



**EXPLORING
THE DIGITAL LANDSCAPE:
INTERDISCIPLINARY PERSPECTIVES**



EXPLORING THE DIGITAL LANDSCAPE: INTERDISCIPLINARY PERSPECTIVES

Monograph

*Edited by Olha Blaha
and Iryna Ostopolets*

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3.3. Digital technologies application for environmental safety management of waste treatment process during emergency situations

In modern economic conditions the most widely used way for storage and utilization of the municipal solid wastes are waste landfills. Alternative ways of the waste treatment are designed and implemented today but for developing countries economy they are quite expensive. Therefore, investigation of such objects functioning comes into the focus of modern researchers all over the world (Yaashikaa et al, 2022).

Unfortunately, this way of waste treatment leads to accumulation of large amounts of wastes with different composition. Such approach of waste management in modern economy allows to raise efficiency of waste treatment process on landfills, however, it brings set of vulnerabilities for the whole waste management system functioning, which may be overcome with application of digital technologies for forecasting and prevention of system breakout.

Waste landfills are classified according to types of accumulated waste as following:

- landfills of construction waste and rock masses;
- landfills of household waste;
- landfills of harmful substances;
- mixed landfills, where household waste is located in combination with harmful substances.

Waste accumulation locations are sources of pollutants spreading in natural environment, in particular, in atmosphere, soil, surface and ground waters. At the same time, this negative impact is long-lasting due to long terms of waste components decomposition. Even small waste landfills are harmful because they lead to the loss of soil resources necessary to ensure the functioning of natural processes in the ecosystems of the territory adjacent to such a facility.

When solving problems related to the placement and operation of waste landfills, a number of environmental problems arise that have not yet found a final

solution. The most important of them is the negative impact on various components of the environment in the area where such objects are located. A significant part of this impact is caused by the presence of toxic substances in the waste layer (Abdel-Shafy et al, 2018).

In modern world economy cases of emergency situations realization in the places of waste accumulation are not unique – fires, floods, landslides of masses of garbage, etc., are regularly observed (Aderemi et al, 2012; California’s Department of Resources Recycling and Recovery, 2022; Vambol et al, 2018). The occurrence of a fire at waste landfill, in particular, leads to a significant increase in negative impact on the natural environment, which is associated with the activation of the following processes:

- 1) atmospheric pollution by waste combustion products;
- 2) spreading of toxic substances together with water used to extinguish the fire;
- 3) collapses and landslides of waste masses with their spread to neighboring areas.

The result of such events is the danger to people lives and the cessation of (temporary or permanent) functioning of such facilities (Feng et al, 2018). This leads to a sharp deterioration in the state of waste management in populated areas (especially in large cities), since it is impossible to place them on a landfill for a long time, sometimes for several days. The result of this is a sharp increase in the negative impact on the environment, because large volumes of garbage accumulate on unprepared sites for their storage, turning the city territory into a large unauthorized landfill. At the same time, the pollution of atmospheric air, ground and surface water, and soil with dangerous components of waste and their decomposition products increases significantly (Vambol et al, 2018).

A waste landfill, even under normal conditions, is a source of constant negative impact on the natural environment. The environmental safety management system created at a similar facility is designed for a certain predicted level of this impact. Usually, the resources of one or more fire brigades equipped with water jet fire extinguishing systems are used to extinguish fires, in the most extensive cases,

aviation equipment can be used. The desire to eliminate the fire as soon as possible and, accordingly, the uncontrolled use of large masses of water or other fire-extinguishing mixtures can lead to an overload of the means of ensuring the ecological safety of the landfill. This, in turn, will increase the risk of an emergency in the area adjacent to the facility. As you can see, the specified situations are complex in nature, cover a territory whose area is much larger than the area of the object, and the number of people living in this territory is quite large.

In the process of storing waste of organic origin, their chemical decomposition occurs, one of the products of which is the flammable gas methane. It often ignites, becoming a source of fire, which can occur not only on the surface, but also in the depth of masses of accumulated waste. As a result of burning, substances and materials that played the role of reinforcing fibers are destroyed, which causes a sharp drop in the strength of the layers of accumulated waste, creating conditions for collapses and landslides. On the other hand, the unrestricted distribution of waste masses on the sites adjacent to the landfill leads to pollution and increases the level of negative impact on the region ecosystem.

The shift of waste masses occurs if the formed slope turns out to be steeper than the maximum allowed by the strength conditions (Jakhar et al, 2023; Kölsch et al, 2005). At the same time, the material formed as a result of storage is more complex in terms of physical properties than ordinary soil, due to the presence of products made of different materials, for example, plastics, which play the role of reinforcing fibers in the created environment. Fibrous reinforcement acts as a factor in strengthening the load-bearing capacity of the formed multi-meter layer of accumulated waste. However, due to the fact that this reinforcement is formed mainly by combustible organic substances, the risk of a sudden shift due to their rapid burning during fires, which often occur at waste landfills, significantly increases.

It seems that the most effective way to simultaneously solve the problems of environmental and man-made safety in this sense is to eliminate the fire as soon as possible in any available way. However, according to the results of known research

on this issue, it can be concluded that the use of such an approach in the past led to the opposite consequences, since the main reasons for the intensification of shear processes in the waste layer are the following (Kölsch, 2001):

1) low density of waste, caused by the increased content of light plastic materials in them, with the simultaneous insufficient use of waste compacting agents during their storage;

2) unlimited penetration of water into the waste layer due to low density and insufficient hydrophilic materials in their composition (for example, paper materials perform the function of regulating water penetration in the waste mass).

The low density of waste and the decrease in the proportion of paper in it leads to a decrease in the surface flow of water and, accordingly, to an increase in the volume of its infiltration into the thickness of the waste. This leads to a sharp increase in the load on the slope, and if the fiber reinforcement is weakened at the same time – to an inevitable landslide. If the landfill is located in a region with a sufficiently large amount of precipitation, the danger of such a disaster is a constant threat to such an object.

However, even in the absence of a catastrophic landslide, the specified processes certainly increase the level of ecological danger of the object, stimulating the dissolution and further washing out of toxic products of waste decomposition. One of the urgent measures in this regard is to ensure the minimization of the volume of water that will enter the waste masses during the operation of waste landfills.

In particular, «National strategy for waste management in Ukraine until 2030» states following negative trends identified in the waste management system in Ukraine (Cabinet of Ministers of Ukraine, 2017):

- accumulation of waste in both the industrial and household sectors, which negatively affects the state of the environment and people health;
- improper disposal and removal of hazardous waste;
- placement of household waste without taking into account possible dangerous consequences;

- improper level of use of waste as a secondary raw material due to the imperfection of the organizational and economic foundations of their involvement in production;

- ineffectiveness of implemented economic tools in the field of waste management.

The creation of a comprehensive waste management system in the state is indicated in the Strategy as key to solving these problems.

Modern methods of waste management in Ukraine are oriented towards landfill disposal of waste, its placement in landfills and/or spontaneous landfills, most of which do not meet the requirements of environmental safety. The technological level of modern waste management methods in Ukraine is low, innovative technologies are introduced extremely slowly, or not at all.

All this leads to excessive dependence of Ukraine on places of accumulation and disposal of waste, and the lack of available alternatives to waste landfills and landfills in the event of an emergency leads to a significant deterioration of the living conditions of people and the ecological state of the territories.

The above-mentioned Strategy separately sets the task of ensuring the recycling of 15 percent in 2023, and 50 percent in 2030 of the total volume of waste generation. However, even if this goal is achieved, the volumes of waste that will be buried will be large enough so that the occurrence of emergencies at the places of their accumulation will lead to significant problems in the waste management system.

The key element of the management system of the city sanitation system is the waste landfill, where waste accumulates. A large landfill can serve as the end point of waste flows that have formed in many settlements of the region. Instead, a small-scale waste storage site (landfill or landfill) will serve only the sources of waste generation from the adjacent territory.

Analysis of the management structure of the city sanitation system indicates the presence of a «bottleneck» in it, namely the waste landfill. Its temporary or permanent decommissioning, for example, due to an emergency on it, leads to a stoppage of the entire system and a rapid accumulation of a large amount

of waste directly on the territory of the city. Instead, on the other hand, the management structure includes a large number of regulatory bodies of various directions. The significant difference between the various emergency situations that can occur within the waste accumulation sites complicates the decision-making process in the waste management system, especially taking into account the need to meet the requirements for ensuring environmental safety. The unpreparedness of the regulatory bodies for prompt decision-making in the event of a sharp change in the conditions of the system functioning generally leads to decision-making in the simplest way – a ban.

Taking into account all of the above, it can be concluded that the use of simulation modeling methods to simulate the operation of systems in the field of environmental safety in order to determine the conditions for the most effective functioning of the local environmental safety management system during an emergency at the place of waste accumulation with the possibility of taking into account all possible parameters affecting the final result of her work is definitely relevant.

To solve this task the simulation complex was developed using the method of simulation modeling (Osetrova et al, 2020). The simulation complex was developed on the basis of the principle of ensuring mobility and operational efficiency, as well as taking into account the fact that for multi-purpose systems operating in the conditions of the need to take into account a complex of contradictory criteria, it is practically impossible to describe the object with an accurate mathematical model. The purpose of its use is the formation of the style and skills of environmental safety management in the waste management system in conditions where the object is replaced by a simulation model.

The presented simulation complex was implemented on the basis of modern software and technical solutions, taking into account the principles of organization and functioning of waste management systems, which made it possible to use it in a wide range of initial conditions.

The application of the developed complex allows obtaining the results of a simulation experiment, which, in turn, make it possible to determine the effectiveness of the use of all types of resources and to find shortcomings in the environmental safety management system in the direction of waste management. Finally, working out the interaction of various links of the environmental safety management system in the simulation process allows to increase the level of mutual understanding between them and ensure the reliability and efficiency of communication in the event of an emergency at the landfill site.

The number and parameters of waste landfills participating in the simulation significantly affect its result and should be determined in advance based on the indicators of their formation not only in a separate settlement, but also in the region as a whole.

For each of the organizations involved in the simulation, it is necessary to determine in advance the number and capacity of each «vehicle», based on their available transport and production capacities.

Simulation process is realized step-by-step. Steps of simulations may be of different scale -recommended scale for simulation is step-by-day. Each step should include following actions applied by all participants of the simulation.

A. Settlement:

A.1. Increase of amount of simulated «waste amount» accumulated at the territory of the settlement according to forecasted amount of waste production for one day.

A.2. Verification of availability of all waste landfills used on previous simulation step and own specialized waste transportation organizations.

A.3. Assessment of capability of own specialized waste transportation organizations to transport accumulated waste amount to available waste landfills.

A.4. In case of lack of capability of transportation or waste landfills resources to transport whole amount of accumulated waste out of the settlement: selection of waste landfill not used on previous step and addressing to settlement-manager of selected landfill with the request about placing of redundant waste amount.

A.5. In case of receiving of request from another settlement about placing of redundant waste amount at managed waste landfill: conclusion making about the capability and needed resources for placing such amount of waste and providing an answer for received request.

B. Waste transportation organization:

B.1. Calculation of capability of waste amount transportation.

B.2. Transfer of corresponding simulated «waste amount» from settlement to landfills.

C. Waste landfill:

C.1. Calculation of capability of waste amount placing at the territory of landfill using available resources.

C.2. Obtaining of corresponding simulated «waste amount» from waste transportation organizations.

Represented algorithm of simulation allows conduct both management or training procedures depending on the task. Simulation process may include different combinations of participants and waste components depending on regional conditions. For example, basic scenarios proposed for training are:

Scenario 1. One settlement, own specialized waste transportation organizations, available waste landfills. The aim of simulation – improvement of interaction of waste management system elements un case of emergency situation at some of waste landfills.

Scenario 2. One settlement, own specialized waste transportation organizations, one available waste landfill, other settlements managing different waste landfills each. The aim of simulation – improvement of interaction of regional waste management system elements in case of emergency situation at some of waste landfills.

For effective implementation of *Scenario 2* the mechanism realization of operative selection of available waste landfills is critical factor due to necessity of taking into account such complex set of parameters as distance and capability

of transportation and placing of redundant waste amount. Simulation of the selection is based on approach of nearest neighbor selection (Tutz et al, 2016).

Formal representation of simulation task uses following marking:

$A = \{a_1, a_2, \dots, a_{N_A}\}$ – the set of waste landfills of the region;

$N_A = |A|$ – the power of the set of waste landfills of the region;

$a_i = \{x_i^a, y_i^a, s_i^a, t_i^a\}$, $i = 1 \dots N_A$ – the set of waste landfill parameters, where x_j^a and y_j^a – geographical coordinates of waste landfill; s_i^a – surface area waste landfill; t_i^a – current state of waste landfill («active» or «inactive»);

$B = \{b_1, b_2, \dots, b_{N_B}\}$ – the set of settlements of the region;

$N_B = |B|$ – the power of the set of settlements of the region;

$b_j = \{x_j^b, y_j^b, w_j^b, p_j^b\}$, $j = 1 \dots N_B$ – the set of settlement parameters, where x_j^b and y_j^b – geographical coordinates of settlement; w_j^b – daily waste amount accumulated at settlement; p_j^b – number of inhabitants of settlement;

$l = \{t^l, s^l, d^l, D^l\}$ – the set of task limitations, where t^l – desired state of waste landfill («active», «inactive», «any»); s^l – minimum value of surface area of waste landfill; d^l – minimum value of distance between settlement and waste landfill; D^l – maximum value of distance between settlement and waste landfill;

$c = \{x^c, y^c, s^c, t^c\}$ – the set of parameters of desired waste landfill, where x^c and y^c – geographical coordinates of settlement; s^c – surface area of desired waste landfill; t^c – state of desired waste landfill («active» or «inactive»);

$dist(b, a)$ – distance from some settlement $b \in B$ to some waste landfill $a \in A$, which may be found for known geographical coordinates and lengths of 1 degree along the parallel k_x and 1 degree along the meridian k_y may be calculated using following formula

$$dist(b,a) = \sqrt{(x^a \cdot k_x - x^b \cdot k_x)^2 + (y^a \cdot k_y - y^b \cdot k_y)^2} \quad (1)$$

The direction on the map to the waste landfill site relative to the settlement can be determined by the values of the direction angles, which are calculated according to the formulas

$$\varphi(b,a) = \arccos \left(\frac{x^a \cdot k_x - x^b \cdot k_x}{dist(b,a)} \right); \quad (2)$$

$$\psi(b,a) = \arcsin \left(\frac{y^a \cdot k_y - y^b \cdot k_y}{dist(b,a)} \right). \quad (3)$$

Correspondence of calculation results according to formulas (2)-(3) and directions on the map is presented in the table 1.

Taking into account marking mentioned above, the task of finding the desired waste landfill can be presented in the following form: for given limitations l we must find waste landfill c from the set of waste landfills of the region $a \in A$, nearest to selected settlement $b \in B$. In a formal form, the task of finding the nearest waste landfill can be presented in the following formal form:

$$\forall a \in A: dist(b,c) \leq dist(b,a). \quad (4)$$

Table 1. Correspondence of the calculated values of the guide angles $\varphi(b,a)$, $\psi(b,a)$ and direction to waste landfill on the map

$\varphi(b,a)$	$\psi(b,a)$	Direction on the map
0...22,5	-22,5...22,5°	East
22,5...67,5°	22,5...67,5°	North-East
67,5...112,5	67,5...90	North
112,5...157,5	22,5...67,5	North-West
157,5...180	-22,5...22,5	West
112,5...157,5	-22,5...-67,5	South-West
67,5...112,5	-67,5...-90	South
22,5...67,5	-22,5...-67,5	South-East

Using represented model (1)-(4) the software and computing complex for decision-making support in the environmental safety management system of the city during an emergency at the waste landfill was developed. It realizes following functions:

- maintaining a database of waste landfills in the region;
- selection of the values of the specified conditions – the settlement, restrictions on the waste removal system, as well as the hazardous waste landfill where the emergency occurs;
- automated selection of waste landfills that meet the specified conditions.

Developed complex may be used on a cellphone or tablet based on Android operating system and free office software.

The practical development of the software and computing complex was carried out on the basis of data on waste landfills obtained from the database of the Ministry of Ecology and Natural Resources of Ukraine (Ministry of Environmental Protection and Natural Resources of Ukraine, 2024). The L'viv region, Ukraine was chosen as the base region for simulation.

As a result of working out the scenario related to the failure of the L'viv waste landfill, the following reasons for the deterioration of the situation with excessive accumulation of waste in the city of L'viv were established:

1. Drohobytzky waste landfill, located near the village, was used for waste removal. Bronytsia, Drohobytzky district (202 km from Lviv) and the Boryslav landfill located near Boryslav (196 km from L'viv). Both landfills were closed in 2018 (Agency of information and analytics galinfo, 2018).

2. The available waste landfills located two to three times closer than the used ones were identified, namely landfills in the city of Stryi, Stryiskyi district (64.7 km from the city of L'viv), the city of Zhydachiv, Zhydachivskiy district (52.8 km from the city of L'viv) and the city of Brody, Brodivskiy district (87.1 km from the city of L'viv).

Thus, the created simulation complex, equipped with a software and computing complex for decision-making support «System of environmental safety management

of the city during an emergency at a waste landfill» is suitable for simulating the functioning of environmental safety management systems in the direction of waste management in regional and state economy. The results of simulation by the developed complex can be used to increase the efficiency of environmental safety management in the waste management systems both of local, regional and state level communities by increasing the level of interaction of local authorities, communal enterprises in the field of waste management.

Conclusions

The structure of the simulation complex of the environmental safety management system of the city during an emergency at the waste storage site is proposed.

A simulation model of the environmental safety management system of the city during an emergency at the waste landfill was developed. On its basis, a software and computing complex was created to support decision-making in the environmental safety management system of the city.

The use of developed models of environmental safety management systems, focused on the complex nature of the effects on the natural environment of hazard factors, allows not only to fulfill the task of ensuring the required level of safety, but also to increase the effectiveness of protective measures implemented to solve it in the system of regional and state economy.

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Annotation

Part 1. Interdisciplinary insights into modern digitalization and management

1.1. *Natalia Bobro*. Digitalization and management of the modern educational process.

The article analyzes the management of the modern educational process in the context of digitalization. The features of the digital transformation of education are considered and its main advantages and disadvantages are outlined. The use of immersive educational technologies, in particular, the use of virtual and augmented reality, as well as other means of interaction to create an interactive learning environment, is analyzed. The possibilities of using virtual and augmented reality technology in the learning environment are highlighted. It is noted that digital technologies can significantly improve the quality of education, provide greater flexibility and adaptability of the educational process, expand access to education for different groups of the population, improve monitoring and assessment of knowledge, and increase students' motivation and interest in learning.

1.2. *Nataiia Bozhko, Olha Tsubova*. Lviv Medical University's architectural complex: a historical perspective on its establishment and development.

The purpose of the study is the history of the development of the main stages of the design and construction of educational buildings, which have become the central premises for the study and training of medics at Lviv University. The methodological basis of the study became historiographical analysis and synthesis methods and historical-systemic method used under the principles of historical objectivism.

The main results of the study. The study examines the process of founding Lviv University as one of the oldest in Ukrainian lands. Attention is drawn to the progress of secularization in the Austrian Empire, which provided an opportunity to use the fortunes of liquidated monastic orders for the needs of the state, in particular, the restoration of educational institutions in Lviv. The scientific investigation examines the process of the formation and development of the medical faculty into a medical university proper, as well as the possibility of using the old hospital premises of Lviv monasteries. Information is highlighted concerning the construction of new educational buildings for the medical faculty of Lviv University and educational premises where future medical professionals were trained at city medical institutions at the end of the 19th and 20th centuries.

Conclusions. The presented information shows that the history of the design and construction of premises where medics studied is inextricably linked with the formation of the historical landscape of the city of Lviv during the 19th and 20th centuries. This period also provides an opportunity to analyze the changes that took place in the development of the city's infrastructure, especially in its eastern suburb – the Lychakiv district. The author of the study draws attention to the creative activity of famous European architects and constructors who participated in the design and construction of the city's medical institutions and educational buildings of the medical university. Their creative output makes it possible to trace the evolution of the use of architectural styles in Lviv from baroque to twentieth-century constructivism.

1.3. Vasyl Kot, Valentyna Yuskovych-Zhukovska. Control software by electronic load of the household. The latest information technologies today affect the pace of development and changes of the element base and software in the electric power industry. The use of computer information technologies ensures uninterrupted supply of electricity to household consumers. Control of parameters, monitoring and forecasting of indicators takes place with the help of controllers, routers, networks, and software. In the context of the formation of the information society and the need to ensure the reliability and efficiency of autonomous energy supply systems, the authors propose a computerized approach to energy consumption management.

1.4. Igor Shaforenko, Svitlana Zaika. Optimization of the stages of accepting administrative decisions to minimize the impact of uncertainty. In the conditions of fierce competition and limited resources, enterprises need to make effective management decisions that will enable them to achieve their goals and minimize risks. Existing theories and methods of management decision-making do not always account for the specifics of decision-making in uncertain conditions, necessitating their scientific study.

The study examines issues related to improving the management decision-making process under conditions of uncertainty. The authors investigate the main stages of management decision-making, as well as factors influencing their effectiveness in uncertain conditions.

The results of the study can be valuable for enhancing the effectiveness of management decisions in uncertain conditions, reducing risks associated with decision-making, and enhancing the competitiveness of enterprises.

1.5. Sviatoslav Shaforenko, Svitlana Zaika. Remote work: analysis of the essence and strategic significance. The study examined the impact of remote work on Ukrainian society in the context of martial law, revealing its significance and necessity as a strategic tool for supporting the country's economy, ensuring labor productivity, and promoting the social well-being of citizens. Remote work has proven to be an effective response to numerous problems related to the forced migration of Ukrainians and the imperative to ensure the safety of workers, enabling them to sustain their professional activities amidst uncertainty and change.

The proliferation of remote work not only contributes to job preservation and the maintenance of economic stability but also opens up new opportunities for the implementation of flexible forms of employment that can be adapted to various life circumstances. The importance of this transition to new work formats lies not only in addressing current issues but also in laying the foundations for the future development of enterprise personnel and the economy.

It has been established that remote work holds significant potential as a tool for enhancing the country's economic and social stability during crisis conditions. It provides the necessary adaptability and flexibility, aiding in overcoming challenges associated with the economic and social consequences of war while facilitating the integration of Ukrainians into the international labor market.

It is crucial to continue developing and supporting policies and initiatives that facilitate the expansion of telework opportunities while ensuring adequate working conditions and social protection for all categories of workers.

1.6. Iryna Shumilova, Nataliia Hrechanyk, Serhii Kubitskyi. Pedagogical prognostication of formation of innovative and entrepreneurial competence in future managers of education. The article is aimed at pedagogical forecasting of the formation of innovative and entrepreneurial competence of future education managers. The article defines and characterizes the direction of the strategy of entrepreneurial activity of the university of sustainable development; the role of the «entrepreneur-scientist» – a new type of manager who has economic thinking, mobility and can effectively carry out innovation and entrepreneurial activities based on a sufficient level of innovation and entrepreneurial competence. The features of the intensified influence of the formation of innovation and entrepreneurial competence of future education managers are characterized.

1.7. Svitlana Zaika, Andriy Avriata. Information technologies as a driver of tourism business development. In the modern world, information technologies play an increasingly important role in the development of all sectors of the economy, including tourism. They contribute to the improvement of management efficiency, the promotion of the tourist product, and the enhancement of the quality of the provision of tourist services.

The purpose of the study was to generalize the theoretical and practical aspects of the influence of information technologies on the development of the tourism business.

As a result of the study, it was established that information technologies have a positive impact on the development of the tourism business, in particular:

- contribute to increasing the efficiency of management of tourist enterprises by automating routine operations, such as booking, financial, and personnel management.

- improve the quality of service for tourists by providing them with access to information about tourist destinations and services at any time and in any place. This also allows them to compare the offers of different tourist companies and choose the best option.

- create new types of tourist products and services.

Therefore, the introduction of information technologies in tourism is an inevitable process that has a significant impact on the development of this industry. Tourism businesses need to understand these impacts and develop strategies that will allow them to get the most out of their application.

1.8. Iryna Hrabovets, Liudmyla Kalashnikova, Liudmyla Chernous. Information privacy: threats and challenges in the conditions of hybrid war in Ukraine. The article analyzes modern threats to Ukraine's information security under martial law conditions. Particular attention is paid to the fact that today, in connection with the full-scale war in Ukraine; information security issues are becoming extremely acute and urgent. The level of security of information resources becomes one of the critical factors that determine the course of military operations and affect the privacy of life and the national security of the state as a whole. An important component of this analysis is an understanding of what threats specifically exist in the modern information environment and how they can affect private security in wartime conditions.

1.9. *Serhii Kachurynets*. The essence of the concept «choreographic projects» in the media industry: social-humanitarian dimensions. The article deals with the topical aspects related to the essence of the concept of «choreographic projects» in the context of the media industry and their social-humanitarian dimensions. The importance and the role of choreographic projects in the modern media space as a key element of the cultural paradigm has been revealed. The influence of choreographic projects on the formation of social values and the perception of art by the audience has been analyzed. The possibility of using choreographic projects as a means of communication and solving social problems in society has been studied. The role of the media industry in the formation and dissemination of choreographic projects and their influence on the cultural development of modern society has been considered. Examples of choreographic projects have been offered for a better understanding of the deep socio-cultural and media-discursive processes that take place in the modern media space.

1.10. *Tetiana Koliada-Berezovska, Stanislav Berezovsky*. Cross-cultural communication: Ukrainian-Polish informational-educational connections. Authors, basing themselves on the definition of information and communication technologies as the driving force of progress, as declared in a globally recognized document of the international organization for education, science, and culture, provide a retrospective analytical overview of the development of Ukrainian and Polish printing as components of the general civilizational cross-cultural process. Defining the polyvalent nature of the latter, the role of historically significant figures that ensured mutual influence in the field of publishing, design, and dissemination of Ukrainian and Polish printed books is emphasized – as determinants of culture, spirituality, and national spirit. As a result, an expanded understanding of cultural connections in the late Middle Ages among all Slavic peoples and their neighbors is proposed in the context of ethnocultural identification as a counteraction to dehumanizing tendencies of modernity.

1.11. *Hanna Stepanova*. Electronic evidence in the criminal process of Ukraine. The parties to criminal proceedings are increasingly using the practice of submitting electronic evidence, which is due to the specifics of certain types of criminal offenses, the method of commission of which directly involves the use of devices and instruments which operate with information in electronic (digital) form.

The article notes that electronic evidence has certain specific features which will be reflected in the procedural legislation and proves that compliance with the requirements for the form of an electronic document forms its evidentiary value, the possibility to put it in the basis of a procedural decision and refer to it when considering criminal proceedings in court.

1.12. *Liutsiia Tsyhaniuk*. The music of the Ukrainian composer V. Bibik in the global information space of the 21st century. The article describes the personality of Valentyn Bibik, an outstanding Ukrainian composer of the second half of the twentieth century, describes his life and creative work, analyses the reasons that led to the silencing of his music in Ukraine in Soviet times, because of which the composer's music is sometimes better known in the world information space than in Ukraine. The article analyses the polyphonic cycle «34 Preludes and Fugues»

for piano by V. Bibik, its constructive, artistic and interpretive features, and highlights an extraordinary event for the world and Ukrainian artistic community – the premiere of the entire cycle in the United States on 7, 8 and 9 March 2018 by American pianist Timothy Goft with the assistance of Ukrainian-American composer, pianist and conductor Virko Balei, who has become a kind of «a bridge» between Ukrainian and world music culture, persistently promoting Ukrainian art in the global information space of the 21st century.

Part 2. Advancing education in the digital age: insights and strategies

2.1. Alina Chaikina. A competent approach to the information security digital skills formation in the educational environment. The article examined the concept of lifelong learning, which involves constantly acquiring new knowledge, abilities, and skills for successful functioning in society. European approaches to defining competencies that should be formed in future specialists were analysed. It was determined that formal and informal education in Ukraine should provide higher education students with opportunities for their development, as well as forming key competencies such as digital literacy, critical thinking, adaptability, stress resistance, information security, and others.

2.2. Vasyl Levkulych, Oksana Petriv, Mykola Yehupov. European strategy «Open Science» as a driver of innovation in the information society. The last decades have seen the growth of integration processes in the world, the development of trends towards joint solutions of social, research and economic problems by countries. Another difference is related to the scientific and technological revolution and the emergence of the «information society». The reality is that globalisation is an objective and absolutely inevitable phenomenon of our time, which can be slowed down by means of economic policy (which is happening in some cases), but cannot be stopped or «cancelled», as it is an imperative requirement of modern society and scientific and technological progress. The scientific system and its various components, in particular, the Open Science strategy, the so-called «databases», are a global research, analytical, comparative and ranking, bibliographic and abstract system of scientific research data, a tool for tracking the citation of scientific publications and other results of scientific and research activities. As this need was felt in different countries with a relatively small time difference, various research technologies were invented and developed in the context of the common strategy of Open Science.

2.3. Liudmyla Zagoruiko, Yevhen Plotnikov, Iryna Didenko. Quality assessment of blended language learning courses: a practical case. The paper is aimed at identifying the features of quality evaluation of blended courses for foreign language teaching based on a practical example of their implementation. The pre-service English learners from several Ukrainian universities were asked to take a questionnaire to determine their general readiness to work with e-courses, identify factors that may influence the effectiveness of blended learning, and find out their attitudes towards working with e-courses. Those e-courses were placed on Moodle platform.

The results of the proposed questionnaire made it possible to identify the quality of studied e-courses, namely via assessment of teaching methods, examining assessment techniques, inquiry into student engagement and evaluating technology support. That feedback supported identifying strengths, weaknesses, and areas for improvement of blended courses.

2.4. Viktor Zinchenko, Tetiana Bilan, Nataliia Vynnyk. Transformation of the education system in preparation for the «Digital Era». A strategic and long-term approach to the digital transformation of education and science is essential to prepare people for life and work in a changing world. In recent decades, many initiatives and investments have been made in educational technology and digital skills development. As digital change accelerates, it is essential that science, education and training systems adapt accordingly. While the responsibility for the content of teaching and the organisation of educational systems lies primarily with Member States, there has been a growing momentum in recent years to share best practices in digital science, education, and training; and to develop common tools and frameworks at EU level. Joining forces and working together on digital education has never been more important. The EU can play a more active role in identifying, sharing and scaling up good practice and supporting Member States and the education and learning communities at large through tools, frameworks, guidance, technical expertise and research.

2.5. Natalia Afanasieva, Natalya Byelyayeva, Viktoria Shkoda. Psychological features of the adaptation of Ukrainian adolescents to learning conditions in a foreign school. The article presents the results of a study of the peculiarities of the socio-psychological adaptation of teenagers – Ukrainian migrants – in German schools. Modern events forced a large number of Ukrainian citizens to go abroad. Germany has taken in about one million Ukrainians seeking asylum, most of them school-age children. The results of the study showed that female respondents suffer from depression. In the group of girls, depression has much greater and closer connections with adaptation and its criteria. It has been scientifically proven that early diagnosis and treatment of depression helps prevent or minimize its negative consequences. According to the results of the study, a close relationship between the depression index and the self-assessment of the feeling of loneliness was found in the boys, although depression as such was not found in them. Therefore, it will be appropriate to pay attention to the feeling of loneliness in boys, which can improve their general emotional state.

2.6. Zhanna Bogdan. Theoretical justification of soft skills development of youth students. The article presents a theoretical analysis of the problem of flexible skills and shows that the ideas about their structure, list and characteristics are scattered in modern studies of psychological, pedagogical and managerial directions. The presented study shows a new author's model of soft skills of a modern specialist, which represents the inter- and intrapsychic reality of the individual and contains soft skills described in traditional studies, as well as those proposed for consideration for the first time.

2.7. Oksana Davydova. Optimization of the process of adaptation of visually impaired persons to life in war conditions: empirical dimension. The work presents a comprehensive study of the problem of psychological aspects of adaptation of visually impaired persons in wartime conditions. The results of theoretical and empirical research on the relevant issues are analyzed. The sample of respondents is characterized, the quantitative and qualitative analysis of the results of the formative stage of the experiment is presented. The study was conducted in the context of Russian aggression, which is currently ongoing during a large-scale war in Ukraine, In the theoretical discourse, the aspects of the phenomenon of adaptation as a functional possibility of the individual are clarified, it is about the problems of integration and social-psychological adaptation of people with visual impairments. It was determined that traumatic events in a person's life are related to the phenomenon of stress resistance, coping strategies, the activation of human resources to overcome negative emotional experiences and depends on the effectiveness of continuous social and psychological support, relying on the positive potential of a person with visual impairments.

2.8. Marina Zaushnikova, Liubov Dolynska, Yulia Tonkopei. Psychologist communicative competence as a condition for his efficiency in the realities of the information society. The article highlights the study of a psychologist's communicative competence as a condition for his successful professional activity in the realities of using information and communication technologies. It is noted that professional activity in the «person-person» system has its own specificity, which determines the necessary professionally significant qualities and its set of competences, among which the leading place is occupied by communicative competence, which subsequently acquires changes in the conditions of the information society: on the one hand, it expands and improves the psychologist's field of activity, and on the other hand, it leads to a decrease in the development of communicative competence and complicates the consultation process. Accordingly, the problem of forming a psychologist's communicative competence in accordance with society's requirements in a combination of modern and traditional teaching methods arises.

2.9. Olexiy Os'machko, Roman Maiboroda, Eduard Shcholokov. Use of software environments of simulation for the information society development. In the article a scientific problem of designing the technological object has been analyzed. The information technology of the technological object computer-aided design and its information support have been developed. Demonstration the decomposition a general task of synthesis system of technological object on separate task. Demonstration the information technology of synthesis system of technological object. The information support of process of designing technological object is developed.

2.10. Oleh Samborskyi. Multidisciplinary approach to pharmaceutical management and marketing teaching. The article reveals the importance of an interdisciplinary approach to pharmaceutical management and marketing teaching in the professional training of future specialists in the field of pharmacy. The study discipline «Pharmaceutical Management and Marketing» in pharmacy taught at the Higher Education Institution has been characterized and evaluated. Emphasis is placed on the expediency of implementing an interdisciplinary approach as an effective didactic tool for increasing the efficiency of professional training of future pharmacists.

2.11. Svitlana Sechka, Maryna Kushnarova. Application of innovative methods in English language lessons as an educational component of the information society development. The article considers the use of innovative methods in English lessons on the example of personality-oriented method. The tasks of modernization of education cannot be solved without the optimal introduction of modern educational technologies in all its spheres. The use of innovative methods gives impetus to the development of new forms and content of traditional activities of students, which leads to their implementation at a higher level. Work with the use of such methods should be organized in such a way that from the very beginning it becomes a powerful psychological and pedagogical means of forming a motivational plan for students, a means of supporting and further developing their interest in the subject. It is emphasized that properly organized work of students with the use of innovations can promote in particular the growth of their cognitive and communicative interest, which in turn will enhance and expand opportunities for independent work of students to master a foreign language, both in class and after school. It is emphasized that the use of innovative forms of learning in contrast to traditional methods gives the student a major role in the acquisition of knowledge, in which the teacher is an active assistant, organizes, directs and stimulates learning activities. In his work, the teacher must not only solve educational problems, but also create conditions for students to independently creatively search, encourage them to research, develop skills of orientation in a huge information space and independent decision-making. And as a necessary condition in solving the tasks is the introduction of innovative technologies in the educational process. The constantly evolving system of information support in combination with technical support ensures the quality of the educational process.

Innovative methods have become an integral part of the process of teaching and learning English. They help students to acquire the necessary skills for free use of English in a short time, namely: listening, reading, writing and communication skills. Given the importance of innovative methods, it should be noted that the central place in the teaching process is the personality of the teacher, who selects, evaluates and implements new methods. Thus, innovative methods help the teacher to solve a large number of organizational issues, to make the lesson more interesting, but innovation cannot completely replace the teacher. An analysis of other innovative trends in the teaching of English may be a prospect for further research.

2.12. Yehor Sypchuk. Physics simulations as a tool for forming the research competence of students in the process of learning physics. The paper reveals the possibilities of physical simulations for the development of research competence of students in physics. The advantages and disadvantages of using simulations

in the educational process are analyzed. Examples of online platforms, mobile applications, which include similar tools are given and described, and an own structure of physical simulations is proposed. It is noted that this technology is one of the effective digital tools for the development of research skills in students during the study of physics, which vividly and accurately models various physical phenomena and processes, and also greatly facilitates the process of perception and assimilation of the material.

2.13. Iryna Ushakova, Bohdan Liashenko, Anastasia Mahonina. Psychological factors of procrastination in students. The article is devoted to consideration of the current issue of procrastination and the psychological factors that determine it. Procrastination is defined as a tendency to put off important and difficult, unpleasant things and make decisions «for later». Its differences from laziness and rest are shown. The main causes (factors) of procrastination have been identified: internal and external, permanent, and situational, motivational, emotional, behavioral, psychophysiological and temporary. The results of an empirical study of the relationship between procrastination and perfectionism, anxiety and coping strategies are presented. It was established that they can act as positive and negative factors of delaying actions. Initial recommendations regarding the prevention and correction of procrastination among students have been provided.

2.14. Iryna Shymkova, Svitlana Tsvilyk, Vitalii Hlukhaniuk. Formation of environmental competence of labor education future teacher in the higher teaching school. The study deals with the peculiarities of the formation of environmental competence of the future teacher of labor education. The directions of this process are as follows: formation of ecological awareness, environmentalization of the content of professional disciplines, organization of ecological and technological activities of students. It was established that the formation of environmental competence of the future teacher of labor education is effective under certain organizational and pedagogical conditions: familiarization with the purpose, tasks, and content of environmental education; formation of a value-motivational attitude towards nature; environmentalization of learning content; organization of ecological-technological and artistic-creative practical activities.

2.15. Olha Yuzyk, Sergiy Veyna, Halyna Bilanych. Tests as a modern knowledge assessment technology. The article substantiates the role and place of competence formation in the modern New Ukrainian School and institutions of higher or professional higher education. The role and types of assessment of students are studied.

The essence of the concept of «testing» as a method of measurement and one of the technologies of modern assessment in such levels of education (primary, secondary, higher education) is revealed. It is taken into account that testing is a process of measuring quantitative indicators using a test. Examples of test tasks for the 6th grade textbook «Informatics» that can be used in written testing and computer testing are given. We offer test tasks with one best answer and test tasks with several best answers. We offer examples of educational resources on the methodology of test item design that are available on YouTube.

The author argues that test technologies can be key to the quality training of students.

Part 3. Navigating the digital frontier: innovations in management and economy

3.1. Olena Chukurna, Olena Stanislavyk, Olena Radius. Digital assets as a tool for financial assets management in the digital economy. The article discusses digital assets and ways of managing them in the digital economy. Identified types of digital assets, their economic and legal nature. Four components of digital assets were substantiated: economic component, legal component, information component, value component. It had defined the concept of tokenomics. Research aspects of tokenized legal relations and virtual assets. It was systematized and characterized structural components of virtual assets according to their technological, economic-legal and informational-application nature. The most common digital ecosystems of digital asset management were considered.

3.2. Artem Koldovskiy, Kateryna Shafranova. Reshaping management infrastructure in the digital financial frontier. This paper explores the transformative impact of digital technologies, particularly blockchain, on the management infrastructure within the financial sector. Examining a collection of key literature, including studies on blockchain architecture, consensus mechanisms, hybrid blockchains, and diverse applications in banking, trade finance, and digital currencies, the research aims to elucidate the evolving landscape of management practices. Insights from this literature review shed light on how the integration of blockchain technology is reshaping traditional financial management structures. The discussion encompasses challenges, advantages, and the potential for establishing global norms to safeguard the integrity of financial data. By providing a comprehensive overview, the paper contributes to understanding the nuanced dynamics at play in the digital financial frontier and sets the stage for further exploration into the managerial implications of these technological advancements.

3.3. Volodymyr Koloskov. Digital technologies application for environmental safety management of waste treatment process during emergency situations. The purpose of the study is to develop the simulation complex of the environmental safety management system of the city during an emergency at the waste storage site on the basis of digital technologies application for the regional economy.

A simulation model of the environmental safety management system of the city during an emergency at the waste landfill was developed. On its basis, a soft ware and computing complex was created to support decision-making in the environmental safety management system of the city.

Developed simulation complex may be applied to fulfill the task of ensuring the required level of safety, but also to increase the effectiveness of protective measures implemented to solve it in the system of regional and state economy.

3.4. Olha Komelina, Inna Miniailenko. Smart – concept of regional policy of spatial development in conditions of digitalization. The main task of the post-war reconstruction of Ukraine is determined – the application of smart – concept of regional policy of spatial development in conditions of digitalization. The fundamental principles of sustainable spatial development have been formed. An algorithm for forming a smart concept of regional spatial development policy in conditions of digitalization has been developed. The peculiarities of the priorities of smart specialization in Ukraine are noted. Practically-oriented methodical approaches

to the development of a regional smart strategy are analyzed. It has been proven that strategic planning of spatial development on the basis of smart-specialization is the only means of forecasting and planning the development of territories for the future regarding the acceleration of innovative development. The principles of formation and implementation of spatial development strategies of regions on the basis of reasonable specializations are highlighted. A digital platform for strategic planning of the spatial development of regions based on the criteria of smart specializations has been created.

3.5. Olha Komelina, Mariana Vasylychenko. Exploring the startup ecosystem's vibrant growth: lessons learned from the advanced economies. The main purpose of the given paper is to put everyone in the picture about the economic essence of the startup ecosystem as a driving force for innovation and economic prosperity, to analyze the role of the leading players in the startup ecosystem's development, to compare the American and European models of the startup ecosystems' growth and to determine the lessons learned from the advanced economies that can be implemented in Ukraine to support its national economic development in the conditions of the full-scale war. It is emphasized by authors that the contemporary startup ecosystem is able to bring together all the stakeholders that gravitate towards ventures that leverage disruptive technologies. The findings of the analysis indicate that they should work together to promote startups, disruptive business models and leadership in various areas of technology.

3.6. Tetiana Lysiuk. Historical museums in innovative tourism activities in Ukraine. The article examines Ukrainian historical museums, which are currently developing in difficult conditions due to economic difficulties caused by limited funding for museum activities.

The conditions for the use of innovative digital technologies in the work of museum institutions are analysed. The process of digitalisation of museums and its role in the work of modern museology in terms of attracting tourists, which is inseparable from the socio-cultural function of the museum space, are described.

It is determined that under the influence of the latest trends in museology, which have shifted the focus from museum objects to the socio-cultural needs of visitors, society's requirements for the communication capabilities of museums have increased. In the context of information and technological development, in addition to traditional forms, modern ways of interaction between museums and society are emerging in the form of three-dimensional technologies, including creative video screenings, panoramic projection, virtual reality and animation technologies.

3.7. Inna Vlasenko. Assessment of the influence of factors on the formation and improvement of quality and competitiveness of products of industrial enterprises. The article identifies the factors influencing the formation and improvement of the quality and competitiveness of products (QCP) of industrial enterprises. To this purpose, at four industrial enterprises it was conducted a relevant study, on the results of which it was identified and substantiated 6 criteria that characterize the level of quality and competitiveness of products at industrial enterprises. The method of rank correlation and the method of expert evaluations were used to process the research results. According to the results of their use, it is proved the scientific assumption about the dependence of the level of QCP on the efficiency of use of materials, raw materials and resources in the enterprise activity.

3.8. Wladyslaw Wornalkiewicz. Breaking social anxiety – green light for nuclear power plants. In the past period, the world community was surprised by several nuclear power plant accidents. The Chernobyl power plant in Ukraine and the Fukushima power plant in Japan were particularly remembered. This caused many countries to periodically withdraw from the operation of already existing nuclear reactors, also called nuclear reactors, of a similar class as at Chernobyl, and to make efforts to secure them against harmful radiation to the environment. However, not all countries did so. France and the United States continued to improve the structures and control systems of nuclear power plants. Years passed, and offers of improved solutions in the field of nuclear energy appeared on the market. The times of the current climate warming, the increase in the prices of fossil fuels, especially gas and oil, have resulted in a return to the so-called clean sources of renewable energy. We are talking about wind energy, photovoltaics, energy of the Earth and electricity and heat derived from the splitting of uranium nuclei. The next COP28 conference devoted to counteracting climate warming, by gradually reducing the consumption of carbon dioxide-emitting fuels, gave a clear incentive to intensify the efforts of countries, including Poland, towards nuclear energy.

3.9. Wladyslaw Wornalkiewicz. Carbon-nuclear transformation. Nuclear power plants, also called nuclear energy, after the period of stagnation of the 1990s, underwent quite turbulent development in terms of size, construction, control, security, IT technology and fissile fuel supply. The trend of building rather medium and small power plants powered by uranium, thorium or hydrogen emerged. Particularly small SMR nuclear power plants, built modularly, found many supporters in the business world. The elements of nuclear reactors can be transported to the construction site. There is an era of fabrication of these elements and serial production of reactors. This is an impulse towards the coal-nuclear transformation of many already obsolete installations generating electricity and heat and operating on fossil fuels. Meeting this trend involves gradual replacement of boilers in coal-fired power plants with technically modern, designed generation IV nuclear reactors. In this generation, special emphasis was placed on environmental protection, increased safety for the environment and reliability of nuclear reactors. It should be noted that the United States are well advanced in the direction of efficient control of nuclear fission reactions, not only uranium.

3.10. Liudmyla Halan, Evgeniya Borysevych. Features of using Amazon Web Services as digital tools of modern business. Cloud web services of Amazon, AWS (Amazon Web Services) represent a wide set of infrastructure services, such as the provision of computing power, various data storage options, network solutions and databases, which are offered as services, if necessary, with availability within seconds, with payment according to the fact of consumption. At the customer's disposal are more than 200 varieties of AWS: from data storage to deployment tools and catalogs for content delivery. New services can be set up for the client quickly and without initial capital expenditure. This enables corporations, start-ups, small and medium-sized businesses and customers from other sectors to gain access to the components they need to quickly respond to changing business requirements and, most importantly, to increase their competitiveness and customer focus.

3.11. Oleksandr Hladkyi, Tetiana Dupliak, Mikael Hashimov. Innovative technologies of digital management of the tourist enterprise. The essence of innovative technologies as well as the main directions of their application in digital management of tourist enterprises are defined. The classification of innovative technologies in tourism is proposed. The main directions of innovative technologies usage in tour operators' business are analyzed. The main problems and advantages of innovative technologies usage in digital management of tourist enterprises are highlighted. The most promising directions for innovative technologies usage in tourism are: e-commerce, online stores and online travel agencies, as well as extensive development of tours based on virtual (augmented) reality technologies. The application of innovative technologies extremely need for high-tech computer equipment of tourist enterprise as well as for availability of highly qualified personnel.

3.12. Liudmyla Zveruk, Anna Monzolevska. Banking business management in the conditions of digital transformation of the economy. The digital transformation of the economy means the integration of digital technologies into all areas of economic activity, which leads to a change in the way of thinking, strategy and management of the banking business. Updating the management system includes innovative approaches and the introduction of new business models. Digitalisation in management is a comprehensive and systematic process of optimising and automating management decision-making, increasing communication methods and creating a new corporate culture. In the context of digital transformation, the effectiveness of the banking business development management mechanism, which is a set of functional elements: methods, tools, and levers, is important. The innovation management method and the technology management method are relevant. Successful implementation of the banking business development management strategy is ensured by: effective areas of innovation, marketing management, risk management and cybersecurity, improvement of management structures and information and communication technologies. Modern digital tools in business management include cloud technologies, AI analysis of branches, distributed ledger technology (DLT), electronic document management, ERP systems (Enterprise Resource Planning), Agile, and BI systems (Business Intelligence). Modern digital banks include online banks or direct banks, challenger banks, digital natives. The main directions of transformation of the modern banking system under the influence of digitalisation of management are: digital transformation of bank transfers, rethinking the banking business model using blockchain technology and smart contracts, application of cloud technologies, and development of Big Tech.

3.13. Olha Komelina, Sveta Shcherbinina. Digital technologies in the green economy. The article examines the concept of «green economy» and directions for its implementation, defines the features of the formation of the «green economy» model. The principles of building an «inclusive green economy» are revealed. The main aspects of the use of digital technologies in the green economy, their advantages and challenges, as well as examples of the successful implementation of these technologies in various sectors of the economy are studied, and the key role of the «green economy» in the post-war reconstruction of Ukraine is emphasized.

3.14. Svitlana Kulakova, Oksana Zhytnyk. Formation features of Ukraine's digital economy in modern conditions. The purpose of this article is to provide a multidimensional overview of the essence of the digital economy, the process of digital transformation, and a general analysis of the IT sector of the national economy. In addition to the theoretical foundations, the authors paid special attention to determining Ukraine's place in terms of digital development in the international market. It is found that the martial law in force on the territory of Ukraine, imposed in connection with Russia's armed aggression, has slowed down the innovative development of the information and communication technologies sector. However, this sector of the economy is still considered promising. Therefore, the issues of increasing the efficiency of investments in the IT sector, increasing the volume of investments, and accelerating digital transformation by learning from the experience of the leading EU and world countries are of relevance today.

3.15. Maryna Mashchenko, Olha Haponenko, Iryna Lisna. Forming a strategy of investment and innovation development of enterprise in the information society. The article is dedicated to the pertinent issue of forming a strategy for investment and innovation development of enterprises in the information society. The dynamics of capital investments by types of economic activity in Ukraine and their share in the total volume are analyzed. The directions for improving investment and innovation policy are systematized: increasing accessibility of financing; increasing the number of investment projects; state regulation; availability of highly qualified personnel with innovative thinking and knowledge; development and implementation of new technologies; support for small and medium-sized enterprises; attracting foreign experience and investments. A methodical approach to forming an innovative strategy is proposed, which includes: analysis of needs and opportunities for innovation implementation; after market analysis, it is necessary to develop an innovation idea that meets the needs of customers and can compete with other products in the market; development of a detailed plan for implementing the innovation strategy; product testing; market implementation of the innovation; evaluation of the results of implementing the innovation strategy.

3.16. Andrii Romin, Nina Rashkevich, Yurii Otrosh. Overview of the modeling approaches of the technical condition of used building structures under force, deformation and high-temperature influences. The authors reviewed approaches to determine the technical condition and residual resource of both individual structures and buildings and structures as a whole under force, deformation, and high-temperature influences. It was established that the difficulty of solving the problems of the theory and practice of construction in complex soil conditions with the possibility of high-temperature effects during a fire is due to the uncertainty of the initial information, the uncertainty and diversity of structures, the variability of the effects, the properties of building materials, and their insufficiently studied limit state.

3.17. Olha Rudachenko, Vitalina Konenko. Analysis of the current state of digital transformation of business processes in business activities of Ukraine. In this section, the role of digitalization entrepreneurial activity and in the economy of Ukraine as a whole, providing an incremental-iterative methodology that allows narrowing down the scope and research issues using a multiplicative effect. Explanations

for the concepts of «platform», «digital transformation», and «business process management» are provided. An overview of methods for transforming business processes is presented. An analytical review of the characteristics of business processes and platforms is conducted.

3.18. Alexander Sklyarenko. Digital economy and its significance for the development of modern innovative society. The purpose of the article is to study the theoretical foundations and aspects of the development of the digital economy and further informatisation in general, its features, problems and development trends in Ukraine. The paper examines the need for transition of the economy from a traditional format to a digital one in the context of global development of the information and innovation society. The material presented in the article shows that the latest technologies penetrate all spheres of society, thereby affecting the economy, its essence and forming structural innovative changes in it.

3.19. Leonid Tsubov, Oresta Shcherban. Management of life activities of territorial communities under the conditions of marital state. The purpose of the article is to study the peculiarities of managing the financial resources of territorial communities in the conditions of martial law in Ukraine. This article examines the management of financial resources of territorial communities. It is substantiated that one of the key problems faced by the United Territorial Communities (UTCs) is to ensure the proper performance of their duties. This includes the ability to effectively form a budget, accumulate sufficient financial resources to cover urgent social needs of citizens, in accordance with the principle of subsidiarity, and implement strategies for their economic and technological development. The key sources of funding to support the development of territorial communities in Ukraine against the background of decentralization processes are outlined. The importance of financial support in the process of development of local communities is emphasized. The management of financial resources of territorial communities in Ukraine acquires special relevance in the current conditions of wartime. Therefore, finding effective ways of financing territorial communities for their development, managing local budgets becomes a relevant aspect of scientific research. Successful management of this process involves using the unique capabilities of each territory, attracting various sources of financing, accumulating and effectively distributing resources, creating favorable conditions for the implementation of economic initiatives and local social programs. The main sources of funding for the development of local communities include revenues from local budgets, financial support from the state for local self-government, as well as the attraction of additional financial resources by local authorities through the use of the development potential of the territory. The dynamics and structure of revenues of local budgets, as well as their share in the consolidated budget of the country in recent years, were analyzed. The factors affecting financial management in united territorial communities are highlighted, and the positive influence of community unification on local financial management is emphasized. The contribution of territorial communities to the strengthening of the financial situation and the efficiency of filling the Unified Treasury Account is significant. Attention is focused on the fact that it is communities who take responsibility for financing a large number of powers, both delegated and their own, which have not yet been clearly defined in the Budget Code. These duties form the basis for local budgets, as they form the foundation for the stability of local finances.

3.20. *Olena Shevchenko, Svitlana Shcherbinina.* Financial technologies development and their role in improving of financial inclusion in the digital economy.

An analysis of scientific views on the essence of financial technologies was carried out, and the economic essence of this category was clarified. Emphasis is placed, first of all, on the fact that fintech is a synthesis of digital technologies and innovations in the financial sphere, which are used to provide, expand and distribute financial services by technological companies. The global experience of the functioning of the financial technology market in the modern conditions of geopolitical uncertainties and macroeconomic problems was analyzed and it was found that the most popular segments of investing funds are remittances and payments, blockchain and cryptocurrency, and regulatory technologies. It has been proven that fintech performs an important function – expanding access to digital financial services for all segments of society without any economic or non-economic barriers. The advantages of financial technologies in improving financial inclusion are studied, which include: ensuring economic stability in the financial market in conditions of increasing risks, reducing income inequality and increasing the general well-being of the country, economic growth through the mobilization of population savings, investments in the development of the economy.

Part 4. Innovative approaches in digital healthcare and rehabilitation

4.1. *Anastasiia Bondarenko, Tetiana Buhaienko.* Using experience of physical therapy

tools for rheumatoid arthritis. The paper analyzes the etiology, pathogenesis, clinical picture and methods of treatment of rheumatoid arthritis. The experience of various authors regarding the use of physical therapy in the conservative treatment of rheumatoid arthritis was studied. It has been established that physical therapy intervention is aimed at maximally improving the function of the affected joints and preventing the destruction and deformation of the joints.

4.2. *Svitlana Gvozdetska.* The correction of memory index of six-age children with a delay of mental development with the help of physical training.

The article is dedicated to the problem of wing physical training in the correction of memory levels of six-age children with a delay of mental development. Correctional employment by the offered technique has allowed to raise a level of formation of memory at children. Improvement of parameters of formation of memory at children of experimental group has allowed 65% of them to reach a level of normally advanced coevals. It has allowed them to go to a comprehensive school together with normally advanced children.

4.3. Viktoriia Horoshko, Andrii Horoshko, Oksana Hordiienko. The path to digitalization in medical applications: analysis, problems and perspectives.

The global healthcare system is going through a period of complex change due to global changes in technology and treatment methods. There is currently a large gap between the provision of skills at various levels of the education system and the demands of digital health. To train specialists in digital health, the state needs to provide knowledge related to both medicine and computer science. Mixed reality, artificial intelligence and quantum computing are key technologies in the implementation of current innovation strategies. However, the experience of emerging countries over the past decade also shows the risks that such medicine poses to patients. The use of medical mobile applications is a promising method, especially in the field of preventive medicine. Further research is needed on the relationship between health mobile application features such as psychological support for healthcare providers, automated feedback, medication adherence monitoring, reminders, and exercise prescription. Further developments should focus on strengthening the evidence base and implementation in developing countries.

4.4. Yana Kopytina. Development of an instrument for assessment of activities of day living / instrumental activities of day living (IADL / ADL) for visually impaired and blind persons. The publication highlights the process of developing an Activities of Day Living / Instrumental Activities of Day Living (IADL / ADL) profile assessment tool for blind and partially sighted people. The prerequisites for its development are indicated, the features of the content of its constituent thematic blocks are revealed. Practical recommendations for the use of this tool are provided.

4.5. Serhii Lazorenko, Yurii Kurnyshev, Tetiana Kozhemiako. Methodological principles of forming the information and digital culture of future specialists in the field of physical culture and sports. The modern Ukrainian system of higher education is experiencing rather deep transformational problems. Affiliation with the European academic space, autonomy of higher education institutions, actualization of scientific and creative activities of students (student-centrism), adaptation to the conditions of remote teaching of academic disciplines due to the epidemiological activation of coronavirus infections, full-scale war, etc. Distance learning platforms, which are organically connected with the use of information and communication technologies, are designed to solve the last problem. And in this context, the process of forming the information and digital culture of future specialists, in our case – the sphere of physical culture and sports, is quite promising. Therefore, in this scientific publication, we analyzed the methodological principles that will help speed up the educational processes of forming such education.

4.6. Vitalina Lytvynenko, Natalia Kuksa, Yulia Maliarova. Application of art therapy with the help of video information tools in the rehabilitation of post-stroke patients. The article is devoted to the actual problem of using video information in art therapy in the context of rehabilitation of post-stroke patients. The scientific approaches to the interpretation of the art-therapy concept are described, the peculiarities of the use some types of art therapy with post-stroke patients are investigated, and the possibilities practical implementation of video information means with patients of this nosological group are considered.

- 4.7. Oleksandr Mishchenko, Tetiana Buhaienko, Olena Vaida. Features of physical therapy for people with post-traumatic gonarthrosis in the post-acute period of rehabilitation.** The etiology, pathogenesis and modern approaches to the treatment of gonarthrosis are analyzed. An analysis of modern approaches and general recommendations for the use of physical therapy in post-traumatic gonarthrosis was carried out.
- 4.8. Mariya Nutrichina, Jevgenija Nevedomsjka. Segmental and reflex massage in the physical rehabilitation of patients with cervical osteochondrosis.** The purpose of the study was to evaluate the effectiveness of segmental-reflex massage for osteochondrosis of the cervical spine. The experimental study included 20 people, including 14 women (70%) and 6 men (30%), diagnosed with osteochondrosis of the cervical spine. Patients of the experimental group (EG) with a diagnosis of osteochondrosis of the cervical spine were offered a physical rehabilitation program developed by us, which included segmental-reflex massage in a complex with therapeutic exercises and mechanotherapy classes on Bubnovsky multifunctional simulators, and patients of the control group (CG) underwent a similar course rehabilitation, but without the use of a course of segmental-reflex massage. According to the results of a scientific study, it was proved that the use of segmental-reflex massage in the complex of physical therapy of persons with osteochondrosis of the cervical spine is effective. Positive dynamics of the mobility indicators of the cervical spine during flexion and extension were observed, as well as quantitative changes in the level of pain sensations in the cervical spine and the impact of pain on the daily life of patients according to the Ukrainian version of the Neck Disability Index.
- 4.9. Oksana Polianska, Igor Polyanskyi, Olha Hulaha, Inna Moskaliuk. Use of virtual technologies in the training of doctors at the post-graduate stage of education.** The development of innovative technologies makes it possible to improve the training of doctors and trainees with the development of a new approach to the rehabilitation of patients who experience a decrease in the quality of life after an illness or injury, which is expressed by a violation of movement coordination, a decrease in reaction speed, and loss of hand control. When conducting practical classes with trainee doctors, virtual reality technologies make it possible to create an artificial, fully controlled environment that simulates the real conditions of therapeutic exercises. With the simultaneous application of the motion capture and feedback system, it is possible to achieve complete immersion of the subject in the created virtual situation, make it interactive and correct the patient's actions in the virtual situation in real time.
- 4.10. Anna Rudenko, Oleksandr Zviriaka, Anastasiia Syvachenko. Telerehabilitation of patients with acute cerebrovascular accident in the long-term rehabilitation period.** The article considers the possibilities of implementing alternative methods of systematic and controlled recovery of patients with acute cerebrovascular accident using telerehabilitation. The organizational and methodological aspects of telerehabilitation of post-stroke patients in the long-term rehabilitation period are determined in accordance with the above problems based on the International Classification of Functioning, considering its main components at the level of function, activity and participation. The structural components of telerehabilitation intervention are formed: therapeutic exercises to increase the strength of all muscle groups; therapeutic exercises for the development of the vestibular apparatus; therapeutic exercises to improve the range of motion in the affected limbs; breathing exercises, walking.

4.11. *Iryna Skrypka, Inna Kravchenko.* Social and psychological adaptation of children with special educational needs in the process of informatization of modern society.

The article is devoted to the issues of the modern understanding of the concept of «Inclusion in sports» and the conditions and main components of creating an «Inclusive sports environment». In turn, the uniqueness and ability of sports to overcome linguistic, cultural and social barriers, i.e. problems related to norms, values and line of behavior of children with special needs and children with disabilities, were established. It was established that in order to create an inclusive sports environment for the purpose of socio-psychological adaptation of children, coaches should actively use the basic concepts of information technologies in their professional activities.

Part 5. Artificial intelligence and innovative educational approaches in digital society

5.1. *Liudmyla Bazyl, Valerii Orlov, Tetyana Nestorenko.* Preparation of future specialists for a career in youth entrepreneurship: realities and perspectives. In a scientific article «Educational programs for Combat Horting – implementation during training classes strength fitness for a successful personality: athletes (pupils, students and cadets) of Combat Horting (experimental work)» the justification of the expediency of implementation during training sessions of strength fitness for athletes (pupils, students and cadets) of Combat Horting is revealed.

Based on the theoretical and practical research of S. Sychov and Z. Dikhtiarenko, recommendations on the use of strength fitness in training have been developed, which confirmed their effectiveness in the process of training athletes (pupils, students and cadets) in Combat Horting. Therefore, the authors of the publication considered in detail the block system of training (theoretical, physical, technical, tactical, psychological) and educational work) of Combat Horting athletes during educational and training sessions.

5.2. *Liudmyla Bazyl, Valerii Orlov, Mykola Pryhodii.* Professional development of vocational teachers in the context of society digitalization. The publication reflects the study results of the preparing teachers' problems for successful work in the digital transformation conditions of the educational environment through the prism of their professional development. The levels of digital competence of vocational teachers are characterized. It is concluded that most teachers who teach general and special disciplines need additional training in the development of e-learning resources and the use of digital technologies in the system of vocational (vocational and technical) education. The reasons that actualize the problem of developing the digital competence of vocational teachers from the standpoint of professional development are substantiated; the key philosophical and methodological principles of professional development of teachers of vocational education institutions are identified; the psychological and pedagogical substantiation of this process in the digital age is carried out. The importance of training teachers of general and special disciplines to use SMART technologies for their professional development in the digital era is revealed. Particular attention is drawn to the need to use artificial intelligence, virtual and augmented reality, which is a promising area of teachers' professional development in the digital transformation of the educational environment.

5.3. Olena Titova, Petro Luzan, Iryna Mosia. The concept of college teacher's professional competence development. The research dealt with the process of professional competence development for the teachers at a college. The understanding of the fact that the teacher's professional competence is essential in the process of vocational education development under the current global and local challenges requires the college teacher to be involved in the continuing improvement of their professional knowledge and skills. The conceptual idea of the research was based on the assumption that for the purposeful development of the teacher's professional competence, it was necessary to develop a system that covers all the elements of the educational process. The conceptual model was built to illustrate the process of a college teacher's purposeful professional development.

5.4. Oleg Bogut, Valentyna Yuskovych-Zhukovska. Peculiarities of using artificial intelligence in the processes of training and evaluation of web programmers in IT companies. This article explores the innovative application of artificial intelligence in IT companies with respect to the processes of training and evaluating web programmers. It examines the current state and potential of artificial intelligence technologies and the possibilities of their application to enhance the efficiency and productivity of web programmer development and evaluation programs. Key advantages and challenges associated with the use of artificial intelligence are discussed.

5.5. Tetiana Karpenko, Olena Lakomova, Daria Shiyan. The significance of school geographic education in Ukraine for the «green» transition. The article is devoted to the analysis of the possibilities of geography training programs of basic general secondary education in Ukraine for the formation of an ecological style of thinking and ecological behavior among students in accordance with the «Concept of the New Ukrainian School». The greatest attention is paid to the curriculum of the 9th grade «Ukraine and the world economy», which consists of five sections. Each section opens various opportunities for the formation of knowledge about the features of the «green economy» and the policy of sustainable development, and as a result of the formation of an environmentally conscious personality.

5.6. Oleksandr Kondratenko, Olha Lytvynenko. Ecological safety of transport as a component of national security of Ukraine during armed aggression and as a prerequisite for a «green» transition during post-war reconstruction. Present paper describes the results of analysis of modern and relevant issues of technogenic and ecological safety of urban systems as the component of national security of Eastern-European countries on example of Ukraine in the time of armed aggression and as a prerequisite for a «green» transition during post-war reconstruction. The purpose of the study is determining the aspects of assessment and provision of the necessary level of ecological safety of exploitation of transport, in particular units of fire and emergency rescue vehicles, as a component of Ukraine's national security in times of armed aggression as a prerequisite for a «green» transition in times of post-war reconstruction. The object of the study is ecological safety of the exploitation of transport, in particular units of fire and emergency rescue vehicles, as a component of the national security of Ukraine. The subject of the study is the aspects of assessment and providing the necessary level of indicators of the object of the study in times of armed aggression and as a prerequisite for a «green» transition in times of post-war reconstruction.

- 5.7. Oleksandr Sheremet, Valentyna Yuskovych-Zhukovska. Modern computer vision technologies.** The technologies of artificial intelligence, machine learning, neural networks, computer vision, the Internet of Things, and robotics have become trends and one of the main vectors of the development of the modern digital society. Information technologies are developing rapidly and a close relationship has formed between them. This nexus of technologies allows machines to see and understand their environment, recognize and identify objects, be independent and make decisions on their own. This, in turn, affects the development of other industries and spheres of society.
- 5.8. Valentyna Yuskovych-Zhukovska, Yurii Lotiuk. The influence of artificial intelligence on the digitalization of society.** The task of artificial intelligence technologies is development of technological solutions that work on the principle of human intelligence and solve complex practical problems in various subject areas facing society. Successful companies are focusing their attention on providing better customer service, and for this, they are increasingly implementing conversational platforms based on artificial intelligence. Accordingly, innovations in the field of artificial intelligence have a positive effect on the processes of digitization in society.
- 5.9. Wladyslaw Wornalkiewicz. Trend of application of AI in search engines.** The use of advanced artificial intelligence in search engines results in better recognition of the question addressed to the virtual database. The study focuses on the development of search engines, on the leading role of the Google search engine. It has already implemented several new algorithms for interpreting the page or website being viewed. This is to properly rank in the lists, shared pages, and entries, because of answering the questions asked by Internet users. It was pointed out that the progress in the field of software methods was possible thanks to the results of work on the functioning of the human brain, taking over by the programs the skills of current learning based on the observation of the use of the Internet by specific groups of users. The impulse in improving the «intuition» of search engines, some of which are presented in this material, is the development of an application for recognizing natural languages and directing answers, as relevant as possible in the language of the inquirer.
- 5.10. Vyacheslav Borisov, Iryna Lapshina, Svitlana Lupinovych. Methodological approaches to the formation of information security in the conditions of information warfare.** The presented study is aimed at minimizing the negative impact of Russia's full-scale aggressive attack on Ukraine, namely the use of informational hybrid weapons to destroy the mental health of children of primary school age. Primary school students are the future potential of Ukraine. The level of their civic consciousness is important for the country's development in the coming decades. During the information war, younger schoolchildren are an important target for enemy agencies to distort consciousness and involve it in sabotage and provocations. Computerization of education made it impossible to isolate children of primary school age from the global information space. A critically important and reliable way to protect children is to develop their information security skills. The monograph provides a classification of the signs of information threats and possible consequences of their influence in case of insufficient or untimely reaction.

5.11. Vyacheslav Borisov, Iryna Lapshina, Svitlana Lupinovych. Training of students majoring in elementary education for the formation of information security of elementary school students in the conditions of information warfare. Informational hybrid weapons have the potential to destroy the physical and mental health of elementary school children. This is a threat to any country. In the conditions of war, this leads to the loss of children's health and lives. It is important for younger students to develop the skills to protect themselves from dangerous information.

Citizens of our country do not have adequate experience in countering information and psychological operations and propaganda. Therefore, it is difficult for them to teach their children in the family. This is work for professional teachers and psychologists. For this, they must also undergo appropriate training. It is important to develop a methodology for teaching children safety skills and protection against disinformation. The monograph presents step-by-step proposals for the preparation of primary school teachers for the formation of information protection skills in younger schoolchildren.

5.12. Tetiana Pashchenko, Anna Ostapenko, Oleksandr Yamkovyi. Technological aspects of professional competence development of college teachers. The aim of the research is to analyze the application of educational technologies in the system of postgraduate education to develop the professional competence of college teachers. The article shows the improvement of the college teacher's professional competence in the system of continuous professional education. The characteristics of the main technologies for the development of the professional competence of the college teacher are given.

5.13. Mykola Pryhodii, Andrii Hurzhii, Oleksandr Humennyi. Preparation of vocational education teachers for activities in the conditions of digital transformation of education. The key aspects of preparing vocational teachers to work in the digital educational environment include: mastering digital tools; developing media education competencies; using interactive teaching methods; online communication skills; adapting to changes; stimulating creativity and innovation; ensuring cybersecurity. To prepare vocational teachers to work in the context of the digital transformation of education, it is necessary to systematically involve them in trainings on the use of digital technologies in the educational process, compliance with cybersecurity rules in the organization of online communication, as well as in reviewing cases to stimulate the creativity of students and introduce innovative interactive teaching methods, and conduct reflection sessions on adaptation to changes.

5.14. Valentyna Radkevych. Development of the innovative competence of teachers in vocational education institutions in the conditions of the digital transformation of society. The impact of digital transformation on the professional activities of educators in vocational education institutions has been examined. The focus is on the necessity of integrating digital technologies into the educational process to develop professional competence, critical thinking, and independence among vocational education students. Special attention is given to the use of electronic learning platforms such as Coursera, EdX, FutureLearn, LinkedIn Learning, and Google for Education, which facilitate the effective organization of the educational process and provide access to a wide range of educational resources. It is emphasized that this approach enables the most effective use of digital technologies for developing innovative competence in teachers at vocational education institutions.

5.15. Olena Sierikova. Implementation of the educational component «Green technologies of urban ecosystems» in the educational process. Education systems play a significant role in promoting sustainable resource management. By integrating this into the curriculum, providing hands-on learning experiences, encouraging student engagement and collaborating with external organizations, they could help to shape a more sustainable future. Therefore, it is necessary and important to develop and implement new educational components that effectively achieve the program results, and are relevant and expedient.

5.16. Serhii Shevchenko. Use of unmanned aircraft by fire and rescue departments of Ukraine. The article examines the process of creating the concept of using unmanned aerial vehicles in the State Emergency Service of Ukraine. According to the results of the conducted statistical research, the legal and regulatory application of unmanned aerial vehicles was considered, the number of unmanned aerial vehicles of the copter type in the State Emergency Service of Ukraine was established, an analysis was carried out by models of unmanned aerial vehicles, the technical characteristics of the most numerous model of unmanned aerial vehicles and examples of the work of operators were given. The author's conclusions are given regarding the concept of using unmanned aerial vehicles in the State Emergency Service of Ukraine.

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