtschaft und im Bildungswesen. Auch im Bereich der Kunst helfen neuronale Netze dem Menschen (und konkurrieren vielleicht mit ihm). Wir haben bereits die besten Dienste für die Erstellung von Bildern und Texten getestet, aber auch die Musik wurde bei der Spitzentechnologie nicht außer Acht gelassen.

Grundsätzlich gibt es viele Arten künstlicher neuronaler Netze. Aufgrund der vielen Arten künstlicher neuronaler Netze ist ihr Anwendungsbereich vielfältig.

M. D. Chernous
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

UMWELTSICHERHEIT GEWÄHRLEISTEN

Auch heute noch werden globale Umweltveränderungen hauptsächlich durch die Ausweitung oder Intensivierung der nicht nachhaltigen Nutzung fossiler Brennstoffe vorangetrieben. Allerdings sind heute die bislang unbedeutenden Prozesse der Globalisierung und ihre Folgen von vergleichbarer Bedeutung wie die fortschreitenden Umweltveränderungen. Unverändert bleibt, dass der Mensch die Eigenschaften von Ökosystemen um ein Vielfaches stärker beeinflusst als die diesen Systemen innewohnenden natürlichen Schwankungen.

Die Umweltsicherheit oder die Umweltsicherheit, im Englischen „Environmental Safety“, ist ein Sicherheitsbegriff, der im Zuge der Ausweitung des klassischen, engen Sicherheitsbegriffs und dem Beginn der Debatte über Umweltveränderungen in den 1980er Jahren entstand. In den Diskussionen über menschliche Sicherheit, die seit den 1990er Jahren aufkamen, wurde das Konzept der Umweltsicherheit fortgeschrieben. Es wird versucht, die möglichen Zusammenhänge zwischen vom Menschen verursachten Umweltveränderungen und den daraus resultierenden Sicherheitsbedrohungen zu beschreiben.

Ausgelöst bzw. befördert wurde dieser Prozess unter anderem auch durch die Umweltkatastrophen der 1980er und 1990er Jahre wie beispielsweise die katastrophalen Dürren und die sich ausbreitende Desertifikation in der Sahelregion, das Phänomen des Sauren Regens und Waldsterbens in Mitteleuropa oder etwa die Reaktorkatastrophe in Tschernobyl. Diese Ereignisse lenkten die Aufmerksamkeit von Bevölkerung, Politik und Wissenschaft auf das Phänomen der Umweltzerstörung. Die Erkenntnis, dass Umweltveränderungen negative Auswirkungen auf das menschliche Wohlbefinden haben und daher auch eine Bedrohung für die Gesellschaft darstellen können, hat zu Spekulationen geführt, dass sie auch bei Konflikten eine Rolle spielen oder in Zukunft eine Rolle spielen könnten.

In der Folge haben sich in den 90er Jahren mehrere umfassende Forschungsprojekte der Thematik „Kriegsursache Umweltzerstörung“ gewidmet. Seither gibt es eine fest etablierte Forschungsrichtung zu Umweltkonflikten und zu „ökologischer Sicherheit“, die die Bedeutung von Umweltwandel und Umweltdegradation aus verschiedenen Blickwinkeln thematisiert und untersucht.

Es ist jedoch unwahrscheinlich, dass es klare und akzeptierte Definitionen von Umweltsicherheit oder Nachhaltigkeit gibt. Vielmehr gab und gibt es auch heute noch Versuche, Umweltkonflikte zu definieren. Einer der wenigen Versuche, Nachhaltigkeit/Umweltsicherheit zu erklären, wurde von Görrissen (1990/91) unternommen. Unter Umweltsicherheit versteht man das Fehlen und den Schutz vor extremen Umweltbelastungen und umweltschädlichen Einwirkungen: „Ein Zustand der Umweltunsicherheit liegt dann vor, wenn umweltschädliche Einwirkungen oder Verschmutzungen,

deren Ursprung innerhalb des politischen Systems liegt, nach außen wirken.“ und Umwelt (...) einen Einfluss auf oder innerhalb eines anderen politischen Systems haben“.

Das Thema nachhaltige Entwicklung ist auf nationaler und internationaler Ebene eines der wichtigsten Leitprinzipien der Zukunft, damit auch zukünftige Generationen ein sorgenfreies Leben führen können. Dies setzt voraus, dass nachfolgenden Generationen eine unberührte Umwelt und gleiche Lebenschancen zur Verfügung stehen. Nachhaltiges Handeln erfordert die gleichberechtigte Berücksichtigung ökologischer, ökonomischer und sozialer Aspekte. Im Jahr 2015 haben alle UN-Mitgliedsstaaten die sogenannte Agenda 2030 verabschiedet. Es enthält fünf Kernbotschaften: Menschen, Planet, Wohlstand, Frieden und Partnerschaft. Bei dem ging es um die Förderung des Wohlstands für alle, den Schutz des Planeten.

O.A. Juferowa
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

TRANSFORMIERBARE IT-ARCHITEKTUREN

Veraltete IT-Infrastrukturen und Anwendungsumgebungen stellen seit mehreren Jahren eine große Herausforderung für das IT-Management dar. Das in vielen Unternehmen vorherrschende „explosive Wachstum“ führt häufig zu einem Verlust an Transparenz, erhöhten Risiken und Kosten, einer Ablenkung vom Kerngeschäft und der Unfähigkeit, neue Geschäftsstrategien flexibel umzusetzen. Einige Unternehmen sind bereits in der Lage, diese Herausforderungen durch Standardisierungsbemühungen, fortschrittliche Architekturansätze und Unternehmensarchitekturmanagement zu bewältigen. Allerdings bleiben Probleme oft ungelöst, weshalb wir der Meinung sind, dass die IT-Architekturen vieler Unternehmen für agile Digitalisierungsprojekte ungeeignet sind. Die neuen Anforderungen der digitalen Transformation erfordern IT-Landschaften, die sich deutlich einfacher transformieren lassen. Das bedeutet, dass die Standardisierung von IT-Architekturen weiter voranschreiten wird und sich mit Ausnahme von Bereichen, die sich von Wettbewerbern unterscheiden, auch auf Anwendungen und Geschäftsprozesse erstrecken wird. Gleichzeitig werden sich modulare Ansätze und flexible Schnittstellentechnologien noch weiter verbreiten. Insbesondere die IT-Infrastruktur wird durch den Einsatz von Cloud-Technologien elastischer. Die Wirtschaftlichkeit und die Sicherheit sind wesentliche Voraussetzungen für den wettbewerbsfähigen Einsatz von IT.

Die im Zeitalter der IT-Industrialisierung entstandene Unternehmens-IT wird typischerweise als effizienter und effektiver Dienstleister positioniert, wird aber oft als „geschäftsfern“ und wenig innovativ wahrgenommen und selten als gleichberechtigter Geschäftspartner angesehen. Gemäß dem Plan-Build-Execute-Paradigma gliedert sich das Aufgabenspektrum von IT-Organisationen in drei Hauptphasen. Dies umfasst die Erfassung der Kundenanforderungen und die Planung der IT-Servicebereitstellung, der Projektinitiierung und -implementierung und schließlich der Servicebereitstellung. Wir betonen, dass anspruchsvolle und innovative Tätigkeiten in interdisziplinären Teams besser direkt in spezialisierten Abteilungen durchgeführt werden können, Entwicklung und Betrieb an Bedeutung verlieren, da sie aus verschiedenen Gründen besser von spezialisierten Zulieferern erbracht werden können, und in In Zukunft wird die IT-Infrastruktur hauptsächlich aus der Cloud erstellt. Die große Frage an dieser Stelle ist, ob eine klassische IT-Organisation überhaupt Sinn macht. Bei den übrigen Aktivitäten der Unternehmens-IT handelt es sich im Wesentlichen um langfristige Planungs-, Steuerungs- und Überwachungsaufgaben der IT-Architektur sowie um Koordinationsaufgaben hinsichtlich dezentraler und zentraler IT-bezogener Aufgaben.

Der Zugang zu gut ausgebildeten Humanressourcen gilt als zentraler Erfolgsfaktor für aktuelle und zukünftige Digitalisierungsinitiativen. Um die neuen Herausforderungen zu meistern, die Unternehmen durch die digitale Transformation erwarten, sind bestimmte Qualifikationen und Fähigkeiten erforderlich. Allerdings wird es für Unternehmen angesichts des aktuellen demografischen Wandels und veränderter persönlicher Anforderungen, insbesondere bei jüngeren Arbeitnehmern, immer schwieriger, die richtigen Mitarbeiter zu finden und zu halten. Diese Problematik ist insbesondere für IT-bezogene Digitalisierungsherausforderungen relevant, da zu wenige junge Menschen in technischen Berufen

ausgebildet werden. Darüber hinaus sind die Wertesysteme neuer Mitarbeiter deutlich stärker vom Wunsch nach Individualität und Selbstbestimmung geprägt als frühere Mitarbeitergenerationen. Diese Entwicklungen haben enorme Auswirkungen auf die Gewinnung und Bindung guter IT-Mitarbeiter, denen durch gezieltes Personalmanagement, eine attraktive Unternehmenskultur und eine zukunftsfähige Geschäftsentwicklung begegnet werden muss.

K.W. Kondratjuk
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

DIE BEDROHUNGEN FÜR DEN PLANETEN

Es gibt Probleme, die die größte Bedrohung für unseren Planeten darstellen – Probleme, die wir heute lösen müssen, nicht morgen. Aber wie? Wir kennen die Antworten – es kommt nur auf die Umsetzung an.

Luftverschmutzung und Klimawandel. Das Problem: Seit Beginn der industriellen Revolution Mitte des 18. Jahrhunderts pumpen wir CO2 in die Luft. Folge: Es wird immer wärmer. Nicht nur auf der Erde, sondern auch in unseren Ozeanen. In Maßen ist CO2 eigentlich gut, denn ohne die natürliche Freisetzung von CO2, etwa durch die Vegetation, wäre es hier ziemlich frostig, wenn nicht sogar eisig. Aber auch der Mensch trägt einen wesentlichen Teil dazu bei – und insgesamt ist es zu viel des Guten.

Abholzung. Das Problem: Immer mehr Bäume müssen weichen, ganze artenreiche Wälder werden zerstört. Vor allem in den Tropen müssen sie Platz machen für Viehwirtschaft oder Sojabohnen, Palmölplantagen oder andere landwirtschaftliche Monokulturen. Heute sind etwa 30 Prozent der Oberfläche unseres Planeten von Wäldern bedeckt – nur etwa halb so viel wie vor etwa 11.000 Jahren. Jedes Jahr werden 7,3 Millionen Hektar Wald zerstört. Tropenwälder machten einst 15 Prozent der Landfläche aus; heute sind es nur noch sechs bis sieben Prozent. Die meisten von ihnen wurden abgeholzt oder verbrannt.

Artensterben. Problem: Während an Land Tiere für Fleisch, Elfenbein oder andere „medizinische“ Produkte geschlachtet werden, vernichten riesige industrielle Fischereifahrzeuge auf See ganze Fischbestände. Doch nicht nur die direkte Jagd, sondern auch der Verlust und die Zerstörung von Lebensräumen sind die Hauptursachen für das Aussterben vieler Arten – obwohl eine ganz bestimmte Art für all diese Gefahren verantwortlich ist: der Mensch. Arten haben nicht nur ein natürliches Existenzrecht, sondern spielen auch eine große Rolle für das Überleben der Menschheit. Denken Sie nur an Bienen und ihre Bestäubungsarbeit. Ohne sie gäbe es keine Samenbildung, die wiederum die Grundlage für das Überleben der Pflanzen darstellt. Kleine Helfer sind für Natur und Produzenten unverzichtbar.

Bodenerosion. Das Problem: Überweidung, Monokulturen, Erosion, Bodenverdichtung, Schadstoffüberdosierungen, Umwandlung von Grünflächen in Ackerland – die Liste der Möglichkeiten, unseren Böden möglichst viel Schaden zuzufügen, scheint schier endlos. Und wir merken es: Nach Schätzungen der UN werden jedes Jahr etwa zwölf Millionen Hektar Ackerland degradiert.

Überbevölkerung. Problem: Die Weltbevölkerung wächst rasant. Während wir zu Beginn des 20. Jahrhunderts noch 1,6 Milliarden Menschen zählten, leben heute rund 7,5 Milliarden Menschen auf der Welt. Bis 2050 könnten es zehn Milliarden sein. Und dann wird es voll! Eine wachsende Weltbevölkerung gepaart mit steigendem Wohlstand setzt wichtige natürliche Ressourcen wie Wasser zunehmend unter Druck. Laut UN-Prognosen werden die beiden bevölkerungsreichsten Länder der Welt – China und Indien – bereits im nächsten Jahr die Plätze auf dem Podium tauschen. Die Gesamtbevölkerung Indiens wird im Jahr 2023 auf etwa 1,4 Milliarden und im Jahr 2050 auf 1,7 Milliarden anwachsen.

Zu lange haben wir unsere Ozeane als selbstverständlich angesehen, unnötigen Müll hineingekippt und uns ständig ins Meer gestürzt, ohne über die Konsequenzen nachzudenken. Nun, der Tag der Abrechnung ist gekommen.

Unabhängig von der Perspektive kann es schwierig sein, das Gesamtbild zu sehen. Deshalb brauchen wir einen neuen Ansatz, der die heutigen Herausforderungen in den Kontext der Komplexität des

gesamten Planetensystems stellt.

M.A. Demianenko
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

DER NEUE FERNVERKEHRSZUG „ECx“ IN DEUTSCHLAND

Mit “ECx“ bietet die Deutsche Bahn ihren Fahrgästen echten ICE-Komfort: Dazu gehören neben WLAN auch viel Gepäckraum, ein Bordbistro und Fahrgastinformationen in Echtzeit. Der Zug setzt neue Maßstäbe in puncto Barrierefreiheit: Der stufenlose Einstieg auf Bahnsteigniveau von allen Türen erleichtert das Reisen für alle Fahrgäste und ermöglicht Rollstuhlfahrern künftig den selbstständigen Einstieg.

Die erste Bestellung von 23 Zügen im Wert von 550 Millionen Euro ist Teil eines Rahmenvertrags zwischen der DB und dem spanischen Hersteller Talgo über bis zu 100 Mehrsystemlokomotiven und Personenwagen. Talgo reichte im europäischen Beschaffungsprozess das attraktivste Angebot ein und erhielt den Zuschlag.

Der Zug besteht aus einer Mehrsystemlokomotive und 17 Personenwagen. Sie bieten insgesamt 570 Sitzplätze, davon 85 Sitze in der ersten Klasse und 485 Sitze in der zweiten Klasse. Züge können mit einer Höchstgeschwindigkeit von 230 Stundenkilometern fahren. Alle Züge sind äußerst flexibel einsetzbar. Neben einer Mehrsystemlokomotive können Personenwagen auch mit einer Diesellokomotive gekoppelt werden.

Bei der Entwicklung des ECx hat sich die Deutsche Bahn bewusst für eine bewährte Transportplattform entschieden, um durch den Einsatz bewährter Komponenten eine höhere Zuverlässigkeit zu erreichen und die Lieferzeiten der Züge zu verkürzen.

Die DB wird die neuen Fernzüge zum Fahrplanwechsel im Dezember 2023 im zweistündigen Verkehr Berlin-Amsterdam einsetzen. Die Reisezeit auf dieser Strecke verkürzt sich von ca. 30 Minuten auf 5:50 Stunden. Dies ist möglich, da durch den Einsatz einer Mehrsystemlokomotive ein Lokwechsel an der Grenze entfällt. Auch die touristischen Ziele der Nordsee und der Alpen wird der „ECx“ ansteuern: Ab Sommer 2024 wird er auf den Strecken Westerland-Köln, Westerland-Frankfurt-Karlsruhe, Westerland-Berlin und Oberstdorf-Köln eingesetzt.

Die neuen Züge werden zunächst im Pilotbetrieb zur Erprobung modernster Fahrzeuge eingesetzt. Bei der Weiterentwicklung der Züge werden die Ergebnisse des Betriebs sowie Rückmeldungen von Fahrgästen und Mitarbeitern berücksichtigt. „ECx“ wird die alten Intercity-1-Züge ersetzen.

Der Zug ist stufenlos, das heißt der Einstieg befindet sich auf Bahnsteigniveau. Dies ermöglicht Rollstuhlfahrern den selbstständigen Ein- und Ausstieg. Aber auch Reisende mit Gepäck oder Familien mit Kinderwagen haben es einfacher. Dies ist auch der Beginn eines neuen Standards: Künftig werden alle Ausschreibungen für neue Fernverkehrsfahrzeuge besonders kundenfreundlich ausgeschrieben.

Dank des Niederflurkonzepts von Talgo sind fast alle Sitzplätze im Zug stufenlos. Nur wenige Sitzplätze am Ende des Zuges sind über Stufen erreichbar. „ECx“ verfügt über drei Rollstuhlplätze mit höhenverstellbaren Tischen. Es gibt auch eine Toilette für Menschen mit Behinderungen. Der Zug verfügt außerdem über ein haptisches Steuerungssystem. Alle Hinweise sind in Blindenschrift angegeben.

Talgo-Züge zeichnen sich durch ein sogenanntes Einzelradfahrwerk aus, das im Vergleich zu Fahrwerken mit herkömmlichen Drehgestellen das Gewicht deutlich reduziert. Dies führt zu einer deutlichen Reduzierung der Energiekosten für den Zugantrieb. In Kombination mit leichten Fahrzeugkarosserien und einer aerodynamisch optimierten Karosserieform an Übergängen ergibt sich eine sehr gute Energieeffizienz. Auch Klimaanlagen werden mit natürlichen Kältemitteln betrieben.

V.O. Teslenko
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

FÜR DEN FORTSCHRITT AUF DER SCHIENE

In einem der größten Beschaffungsprojekte der Unternehmensgeschichte beschafft die Deutsche Bahn 73 neue ICE-Züge. Die Gesamtinvestition von rund zwei Milliarden Euro besteht aus 56 ICE L des spanischen Herstellers Talgo und 17 ICE 3neo von Siemens Mobility. Die bestellten Züge sollen 2026 auf die Schiene kommen und bis 2030 ausgeliefert werden. Insgesamt investiert die DB nun rund 12 Milliarden Euro in neue Fernverkehrszüge. Das Durchschnittsalter von ICE- und Intercity-Zügen wird bis 2030 von heute 18 auf 12 Jahre sinken. Das Highlight von ICE L ist der Ein- und Ausstieg in die Ebene über standardmäßig 76 cm hohe Bahnsteige. Dies bedeutet für alle Reisenden eine deutliche Steigerung des Komforts. Passagiere profitieren außerdem von zahlreichem ICE 3neo-Innovationen, wie etwa Tablet-Halterungen und Steckdosen auf allen Sitzplätzen. Neue Reservierungsdisplays mit farbigen LED-Anzeigen informieren schnell über reservierte und verfügbare Sitzplätze. Für einen stabilen Empfang im Zug sorgen Fenster, die den Durchgang von Mobiltelefonen ermöglichen.

Der ICE L, der eine Geschwindigkeit von 230 Kilometern pro Stunde erreicht, wird erstmals seit Oktober 2024 zwischen Berlin und Amsterdam verkehren. Mit dieser Zusatzbestellung für weitere Züge wird der ICE L nicht nur auf ausgewählten Strecken, sondern im gesamten Bundesgebiet eingesetzt. Zudem bietet der ICE L durch kürzere Fahrzeuge, ein neues Lichtkonzept und ein neues Innenraumdesign ein deutlich verbessertes Raumgefühl. Dank der Mehrsystemlokomotive ist auch eine Zeitersparnis im grenzüberschreitenden Verkehr möglich. Dazu gehören künftig auch Verbindungen nach Dänemark und Österreich.

Die ersten ICE 3neo sind seit Dezember 2022 im Einsatz und haben sich bestens bewährt. Dank des neuen Aufzugs ermöglicht ICE 3neo auch Rollstuhlfahrern einen deutlich verbesserten Zugang. Mit einer Höchstgeschwindigkeit von 300 km/h ist der ICE 3neo vor allem für Verbindungen auf deutschen Rennstrecken konzipiert, beispielsweise zwischen Nordrhein-Westfalen und Frankfurt sowie weiter von/nach München über die neue Schnellfahrstrecke Wendlingen-Ulm oder zwischen Berlin und München. Im Jahr 2024 wird dieser Zug veraltete Modelle auf den Strecken Frankfurt am Main sowie Amsterdam und Brüssel ersetzen.

Mit dem neuen ICE 3neo wächst die ICE-Flotte der DB weiter an. Das tägliche Platzangebot für die Fahrgäste im Fernverkehr der DB steigt mit den insgesamt 90 neuen Zügen um weitere rund 40.000 Sitze. Mit diesem Flottenzuwachs hat die DB künftig die Kapazität, bis 2030 den für den Deutschlandtakt vorgesehenen Fahrplan zu fahren.

Im Oktober 2023 feierte das neue ICE-Innendesign im 17. ICE 3neo Premiere. Mit der Auslieferung weiterer Züge erweitert die DB das Einsatzgebiet schrittweise. Nach erfolgter Zulassung soll der ICE 3neo im Laufe des Jahres 2024 auch auf internationalen Verbindungen nach Belgien und in die Niederlande fahren.

Der ICE 3neo bietet zahlreiche Neuerungen für einen verbesserten Komfort: Mobilfunkdurchlässige Scheiben für stabilen Empfang; acht Fahrradstellplätze in jedem Zug; neu gestaltete Gepäckregale mit mehr Stauraum; eine Beleuchtung mit tageszeitabhängig wechselnden Farbtönen; Tablethalter und Steckdosen an allen Plätzen, auch in der 2. Klasse; zusätzliche Türen für den schnelleren Ein- und Ausstieg an Bahnhöfen.

Der neue ICE ist der erste Hochgeschwindigkeitszug der DB, der mit mobilfunkdurchlässigen Fenstern ausgerüstet wird. Diese im Hightech-Verfahren hergestellten Fensterscheiben sorgen für guten Mobilfunkempfang im Zug. Die Fensterscheiben eines ICE sind mit einer dünnen Metallschicht versehen, die Sonnenstrahlung fernhält. Auch Mobilfunkwellen gelangen nur schwer durch die Metallschicht ins Zuginnere.

M.S. Tolstyj
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

DIE U-BAHN NOCH SICHERER UND ZUVERLÄSSIGER

Der X-Wagen begann mit der Personenbeförderung auf Wiener Linien. Der Personenverkehr beginnt mit dem ersten Zug des Typs X, im Sommer folgen weitere Züge des Typs X. Bis Ende des Jahres wird der zehnte X-Wagen-Zug geliefert, ab 2024 werden bis zu drei weitere X-Wagen pro Jahr von Siemens Mobility an die Wiener Linien geliefert werden.

Der neue X-Wagen bietet eine offene Kabine mit geräumigen Einstiegsbereichen für einen schnellen Ein- und Ausstieg. Insgesamt kann der X-Wagen bis zu 928 Passagiere befördern – das sind genau 46 Personen mehr als im Vorgängermodell des V-Wagens. Passagiere mit Kinderwagen oder Gepäck finden ausreichend Platz. Die Sitze bestehen aus hochwertigem Sperrholz und sind in einer Kombination aus herkömmlichen Quersitzen mit zusätzlichen Längssitzen an der Außenwand des Zuges und Notsitzen angeordnet. Blaue Sitze weisen auf bevorzugte Sitzplätze hin und sind für Passagiere mit eingeschränkter Mobilität gedacht.

Eine Innovation, die ab Betriebsstart im X-Wagen zur Verfügung steht, ist die Fahrgastinfo Plus. Das digitale Fahrgastinfo- und Wegeleitsystem wurde von Siemens Mobility entwickelt und gemeinsam mit den Wiener Linien speziell für die Anforderungen der Wiener Öffis maßgeschneidert.

Auf Bildschirmen über allen Fahrzeugtüren im Inneren vom X-Wagen werden dynamisch angepasste Informationen für die Fahrgäste angezeigt:

Eine Innovation, die ab sofort im X-Wagen verfügbar sein wird, ist das Fahrgastinformations-Plus. Das digitale Fahrgastinformations- und Navigationssystem wurde von Siemens Mobility entwickelt und gemeinsam mit den Wiener Linien speziell an die Anforderungen des Wiener ÖPNV angepasst.

Auf Bildschirmen über allen Fahrzeugtüren im X-Car werden dynamisch angepasste Fahrgastinformationen angezeigt:

Über den Türen, die sich am nächsten Bahnhof öffnen, wird angezeigt, in welche Richtung die Ausgänge verlaufen, zu welchen anderen Linien Fahrgäste dort umsteigen können und wann die nächste Abfahrtszeit dieser Linien ist.

Bildschirme über den Türen, die an der nächsten Station geschlossen bleiben, zeigen eine digitale Karte des Netzwerks an. Auf dieser Karte sehen Fahrgäste den aktuellen Standort des Zuges, die entsprechende Fahrtrichtung, die nächste Haltestelle und wichtige Umsteigemöglichkeiten.

Auf beiden Seiten der Tür können zudem Zusatzinformationen angezeigt werden, etwa geplante Betriebsbeschränkungen im U-Bahn-Netz oder Wartungsarbeiten an Aufzügen.

Ab 2026 wird die Linie U5 zwischen Karlsplatz und Frankplatz als erste vollautomatische U-Bahn-Linie Wiens in Betrieb sein, hier verkehrt auch der X-Wagen. Zu diesem Zweck werden die Stationen Karlsplatz bis Rathaus mit Fliegengittertüren am Bahnsteig ausgestattet und die U5-Station Frankplatz umgebaut. Der vollautomatische Betrieb macht die U-Bahn noch sicherer und zuverlässiger, da sich die Bahnsteigtüren erst öffnen, wenn der Zug am Bahnhof ankommt.

Zeitgleich mit dem Personenverkehr tritt für X-Wagen-Züge ein Wartungsvertrag zwischen den Wiener Linien und Siemens Mobility in Kraft. Die effiziente Wartung erfolgt durch Spezialisten der Wiener Linien in enger Zusammenarbeit mit den Spezialisten von Siemens Mobility. Der Hersteller ist für die Fahrzeugwartung verantwortlich und greift auf seine weltweite Erfahrung bei der Umsetzung von Wartungsprojekten zurück. Für die Wiener Linien ergeben sich dadurch die Vorteile der besseren Planbarkeit für die Instandhaltungskosten und einer langfristigen Partnerschaft zu sämtlichen Themen rund um die neuen Züge.

W. S. Baglay
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

DIE MULTISYSTEM-STADTBAHN

Der Vorteil dieser Fahrzeuge besteht darin, dass sie die Kommunikation in Megastädten ermöglichen und technisch in der Lage sind, sich sowohl auf Straßenbahn- als auch auf Hauptstrecken zu bewegen und von einem System zum anderen zu wechseln. Durch den Einsatz von Straßenbahnzügen entfällt die Notwendigkeit, dass Fahrgäste zwischen verschiedenen Zugtypen umsteigen müssen. Der Verkehr hält an Straßenbahnhaltestellen im Stadtgebiet und an Haltestellen des Regionalverkehrs.

Die Fahrzeuge bestehen aus drei Fahrzeugteilen mit einer Gesamtlänge von jeweils 36,54 m und einer Breite von 2,55 m. Jedes der drei Motordrehgestelle wird von zwei Quermotoren mit einer Leistung von 140 kW angetrieben. Der Wagen verfügt über 92 Sitz- und 148 Stehplätze, also vier Personen pro Quadratmeter. Die Zwischenräume zwischen den Enddrehgestellen und der entsprechenden Anbindung an den Hochflur-Mittelwagen sind Niederflur.

Vossloh Kiepe, Düsseldorf, liefert komplette Antriebsausrüstungen. Der Straßenbahnantrieb ist mit drei IGBT-Direktimpulsumrichtern ausgestattet. Jeder treibt zwei wartungsfreie, eigenbelüftete vierpolige Drehstrom-Asynchronmotoren des Herstellers VEM an. Auf dem Dach ist ein Traktionssystem für die Motoren installiert, die paarweise in Drehgestellen untergebracht sind. Durch den Einsatz von IGBT-Modulen der neuesten Generation wurde die DPU sehr kompakt und leicht gebaut. Die gesamte Sensorik und Wechselrichtersteuerung sind bereits integriert. Bei einer Gesamtleistung von 840 kW und einem Leergewicht von 55,5 Tonnen erreichen die Fahrzeuge eine Beschleunigung von 1,2 m/s. Das Stromabnehmersystem ist auf dem Dach des Mittelwagens installiert und umfasst den Stromabnehmer selbst sowie einen Überspannungsschutz und einen funktionsfähigen Leistungsschalter. Die Schutzeinrichtung verhindert, dass die Spannung einen bestimmten Wert überschreitet und ist unter bestimmten Bedingungen wartungsfrei.

Aus Redundanzgründen sind in jeder Straßenbahn zwei statische Bordnetzumrichter verbaut. Sie werden direkt aus der Oberleitung gespeist und versorgen alle Nebenaggregate mit einer Dauerleistung von 72 kVA und 12 kW für Batterieladung, Zugbeleuchtung, Tafeln usw. Das HBU-System besteht aus einem dreiphasigen Wechselrichter und einem Batterieladegerät. Gerät. Die Batterien sind stark genug, um im Notfall Türen zu öffnen und fluoreszierende Notbeleuchtung einzuschalten. Die Wagen verfügen auf jeder Seite über zwei 1240 mm breite Türen, die in einer Höhe von 360 mm über der Schienenoberkante den Zugang zum Niederflurinnenraum ermöglichen. Der Niederflurbereich hat eine Bodenhöhe von 375 mm über der Oberkante der Führungen. Damit sind Straßenbahnzüge auch für Fahrgäste mit eingeschränkter Bewegungsfreiheit zugänglich. Große Stehflächen in Bereichen mit Doppeltüren bieten Platz für Fahrräder und Rollstühle. Die Gangbreite beträgt 579 mm zwischen den Sitzen in der Hochbodenkabine und 1.160 mm an der schmalsten Stelle zwischen den Handläufen in der Niederflurkabine. Jeder dieser Bereiche oberhalb der Triebdrehgestelle ist über zwei Stufen im Fahrgastraum erreichbar. In der Hochbodenzone beträgt die Bodenhöhe 900 mm, in der Niederflurzone 360 mm und die zweite Stufe liegt in einer Höhe von 725 mm über dem CO. Der Fahrgastraum und die Fahrerkabine sind mit einer Klimaanlage ausgestattet. Auf dem Dach werden zwei MTU-Verbrennungsmotoren mit einer Leistung von 390 kW untergebracht, die der Abgasstufe IIIB entsprechen. Sie treiben VEM-Permanentmagnetgeneratoren an. Der oft verwendete Begriff „Multisystem-Stadtbahn“ bedeutet, dass Fahrzeuge in einem solchen Transportsystem unterschiedliche Energiequellen oder Antriebssysteme oder sogar Radsätze und Lösungen für unterschiedliche Energiequellen oder Antriebssysteme nutzen.

A. Tschura
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

VORTEILE DER SCHIENENVERKEHR

Nur durch eine konsequente Weiterentwicklung kann die Bahn ihren Wettbewerbsvorteil gegenüber der Straße hinsichtlich Energieverbrauch und CO2-Ausstoß ausbauen.

Generell gilt die Bahn als besonders umweltfreundlicher Verkehrsträger, der sich durch einen geringen spezifischen Energieverbrauch und geringe spezifische CO2-Emissionen auszeichnet. Als Transportmittel konkurriert es mit dem Straßenverkehr, der Binnenschifffahrt und dem Luftverkehr.

Der Straßenverkehr spielt im Personennahverkehr eine wichtige Rolle, während der Luftverkehr auf direkten Mittel- und Fernstrecken eine wichtige Rolle spielt und der Seeverkehr praktisch keine Rolle spielt.

Im Güterverkehr deckt der LKW das gesamte Spektrum von Kurz- bis Langstrecken ab, während der Binnenverkehr nur auf relativ wenigen Mittel- bis Langstreckenwasserstraßen von Bedeutung ist.

Die Luftfahrt hat hier nur eine untergeordnete Funktion. Generell ist die Straße der größte Konkurrent der Schiene. Ein wichtiger Vorteil der Straße ist eine wesentlich genauere Verteilung über das Gebiet. Megatrends und ihre Implikationen Es stellt sich nun die Frage, inwieweit die Bahn vor dem Hintergrund des wachsenden Umweltbewusstseins und unter Berücksichtigung künftiger Entwicklungen ihre Wettbewerbsfähigkeit aufrechterhalten kann. Dazu müssen Sie zunächst die globalen Trends der nächsten 30–40 Jahre betrachten, die im Detail beschrieben werden.

Durch die zunehmende Globalisierung der Wirtschaftskreisläufe ist mit einem deutlichen Anstieg der Transportströme, insbesondere des Güterverkehrs, zu rechnen. Wir gehen davon aus, dass die Weltbevölkerung von derzeit etwa 6,8 Milliarden Menschen auf über 9 Milliarden im Jahr 2050 ansteigt, was auch zu einem verstärkten Personen- und Güterverkehr führen wird. Beide Effekte werden zu einem starken Anstieg des Energiebedarfs führen. Jedes Jahr wird mehr abgebaut als neue Vorkommen entdeckt werden, sodass die Reserven nach und nach erschöpft werden. Die Kosten für fossile Brennstoffe werden aufgrund begrenzter Reserven und immer schwierigerer Entwicklung weiter steigen. Kernenergie ist zumindest in Deutschland umstritten. Ohnehin ist das Problem des Recyclings bis heute noch nicht gelöst und führt zu hohen spezifischen Energiekosten. Die Hoffnung liegt auf erneuerbaren Energiequellen. Wasser-, Wind- und Photovoltaikenergie können direkt zur Stromerzeugung genutzt werden. Solarthermische Energie wird zur Wärmeerzeugung in Häusern und Prozessen genutzt, kann aber auch zur Stromerzeugung genutzt werden. Bekannt wurde diese Anwendung durch den spanischen Solarkraftwerkskomplex Andasol und das Desertec-Projekt. Biomasse kann auch zur Strom- oder Wärmeerzeugung genutzt werden. Die Kosten erneuerbarer Energien sind sehr hoch. All diese Folgen werden in den nächsten Jahren zu einem überproportionalen Anstieg der Energiekosten führen. Aus Umweltgründen, insbesondere zur Bekämpfung der globalen Erwärmung, sind umfangreiche Reduzierungen der CO2-Emissionen erforderlich, die nur durch eine deutliche Erhöhung des Anteils erneuerbarer Energiequellen am Energiemix möglich sind. Somit verbraucht das ideale Verkehrsmittel wenig Energie und nutzt wo immer möglich erneuerbare Energien. Vergleicht man den spezifischen Energieverbrauch und die CO2-Emissionen, hat der Schienenverkehr heute klare Vorteile gegenüber dem Straßenverkehr.

Darüber hinaus eignet sich die elektrische Traktion, die rund 85 % der Schienenverkehrsproduktivität in Europa ausmacht, besonders gut für erneuerbare Energien und
damit für null CO2-Emissionen.

J. S. Bugajtschuk
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

MASTFUßADAPTER FÜR DIE BAHN

Der Mastfußadapter ist eine patentierte Eigenentwicklung der BBL Bahnbau Lüneburg GmbH. Es

wurde konzipiert, um eine zeitsparende, unterirdische und kostengünstige Fundamentverlegung für Eisenbahnsignale jeglicher Form und Größe zu ermöglichen. Der Mastfußadapter ist das einzige Fundamentsystem in Deutschland, das über eine EBA-Zulassung verfügt und im Technischen Regelwerk der Deutschen Bahn AG enthalten ist. Der Mastfußadapter ist eine echte Innovation und wurde deutschlandweit bereits über tausend Mal verbaut. Neben Fundamenten für Eisenbahnsignale wird der Mastfußadapter mittlerweile auch für Fundamente verschiedener Lichtmasten, darunter Schienenlichtmasten, aber auch konventioneller Straßenbeleuchtungsmasten, sowie Steckmasten für Fußgängerüberwege, Funkmasten und Gehwege eingesetzt. .

Ursprünglich unter dem Namen „BBL Signal Base Adapter System“ ausschließlich für den Einbau von Eisenbahnsignalen aller Art entwickelt, war es aufgrund des mittlerweile breiten Einsatzspektrums an der Zeit, den Namen zu ändern. Obwohl der „Signalbasisadapter“ im Entwicklungsstadium noch einen begrenzten Anwendungsbereich hat, spiegelt der Mastbasisadapter auch konzeptionell die Entwicklungen der letzten Jahre wider. Neben dem Kerngebiet der Signalerzeugung haben sich inzwischen eine Reihe weiterer Anwendungsgebiete herauskristallisiert.

Eine Vielzahl von Lichtmasten, darunter Lichtmasten für Rennplätze, aber auch normale Straßenbeleuchtungsmasten sowie Zebrastreifen-Steckmasten, Funkmasten und Laufsteggitter, werden jetzt mithilfe eines Mastfußadapters installiert. Der nächste Schritt in naher Zukunft wird die Errichtung flacher Gittermasten für Freileitungen im Rahmen eines Pilotprojekts sein. Mit der Veröffentlichung des Mastfußadapters knüpft die BBL Bahnbau Lüneburg GmbH nahtlos an die Erfolgsgeschichte des Signalfußadapters an. Die Geschichte des Mastfußadapters beginnt mit genau demselben Problem, das er tausende Male gelöst hat.

Im Rahmen einer Baumaßnahme im Jahr 2019 wurde auch der Oberbau in unmittelbarer Nähe des Hamburger Hauptbahnhofs komplett saniert. Nach Abschluss der Oberbauarbeiten sollten die Signalisierungsarbeiten wie üblich als letztes im Bauablauf durchgeführt werden. In diesem Fall sollten einige Signale zurückgesetzt werden. Die Vorgaben sahen die damals übliche Verwendung vorgefertigter Betonfundamente vor. Wie bei solchen Baumaßnahmen üblich, stieß der diesbezügliche Ansatz, den gerade umfangreich sanierten Oberbau zum Einbau der Signale abzureißen, bei den für den Oberbau verantwortlichen Technikern der DB Netz AG und der DB auf wenig Gegenliebe Projektbau GmbH. . Bereits nach dem ersten Gespräch war man sich einig, dass dieses Problem beseitigt werden muss.

Die BBL Bahnbau Lüneburg GmbH nahm diese Herausforderung an und fand mit einem Mastfußadapter die optimale Lösung für zeit-, kosten- und wegsparende Bahnsignalbasen. Inspiration für die Idee war die Gründung von Freileitungsstützen im Pipe-Stuffing-Verfahren. BBL hat diesen Prozess aufgegriffen und optimiert. Es war von Anfang an klar, dass die bekannten Mängel der Betonfundamentoptionen behoben werden mussten und daher erhebliche Verbesserungen erforderlich waren. Es müssen zuverlässige und fehlertolerante Standorte geschaffen werden, die alle technischen und betrieblichen Anforderungen erfüllen. Der Gleiskörper als Ganzes darf nicht beeinträchtigt werden und die Notwendigkeit von Sperrpausen sollte auf ein Minimum beschränkt werden. Aus technischer Sicht war es eine der maßgeblichen Vorgaben, dass sich die Gründung von Signalen bis zu einer Geschwindigkeit von 300 km/h bewähren musste.

O. M. Netschaj
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

GUMMIGEFEDERTE RÄDER FÜR SCHIENENFAHRZEUGE

Gummigefederte Räder leisten einen wichtigen Beitrag für einen sicheren, umweltfreundlichen und wirtschaftlichen Schienenverkehr. Wenn Sie die optimale Option für den vorgesehenen Zweck verwenden, vom Bo54-Rad bis zum LoRa-Rad, können Sie deren Eigenschaften voll ausnutzen. Dadurch werden die Geräusche beim Rad-Schienen-Kontakt ohne zusätzliche Maßnahmen wie Radschalldämpfer deutlich reduziert. Darüber hinaus wird eine Reduzierung der Fahrzeug- und Gleisbelastungen erreicht und der Körperschall zu benachbarten Wohngebäuden reduziert. Ein geringerer Profil- und Felgenhornverschleiß im Vergleich zu starren Rädern sowie ein einfacher und wirtschaftlicher

Reifenwechsel führen zu erheblichen wirtschaftlichen Vorteilen bei der Betrachtung von LCC.

Gummigefederte Räder für Schienenfahrzeuge sind keine Erfindung der letzten Jahrzehnte. Bereits 1851 erhielt N. Hodge in den USA ein Patent für ein Rad mit Elementen aus „vulkanisiertem Gummi". Ein weiteres Patent wurde 1899 an C. H. Cameron erteilt. Es handelt sich um ein aufschraubbares Rad, das von einem V-förmigen Gummiring umgeben ist. Vollgummireifen im direkten Kontakt mit der Schiene versagten allein aufgrund der Belastung der Räder.

Es sind viele Entwicklungen von gummigefederten Rädern bekannt, insbesondere aus der Zeit zwischen den beiden Weltkriegen, von denen jedoch nur sehr wenige den Markt erreicht haben. Gründe hierfür waren Festigkeitsprobleme insbesondere bei den verwendeten Schraub-, Niet- und Schweißverbindungen, eine ungünstige Kraftverteilung in den Federelementen verbunden mit unzureichenden Federungseigenschaften, eine Überbeanspruchung der Gummielemente, Kriech- und Setzungserscheinungen sowie eine unzureichende Lebensdauer. 1934 erhielt Malmquist ein Patent für das Zweiringrad, das später als SAB-Zweiringrad bekannt wurde und noch heute in lokalen Fahrzeugen und schweren Lokomotiven verwendet wird. Der Nachteil besteht jedoch darin, dass die Konstruktion aufwendig ist und viel Platz beansprucht. Gummiwerkstoffe werden auch heute noch als Federelemente verwendet, d.h. STUNDE. Der Begriff „gummigefedertes Rad" gilt weiterhin. Experimente mit anderen Elastomermaterialien, z.B. B. auf Polyurethanbasis führte nicht zum gewünschten Erfolg. Warum Räder mit Gummifedern? Der Einsatz von gummigefederten Rädern, insbesondere im Stadtverkehr, ist auf die Streckenführung mit ihren engen Radien und die nahegelegene Wohnbebauung zurückzuführen. Bei kleinen Raddurchmessern, großen Radlasten und der gewünschten langen Lebensdauer der Bearbeitungselemente kann durch die Breite der Gummielemente die für die Gleichmäßigkeit des Radaufbaus erforderliche Breite geschaffen werden, was eine Verbreiterung des Radreifens auf die tatsächliche Breite erfordert des Rades. Radprofil. Dies wird nach und nach bei der Ermittlung der Abstände zwischen den Rädern und dem Fahrgestell berücksichtigt.

In den 1980er Jahren wurde der Ruf nach unter den Fahrzeugen neu bereifbaren Radkonstruktionen laut, wobei diese Forderung bei den damaligen Fahrzeugkonzepten nur mit innengelagerten Radsätzen wirklich Sinn machte. Mit dem klassischen Bo 54-Rad konnte diese Anforderung nicht ohne weiteres erfüllt werden. . Auch aktualisierte Reifen und Gummikörper. Bei Bedarf können die Räder ausgetauscht oder repariert werden.

Im Vergleich zu Vollrädern wurden die bereits erwähnten Vorteile gummigefederter Räder hinsichtlich Geräuschpegel und Laufleistung berücksichtigt. Während zu Beginn der 1960er Jahre bei Straßenbahnfahrzeugen Achslasten von rund 6 t bei einem Raddurchmesser von 730 mm üblich waren, besteht heute die Anforderung, Achslasten von bis zu 13 t bei einem Laufkreisdurchmesser von 560 mm zu erreichen.

E.A.Tanasijenko
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

ZENTRALE UMWELTTHEMEN HEUTZUTAGE

Der Energiebedarf, Auto- und Flugreisen sowie Fleischkonsum haben einen großen Einfluss auf Ihren persönlichen CO2-Ausstoß. Aber sind diese „Highlights" des nachhaltigen Konsums auch nachhaltiger Konsum? Also ein Konsum, der auch Umweltaspekte wie Material- und Wasserverbrauch, Platzbedarf oder Artenvielfalt berücksichtigt?

Heute können und müssen wir die Grundbausteine des „klimaneutralen Wohnens" auch in unserem Privatleben umsetzen.

Die Suche nach global verallgemeinerbaren Konsummustern „Konsumbürger": Engagement jenseits des eigenen Konsums Umweltrelevanz und prioritäre Bedarfsfelder. In der Umweltforschung existieren unterschiedliche methodische Herangehensweisen, mit denen geprüft wird, welche Bereiche des Haushaltskonsums welchen Umweltverbrauch aufweisen. Vorliegende Studien benennen trotz der methodischen Unterschiede die gleichen drei prioritären Bedarfsfelder im Hinblick auf die Umweltrelevanz. Demnach sind die Bedarfsfelder Bauen und Wohnen, Mobilität und Ernährung für 70

bis 80 Prozent der Umweltfolgen des Konsums verantwortlich.

Klimaschutz und Energiefragen sind zentrale Umweltthemen sowohl in der öffentlichen Debatte als auch in der Verbraucherberatung. Auch der CO2-Rechner UBA ist ein bekanntes Tool, mit dem Verbraucher wichtige Aspekte des grünen Konsums einfach ermitteln können.

Die meisten Konflikte lassen sich dadurch lösen, dass man beim Energieverbrauch den gesamten Lebenszyklus eines Produkts betrachtet, also von der Herstellung über die Nutzung bis zur Entsorgung. Die Studie macht dies am Beispiel von Computern deutlich: Auch wenn der gesamte Lebenszyklus ausschließlich aus energetischer Sicht betrachtet wird, wird deutlich, dass ein vorzeitiger Austausch eines noch funktionierenden Computers durch ein energieeffizienteres Neugerät aus ökologischer Sicht keinen Sinn ergibt Standpunkt. Perspektive. Der Energieaufwand für die Herstellung eines Computers ist um ein Vielfaches größer als die möglichen Einsparungen bei der Nutzung. Das Ergebnis ist eine klare Empfehlung, die entsprechenden Geräte möglichst lange zu nutzen.

Klima- und ressourcenschonender Konsum lässt sich durch folgende Merkmale charakterisieren:

Ein umweltfreundlicher und gesunder Ernährungsstil, der auf der Reduzierung des Konsums von tierischen Produkten und Genussmitteln, der Wahl von Bio-Produkten und dem vollständigen Verzicht auf Treibhausprodukte und per Flugzeug importierte Waren basiert.

Eine kleine, maßgeschneiderte Wohnung in einem isolierten Wohnhaus, ausgestattet mit hochwertigen und langlebigen Produkten und Elektrogeräten, die wiederum optimal belastet und in der Regel sparsam genutzt werden.

Individuelle Mobilität, basierend auf öffentlichen Verkehrsmitteln, zu Fuß und mit dem Fahrrad, macht Flugreisen und den Besitz eines Autos überflüssig.

Investitionen in Unternehmen zur Erzeugung erneuerbarer Energien oder nachhaltige Investitionsprodukte. an muss weniger hochwertige, nachhaltige und umweltfreundliche Kleidung kaufen, die lange hält, und energieeffiziente Geräte der Informations- und Kommunikationstechnik, die möglichst lange halten.

Die Höhe des verfügbaren Einkommens spielt eine wichtige Rolle für Ihre persönliche Treibhausgasbilanz und Ihren Ressourcenverbrauch. CO2e-Emissionen, Ressourcenverbrauch und damit verbundene Umweltauswirkungen nehmen tendenziell mit dem Einkommen zu. Die Menschen leben in größeren Wohnungen, kaufen größere Autos und konsumieren mehr.

E. S. Burdjusha
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

WEITERE TRASSEN FÜR HOCHGESCHWINDIKEITSZÜGE

Aufgrund verstopfter Straßen, wachsendem Umweltbewusstsein, ehrgeizigen Klimazielen und hohen Sicherheitsanforderungen an den Luftverkehr versuchen immer mehr Länder in der Europäischen Union, Transporte von längeren Strecken auf die Schiene zu verlagern. Mit der Neuauflage eines Weißbuchs zum Ausbau des Kernnetzes und zur Verdreifachung der Länge von Hochgeschwindigkeitsstrecken hat die EU-Kommission nun die Weichen für Diskussionen über einen deutlichen Ausbau der transeuropäischen Strecken bis 2030 und darüber hinaus gestellt. Durch die Kombination von verkehrs- und wirtschaftspolitischen Aspekten will die EU nationale Strukturen auf Schiene, Luft- und Seewegen aufbrechen und mit ernsthaften finanziellen Anstrengungen das Fernverkehrsnetz bis 2021 um 550 Milliarden Euro ausbauen. Da die EU nach aktuellen Daten jedoch maximal 85 Milliarden Euro selbst bereitstellen kann, müssen die 27 EU-Staaten und gegebenenfalls die Privatwirtschaft die fehlenden Mittel für die Schieneninfrastruktur schultern.

Sollte das Förderkonzept umgesetzt werden, müssten die derzeit in Europa bestehenden 6.637 Kilometer Hochgeschwindigkeitsnetze und die noch im Bau befindlichen 2.400 Kilometer bis zum Jahr 2025 auf rund 18.000 Kilometer Hochgeschwindigkeitsstraßen ausgebaut werden. Zusätzlich zu den im EU-Weißbuch enthaltenen Vorschlägen wird erwartet, dass die weltweit rund 18.000 km langen Hochgeschwindigkeitstransportstrecken im Jahr 2015 auf über 40.000 km anwachsen, beispielsweise durch Hightech-Eisenbahnstrecken in China und Brasilien. Parallel zum Ausbau soll die Zahl der derzeit weltweit 2.500 im Einsatz befindlichen Hochgeschwindigkeitszüge auf mindestens 5.000 Züge erhöht

werden.

Allerdings gilt aus Sicht des Verbandes der Deutschen Automobilindustrie die Forderung des EU-Weißbuchs, bis 2030 30 % des Straßengüterverkehrs über 300 km pauschal auf die Schiene oder die Binnenschifffahrt zu verlagern. Die Verlagerung des Güterverkehrs erhöht die Transportkosten und macht ihn auch umweltschädlich. Während in Deutschland solche Diskussionen um Transportqualität oder Wirtschaftlichkeit nicht nur die Vorschläge des Weißbuchs erfassen, greifen andere Länder auf der ganzen Welt nach Ingenieuren, die Trassen planen und bauen können, um Passagiere und Rohstoffe an die Küsten zu bringen oder die Erschließung der Bodenschätze im Landesinneren zu ermöglichen bzw. zu optimieren.

In der Bahnindustrie hat ein Ingenieur ein größeres Aufgabengebiet als in der Automobilindustrie. Es gilt, den Partnern vor Ort die Technik zu erklären, Teststrecken einzurichten oder im Einzelfall ganze Systeme zu installieren. So müssen beispielsweise Wüstenrangierlokomotiven unter enormen Sandlasten und hohen Temperaturschwankungen fahren und Lokomotiven stellen besondere Herausforderungen in den Bereichen elektrischer oder dieselelektrischer Antriebe oder unterschiedlicher Zulassungs- und Abgasnormen. Ingenieure auf der ganzen Welt sprechen die gleiche Sprache. Dabei gibt es nahezu keine Sprachbarrieren, da Formeln, Zahlen und technische Zeichnungen auf der ganzen Welt gültig sind. Und komplexe technische und physikalische Zusammenhänge lassen sich mathematisch lösen und erklären. Die Sprache der Ingenieure sind überraschend klare Zeichnungen.

Der Studie zufolge muss Deutschland von allen EU-Ländern die meisten Streckenkilometer hinzufügen – auch weil das Land aufgrund seiner zentralen Lage in Europa als Drehscheibe für verschiedene Ziele fungieren muss. In Spanien und Frankreich fehlen nur etwa 2.000 Kilometer, in Deutschland mehr als 4.000. Im erweiterten Netz sollen die Reisezeiten deutlich verkürzt werden. Es wird geschätzt, dass die größten Fortschritte im Reiseverkehr in Ost- und Südosteuropa erzielt werden, wo es noch keine Hochgeschwindigkeitsverbindungen gibt.

P. Klimenko
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

GÜTER-WAGGONS DER ZUKUNFT

Durch die Integration bestehender und neuer Technologien wird der Güterwaggon der Zukunft im Jahr 2030 lautlos auf Schienen fahren, eine hohe Ladekapazität bieten, notwendige Daten mit der Umwelt austauschen, perfekt in die Logistik integriert sein und mehr Kosten und Energie transportieren. -Wirksam. Grundlegende Ideen und Konzepte hierfür liegen vor oder befinden sich bereits in der fortgeschrittenen Erprobung. Es bedarf einer gezielten und flächendeckenden Umsetzung. Eine alleinige teilweise Weiterentwicklung der derzeit im Einsatz befindlichen Eisenbahngüterwagen kann keinen entscheidenden Wachstumsbeitrag leisten. Daher hat der Rail Freight Technical Innovation Circle, bestehend aus Vertretern der Waggonindustrie, der Zulieferindustrie, Kunden und Verladern, Waggonbesitzern und Waggonvermietern, Eisenbahnunternehmen und der Wissenschaft, tragfähige Vorschläge entwickelt, wie Schienengüterwagen auf den Schienengüterverkehr gebracht werden können Markt. An die Standards des 21. Jahrhunderts anzupassen, unter Einsatz moderner Technologien, schrittweise, aber konsequent nach einem klaren Zeitplan..

Die 5-L-Initiative bietet einen Rahmen für fünf Wachstumstreiber und zugehörige Technologiebereiche, die für den erfolgreichen Einsatz von Güterwaggon identifiziert wurden:

- leise: deutliche Reduzierung des Geräuschpegels;
- Leichtgewicht: höhere Nutzlast, geringeres Eigengewicht;
- starkes Fahrwerk: erhöhte durchschnittliche Jahresfahrleistung, sehr hohe/höhere Zuverlässigkeit;
- Logistikfähigkeiten: Möglichkeiten zur Integration in Lieferketten sowie;
- LCC-orientiert: Installieren Sie lebenszykluskostenorientierte Komponenten.

Auf diese Weise schließt die 5-L-Initiative die Lücke zwischen einer drastischen Steigerung der Effizienz und Effektivität des Schienengüterwageneinsatzes und einer schnellen und deutlichen Reduzierung unerwünschter Auswirkungen des Straßenverkehrs.

Der Wachstumsfaktor und Technologiebereich „leise“ betrifft vor allem Radsatz, Bremsen und Fahrwerk, unter anderem durch die Erhöhung der Geräuschdämmung im Fahrwerk, die Optimierung der Schwingungsformen, die Reduzierung der Abstrahlung und die Beseitigung von Flatspots.

Dank des Wachstumsfaktors „leicht“ leisten innovative Schienengüterwagen einen zunehmenden Beitrag zur Erreichung umweltpolitischer Ziele hinsichtlich Ressourcenschonung und CO2-Reduktion. Der Horizont muss auch über die Nutzlast hinausreichen. Die für den Schüttguttransport wichtigen Lademaße sind erweiterbar. Der Grund dafür liegt insbesondere darin, dass die Dichte der transportierten Güter künftig tendenziell abnehmen wird. Das bedeutet, dass die Abmessungen eines Güterwaggons und sein Aussehen entscheidend für den Wettbewerb sind.

Die Maßnahmen zur Umsetzung des Wachstumsfaktors „Starklauf“ zielen in erster Linie auf die Steigerung der Laufleistung und der Betriebsproduktivität ab. Eine koordinierte Datenverfügbarkeit ist der Schlüssel zur Modernisierung des Diagnosesystems und zur Reduzierung des Schadensniveaus an Eisenbahngüterwagen.

Der Übergang zur automatischen Kupplung wird aktiv vorangetrieben, insbesondere im Hinblick auf eine deutliche Vereinfachung des Güterumschlags auf Rangierbahnhöfen und Verladestellen. Der Faktor „Logistikfähigkeit“ wird für die Zukunft des Schienengüterverkehrs immer wichtiger. Dies belegen auch die oben genannten Auswirkungen von Menge und Produktstruktur.

D. Wysokos
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

DAS MESSSYSTEM IM WAGGONBAU

Auf den ersten Blick scheinen Güterwagen sehr einfache, unkomplizierte Eisenbahnfahrzeuge zu sein, die aus Rädern, einem Grundrahmen und einem variablen Aufbau bestehen. Dieser Eindruck ändert sich jedoch schnell, wenn man sich moderne Produktionsanlagen für Güterwagen anschaut. Man sieht sofort, wie fortschrittlich die Technik im Auto ist. Allerdings erfolgt die Entwicklung jedes einzelnen Fahrzeugtyps zunächst immer individuell und unter Berücksichtigung seines Einsatzzwecks.

Bei Triebwagenkomponenten finden sich häufig innovative Lösungen. Deshalb kommt der Qualitätssicherung im Produktionsprozess eine besonders wichtige Rolle zu. Zu diesem Zweck nutzt die DB Waggonbau Nasky GmbH modernste Messsysteme, wie zum Beispiel den Laser Trecker 3 von Automaten Precision. Der Traktor wurde im Rahmen eines neuen Produkts angeschafft – einem vierachsigen einseitigen Muldenkipper für den Energiekonzern Vattenfall. Im Vergleich zu anderen Autos sind die Genauigkeitsanforderungen höher. Zum Schweißen; Bei Baugruppen bis zu 20 m Länge ist eine Genauigkeit von einem Millimeter eine sehr kleine Größenordnung.

Mit der User Tracker API können Sie größere Objekte auch aus kurzer Entfernung vermessen. Der Traktorkopf ist horizontal um +/-320° und vertikal um +80° bis -60° drehbar, wodurch das Messsystem nahe am Messort positioniert werden kann.

Das 3D-Messsystem berechnet Koordinaten anhand von zwei Winkeln und einer gemessenen Distanz. Auch mehrmaliges Umpositionieren stellt dank des geringen Gewichts von nur 8,5 kg und der Messkopfgröße von 36 cm kein Problem dar. Der Lasertraktorkopf ist so konzipiert, dass der Laserstrahl keinen Spiegel oder Lichtleiter durchläuft. Dadurch werden systembedingte Messungenauigkeiten durch Ablenkungsfehler eliminiert.

Zu den weiteren Vorteilen des API-Traktors gehört neben seiner kompakten Größe (es gibt keinen kleineren Lasertraktor auf der Welt) auch eine hervorragende Reichweite von 120 m ohne Standortwechsel. Die Laser-Tracker-Technologie basiert auf einem von API erfundenen selbstnachführenden Laserinterferometer.

Bisher nutzen die Triebwagenbauer im Werk Nazca lediglich einen Lasertraktor, der Mitte 2009 im Rahmen des Vattenfall-Projekts angeschafft wurde.

Dieser Wagen transportiert große Mengen (Nass-)Asche, die bei der Verbrennung von Kohle entsteht und durch Wasser gekühlt wird. Aufgrund der besonderen Anforderungen der Braunkohleindustrie verfügt Audi über eine spezielle Innenbeschichtung, die eine vollständige Entladung gewährleistet.

Auch an den Kombi werden hohe funktionale Anforderungen gestellt. Beispielsweise wird die gesamte Rutsche über einen Pneumatikzylinder gekippt. In diesem Fall müssen Scharniergelenke und Durchstechelemente exakt zusammenpassen.

Der Tragrahmen bildet mit der Dachrinne eine funktionelle Einheit. Der Futterspender verfügt über eine bewegliche Klappe. Es muss nicht nur problemlos und einfach zu montieren sein, sondern auch im praktischen Einsatz zuverlässig funktionieren.

Ein Beispiel für eine clevere Lösung, die Automobilbauer in enger Zusammenarbeit mit dem Messgerätehersteller gefunden haben, ist die Messung im Einbauraum der Züge: Die Waggons haben keine Puffer wie herkömmliche Waggons, sondern sind starr gekoppelt.

Der Aufstellraum ist so gestaltet, dass Messungen nur mit Hilfe eines Traktors durchgeführt werden können; Auch Messungen von außen sind nicht möglich. Daher ist ihre Produktionshalle sehr staubig und der Reflektor verschmutzt schnell.

K.V.Osadtschyj
Sprachbetreuerin: M. L. Smyrnowa
Ukrainische staatliche Universität für Wissenschaft und Technologien

SICHERHEIT UND GESUNDHEITSSCHUTZ

Arbeitsschutz und elektrische Sicherheit hängen eng zusammen. Sicherheit und Unfallverhütung haben bei Arbeiten an elektrischen Anlagen höchste Priorität. Doch wie wird die elektrische Sicherheit beim Betrieb elektrischer Anlagen in das Arbeitsschutzsystem eines Unternehmens integriert?

Jeder Unternehmer trägt die volle Verantwortung für die Sicherheit und den Gesundheitsschutz in seinem Unternehmen. Nach dem Arbeitsschutzgesetz ist er verpflichtet, dafür zu sorgen, dass bei Arbeiten an elektrischen Anlagen alle erforderlichen Schutzmaßnahmen getroffen und beachtet werden. Deshalb werden bei Arbeiten an elektrischen Anlagen und Geräten die entsprechenden Anlagenteile abgeschaltet. Es reicht jedoch nicht aus, nur einen Schalter zu betätigen, um ihn zu aktivieren.

Von der Aktivierung der Anlage bis zur Freigabe des Arbeitsplatzes sind zusätzlich zuverlässige Informationen über den Zustand der Anlage, Maßnahmen zur Verhinderung von Fehlbedienungen und -funktionen, Schutz bei Fehlbedienungen und -funktionen sowie Schutz vor möglichen Gefahren erforderlich benachbarte Teile des Systems.

Zu diesem Zweck wurden fünf Sicherheitsregeln formuliert: Abstand halten; einen Wiederanlaufschutz bieten; das Fehlen von Spannung feststellen; Erdung und Kurzschluss; Benachbarte und spannungsführende Teile abdecken oder absperren.

Jeder Elektriker kennt diese Regeln als seine Lebensversicherung. Wie steht es um die Sicherheit und Zuverlässigkeit der Geräte und Tools, mit denen Sie wichtige Informationen erhalten oder Ihre Arbeitsprozesse sichern? Jede Maßnahme ist nur so sicher wie die eingesetzten Sicherheitseinrichtungen. Bei der Durchführung von Wartungs- und Reparaturarbeiten im spannungslosen Betriebszustand muss sich der Mechaniker auf seine Erdungs- und Kurzschließeinrichtung verlassen können. Es schützt es vor schweren Verletzungen, wenn das Gerät versehentlich wieder eingeschaltet wird oder wenn es während des Betriebs Spannungen und atmosphärischen Überspannungen ausgesetzt wird.

Nach geltender Gesetzgebung ist der Unternehmer verpflichtet, bei Arbeiten an elektrischen Anlagen und Geräten eine Gefährdungsbeurteilung durchzuführen. Auf Basis dieser Gefährdungsbeurteilung müssen Betriebsabläufe und Sicherheitsmaßnahmen festgelegt werden, um gesundheitliche Schäden durch elektrische Energie zu verhindern.

Der zentrale Punkt der fünf Sicherheitsregeln ist die Erdung und das Kurzschließen. Dadurch wird sichergestellt, dass die Anlage während des gesamten Betriebs spannungsfrei bleibt, auch wenn sie Spannungen, Überspannungen oder unbeabsichtigten Wiederanläufen ausgesetzt ist. Aber auch diese Sicherheitsmaßnahme ist nur so wirksam wie die eingesetzten Mittel und deren richtige Anwendung. Um die Sicherheit bei allen Arbeiten an elektrischen Anlagen und in diesen zu gewährleisten, müssen – ergänzend und unabhängig von technischen Vorschriften – organisatorische Maßnahmen zum Arbeitsschutz umgesetzt werden. Dazu gehören vor allem Gefährdungsbeurteilungen, Arbeitsanweisungen und Sicherheitshinweise.

Einerseits können elektrische Anlagen einen Brand verursachen, andererseits können sie im Brandfall aber auch zu einer besonderen Gefahrenquelle werden. Es liegt daher in der Verantwortung des Betreibers, für die Sicherheit elektrischer Anlagen zu sorgen. Hierzu muss er sowohl die Besonderheiten des vorbeugenden Brandschutzes elektrischer Anlagen berücksichtigen als auch entsprechende Brandschutzmaßnahmen ergreifen.
Unter elektrischen Anlagen versteht man eine Kombination mehrerer elektrischer Betriebsmittel. In der Industrie werden diese Systeme durch Gerätekennzeichnungen identifiziert.

CONTENTS

National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" **THE IMPORTANCE OF INTERNATIONAL COORDINATION EVENTS TO IMPROVE INFORMATION SECURITY DUE TO THE CURRENT GEOPOLITICAL SITUATION**
V.V. Honcharenko *Dmytro Motornyi Tavria State Agrotechnological University* **DIGITAL TRANSFORMATION: NAVIGATING THE CHALLENGES AND OPPORTUNITIES OF INFORMATION TECHNOLOGY**
B. V. Isak *Dnipro University of Technology* **HOW AI HELPS HUMANITY**
A.V. Khaustov *Ukrainian State University of Science and Technologies (Dnipro)* **INFORMATION TECHNOLOGY IN FUTURE**
L.V. Khodaba *Dmytro Motornyi Tavria State Agrotechnological University* **THE IMPACT OF ARTIFICIAL INTELLIGENCE AND BLOCKCHAIN ON THE ECONOMY: TRANSFORMING INDUSTRIES AND EMPOWERING SOCIETIES**
Ye. A. Koval *Ukrainian State University of Science and Technologies (Dnipro)* **ANALYSIS OF CUSTOMER DATA USING DATA MINING**
B. T. Kushnir *Ukrainian State University of Science and Technologies (Dnipro)* **THE IMPORTANCE OF INTRODUCING FREE SOFTWARE IN THE EDUCATIONAL PROCESS OF UNIVERSITY STUDENTS**
I. O. Kryvonos *Dmytro Motornyi Tavria State Agrotechnological University* **ARTIFICIAL INTELLIGENCE IN EDUCATION: OPPORTUNITIES AND CHALLENGES**
R.E. Kukovskiy *Ukrainian State University of Science and Technologies (Dnipro)* **INFORMATION TECHNOLOGY**
O. I. Letuchyi *Ukrainian State University of Science and Technologies (Dnipro)* **DIGITAL TWIN. PART OF INDUSTRIAL REVOLUTION 4.0**
D. V. Monakhov *National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"* **THE CONCEPT OF VIRTUAL PRIVATE NETWORKS**
V. S. Nahornyi *National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"* **ANALYSIS OF ATTACKS ON CLOUD SERVICES**
O. V. Rasnitska *National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"* **THE MERITS OF USING ARTIFICIAL INTELLIGENCE IN THE CREATION OF SIMULATORS FOR OPTIMIZING QUEUING SYSTEMS**
S.R. Rusakevych *Ukrainian State University of Science and Technologies (Dnipro)* **QUANTUM COMPUTING: REVOLUTIONIZING COMPUTATION AND SECURITY**

D. M. Sai *National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"* **RISK ASSESSMENT AND DETECTION OF SQL - INJECTIONS**
R.I. Skorokhod *Dnipro University of Technology* **ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING: TODAY AND THE FUTURE**
O. Slivets *Ukrainian State University of Science and Technologies (Dnipro)* **FASHION COLLAPSE IN GENERATIVE ADVERSARIAL (GAN) NETWORKS**
D.E. Uniegova *National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"* ***OPERATING SYSTEMS OF THE LINUX FAMILY***
M. V. Vietluzhskykh *Ukrainian State University of Science and Technologies (Dnipro)* **QUANTUM COMPUTING AND CRYPTOGRAPHY: IMPLICATIONS AND CHALLENGES**
V.V. Vietluzhskykh *Ukrainian State University of Science and Technologies (Dnipro)* **THE INTERNET OF THINGS: PAVING THE WAY FOR A CONNECTED FUTURE**
M. Y. Vyskarka *Ukrainian State University of Science and Technologies (Dnipro)* **CURRENT ETHICAL AND LEGAL CONCERNS OF ARTIFICIAL INTELLIGENCE**
SECTION 5. ENERGY EFFICIENCY
Yu.S. Artemchuk, V.V. Artemchuk, S.P. Filonenko *Zaporizhia National University, Department of Electrical Engineering and Cyberphysical Systems* **INCREASING ENERGY EFFICIENCY IN VARIOUS AREAS OF LIFE USING ARTIFICIAL INTELLIGENCE**
V.V. Artemchuk, V.L. Kovalenko *Zaporizhia National University, Department of Electrical Engineering and Cyberphysical Systems* **ENERGY EFFICIENCY: A KEY FACTOR IN SUSTAINABLE DEVELOPMENT**
V. G. Gapotchenkov *Ukrainian State University of Science and Technologies (Dnipro)* **ENERGY EFFICIENCY IMPROVEMENTS IN ELECTRIC DRIVES**
V.E. Kukovskiy *Ukrainian State University of Science and Technologies (Dnipro)* **THE PROBLEM OF ENERGY EFFICIENCY NOWADAYS**
Y.O. Kuramshin *Ukrainian State University of Science and Technologies (Dnipro)* **ENERGY EFFICIENCY DETERMINATION OF LOADING-BACK SYSTEM OF ELECTRIC TRACTION MACHINES**
O. S. Pushkar *Ukrainian State University of Science and Technologies (Dnipro)* **ENERGY EFFICIENCY OF GREEN ENERGY USE IN UKRAINE**
A.A. Roshchina *Dmytro Motornyi Tavria State Agrotechnological University*

GERMAN LANGUAGE SECTION
I.S. Shynkariuk **DER EINSATZ VON MODALPARTIKELN IM DAF-UNTERRICHT: ANALYSE UND BEISPIELE DER ÜBUNGEN**
O. R. Osadcha *Ukrainische staatliche Universität für Wissenschaft und Technologien* **NEUE TECHNOLOGIEN IM BAUWESEN**
V.V. Wasyliskin *Ukrainische staatliche Universität für Wissenschaft und Technologien* **DAS IT-MANAGEMENT HEUTZUTAGE**
D. A. Tscherewertschenko *Ukrainische staatliche Universität für Wissenschaft und Technologien* **DAS WACHSTUM DES INTERNETS UND PERSPEKTIVEN DES INGENIEURWESENS**
N. O. Rondow *Nationale staatliche Universität für Wissenschaft und Technologien* **KRÜMMUNGSRADIUS FÜR DIE ZULÄSSIGE GESCHWINDIGKEITSBEGRENZUNG**
E. O. Tyshchenko *Ukrainische staatliche Universität für Wissenschaft und Technologien* **WEITERENTWICKLUNG VON TRANSPORTTECHNOLOGIEN**
W.W Uschakow *Ukrainische staatliche Universität für Wissenschaft und Technologien* **KLASSISCHE BAHNBAUPROJEKTZIEHLE**
R. I. Buchrejew *Ukrainische staatliche Universität für Wissenschaft und Technologien* **DAS INTERESSE AN NEURONALEN NETZEN**
M. D. Chernous *Ukrainische staatliche Universität für Wissenschaft und Technologien* **UMWELTSICHERHEIT GEWÄHRLEISTEN**
O.A. Juferowa *Ukrainische staatliche Universität für Wissenschaft und Technologien* **TRANSFORMIERBARE IT-ARCHITEKTUREN**
K. Kondratjyuk *Ukrainische staatliche Universität für Wissenschaft und Technologien* **DIE BEDROHUNGEN FÜR DEN PLANETEN**
M. Demianenko *Ukrainische staatliche Universität für Wissenschaft und Technologien* **DER NEUE FERNVERKEHRSZUG „ECx“ IN DEUTSCHLAND**
V.O.Teslenko *Ukrainische staatliche Universität für Wissenschaft und Technologien* **FÜR DEN FORTSCHRITT AUF DER SCHIENE**
M.S. Tolstyj *Ukrainische staatliche Universität für Wissenschaft und Technologien* **DIE U-BAHN NOCH SICHERER UND ZUVERLÄSSIGER**
W. S. Baglay *Ukrainische staatliche Universität für Wissenschaft und Technologien* **DIE MULTISYSTEM-STADTBAHN**
A.Tschura *Ukrainische staatliche Universität für Wissenschaft und Technologien*

VORTEILE DER SCHIENENVERKEHR
J. S. Bugajtschuk *Ukrainische staatliche Universität für Wissenschaft und Technologien* **MASTFUßADAPTER FÜR DIE BAHN**
O. M. Netschaj *Ukrainische staatliche Universität für Wissenschaft und Technologien* **GUMMIGEFEDERTE RÄDER FÜR SCHIENENFAHRZEUGE**
E.A. Tanasijenko *Ukrainische staatliche Universität für Wissenschaft und Technologien* **ZENTRALE UMWELTTHEMEN HEUTZUTAGE**
E. S. Burdjusha *Ukrainische staatliche Universität für Wissenschaft und Technologien* **WEITERE TRASSEN FÜR HOCHGESCHWINDIKEITSZÜGE**
P. Klimenko *Ukrainische staatliche Universität für Wissenschaft und Technologien* **GÜTER-WAGGONS DER ZUKUNFT**
D.V. Wysokos *Ukrainische staatliche Universität für Wissenschaft und Technologien* **DAS MESSSYSTEM IM WAGGONBAU**
K.V. Osadtschyj *Ukrainische staatliche Universität für Wissenschaft und Technologien* **SICHERHEIT UND GESUNDHEITSSCHUTZ**

НАУКОВЕ ВИДАННЯ

ТЕЗИ ДОПОВІДЕЙ

Міжнародної наукової мультидисциплінарної конференції студентівта молодих учених *Новітні технології: покращення сьогодення та вплив на майбутнє*

(23-24. 11. 2023)

Англійською, німецькою, іспанською, польською та французькою мовами

Друкується в авторській редакції

Відповідальна за випуск: І.А. Колієва

Український державний університет науки і технологій