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GIG-ECONOMY AS A SAFETY GRADIENT FOR SUSTAINABLE DEVELOPMENT OF THE MINING INDUSTRY

Purpose. To evaluate causality of expanding the gig-economic space and the socioeconomic and ecological security of Ukraine's mining industry in the context of the changing technological structures caused by the emergence of a new security structural and functional post Covid-19 component. To propose typical scenarios for sustainable development of the gig-economy in the context of improving security policy of Ukraine's mining industry.

Methodology. To achieve this goal, a scenario planning, Delphi, SMART, SWOT analysis and mathematical research methods – econometric and gradient analysis, were used to determine the scalar values and directions of extreme innovative changes in the gig economy in the context of sustainable development of mining industry in Ukraine. The calculations were carried out using the SPSS Data Analysis Software.

Findings. The work systematically analyzes key safety indicators of scientific-technological progress for sustainable development of the mining industry and establishes a one-to-one relationship between existing socio-economic phenomena and gig-economic processes, which in recent years have been asymmetrically activated under the influence of the post Covid-2019. The security specifics of tactical and strategic management of the gig-economy are outlined.

Originality. A methodological approach to the quantitative and qualitative determination of the safety gradients of the development of the mining industry enables the consideration of transformational Post-Covid consequences, as well as diversifies tactical and strategic management. In particular, it is proposed to use an innovative digital platform CENSIE – “Central European Network for Sustainable and Innovative Economy”.

Practical value. A proposed approach would facilitate to improve the efficiency of strategic and tactical management of personnel policy of the mining industry in the context of the formation of a gig-economy, as well as synchronize time and space parameters, increasing the targeting of management decisions. It was proposed to introduce a special remote platform “MiningFreelance” to provide freelance services to households, family farms and other manufacturers which will be protected by the Blockchain registry based on existing ProZorro programs. At the same time, Blockchain technologies will increase the role of trade unions, which will be able to unite gig workers into a single system and control working conditions, taking on certain social obligations.

Keywords: *innovation, Gig-economic Space, safety gradients, amber, mining industry, Blockchain, Post Covid-19*

Introduction. At the time of the declaration of independence of Ukraine, the domestic economic system began to function according to the “rules of wild capitalism” and the country went through all the stages of the formation of market relations in turbo mode. Given the definition and etymology of the concept of “capitalism”, which comes from the Proto-Indo-European “kaput – head”, since wealth in ancient times was associated with the number of heads of cattle [1], and also given that in most Slavic peoples “kaput – means death, end” [2], the logical conclusion is that the refusal of the domestic chief executives from the evolutionary path of development, which provided for the gradual improvement of the planned economy and the creation of a “market economy under state control”, which China successfully implemented, was erroneous (more details in research by W. Junha [3] B. Andreosso-O'Callaghan, W. Moon W. Sohn [4]). As a result of the activities of the Governments and Presidents of Ukraine from 1991 to 2021, the decline in the national economy is more than 60 % of the achieved output of products in December 1990 [4]. These shocking loss indicators are most relevant to the mining industry.

The safety losses of the mining industry, which was and is strategically important for the national economy, were hyperbolized as a result of the occupation of Donetsk and Luhansk regions, where half of the coal was mined and all anthracite reserves were concentrated. Thus, compared to 1990, the pro-

duction of coal, peat, iron ore, and other minerals decreased by 80 % [4].

In addition, the military action has contributed to a significant reduction in the average number of full-time employees, as well as the deterioration of a number of important safety indicators that characterize the mining industry of Ukraine (details in Table 1).

The conducted comparative analysis indicates that Ukraine should not return to the restoration of the traditional market economic system in the studied sectors of the national economy, which is built on the principles of outdated technological systems. As painful as it may be to admit, restoring the usual mines, metallurgical plants and other types of traditional production is a road to nowhere.

In our opinion, the current vector of miningholdingization is erroneous, since the domestic economic history remembers the negative experience of consolidation of mining industry, and the experience of Argentina, Brazil, Mexico, and other countries indicates catastrophic environmental, social and geographical consequences for the territorial communities on which the holdings operated (in particular, after the closure of mines). If we want to see Ukraine as a successful European state, we must skip several technological structures that Ukraine has evolutionarily missed due to its unprofessional state management policy, and reach the border between the sixth and seventh technological structures.

Thus, in this article, we will consider the issues of forming a change in the method of technological production on the example of mining industry on the basis of consistent access to

Table 1

Systematization of Safety Indicators of the Mining Industry which deteriorated extremely (after the occupation of Donetsk and Luhansk Regions) [4]

Indicators	Years		
	2010	2015	2019/20
1. Number of employees (full-time) in the mining industry, thousand	436	255	195
2. Mining of hard and brown coal, thousand tons	266	125	72
2.1. Mining of hard coal (including enrichment products and ordinary coal shipped to consumers without enrichment), thousand tons	55	30	26
2.2. Mining of brown coal, thousand tons	211	95	46
3. Production of coke, refined petroleum products, thousand tons	49	28	18

the innovative level of development of the free gig economic system of society.

Literature review. Domestic research is still very limited in covering the problems of the formation of the gig economic system in Ukraine, but it is worth noting the achievements of such scientists as N. Kraus, K. Kraus, O. Manzhuza [5], who studied the ecosystem of the gig economy in the context of entrepreneurial universities and focused on identifying negative phenomena associated with the development of the gig economy. Foreign scientists have been studying the gig economic processes in various fields more actively. For example, among the latest articles, the attention should be paid to J. Duggan, A. McDonnell, U. Sherman, R. Carbery [6], K. Perera, J. Ohrvik-Stott, C. Miller [7], Dolber B., Rodino-Colocino M., Kumanyika C. [8], J. Naughton [9] and V. Gupte [10].

However, a number of issues related to the study on innovative processes of expanding the gig economic space in mining industry of Ukraine in the context of rapid changes in the system of the technological structures, as well as the emergence of Post Covid-19 consequences, remained out of the attention of these researchers.

Purpose. The purpose of the research is to review and evaluate causality of expanding the typical scenarios for sustainable development of the gig economy space in the context improving security policy of Ukraine’s mining industry.

Methods. Scientists in developed countries are increasingly paying attention to the study on a new type of economic relations between the employer and worker based on modern IT technologies and the emergence of new types of the economy when the employer does not have the means of production, but fully controls intellectual property, and employees have an indeterminate status. The economy of Ukraine is at the stage of revolutionary changes in business, office management, production, in which the gig economy forms an innovative model of short-term labor relations, which form a new system of unofficial institutions [5].

We share G.Allon’s view, stating that “the gig economy not only gives incredible flexibility to employees and the companies in which they work, but it also bears much more unknown risks than traditional business does” [11]. Obviously, all new changes cause concern and resistance. Indeed, in terms of economic and national security, on the one hand, freelancers largely are not officially (legally) employed, and receive “money in envelopes”, which leads to an increase in the level of the shadow economy; on the other hand, this problem will be solved if freelancers are introduced into the legal tax field as new entities.

If we talk about mining of certain minerals: coal, amber, titanium, etc., where, in addition to large state corporations, the

unofficial sector operates and, in the case of amber, grows colossal in size (especially in Zhytomyr and Volyn regions). At the same time, most participants in the innovation system of the free market (freelancers) form a gig-economic space, which is currently partially outside the legal field of Ukrainian legislation.

Here is a SWOT analysis of the strengths and weaknesses of implementing the gig economy (Table 2), which will help to determine the initial steps to modernize the tactical and strategic management of the gig economy in the context of sustainable development of the mining industry of Ukraine in terms of Covid-19.

So, the conducted SWOT analysis indicates that one of the key tasks, that should be solved first, is to determine the overall size of the gig economy in Ukraine. At the initiative of the International Innovation Center (Kyiv, Ukraine) within the framework of the Central European Network for Sustainable and Innovative Economy, the international Polish-Ukrainian project, the scientists from Maria Curie-Skłodowska University (Lublin, Poland), Poznan University of Economics (Poznan, Poland) and National Academy of Security Service of Ukraine (Kyiv, Ukraine) found that among the European countries, the largest number of gig workers is in Ukraine – almost half a million is involved in the gig economic space.

In particular, component analysis of mining activities in the context of export potential in terms of product items (Fig. 1) shows the key areas of providing gig services for the last calendar year for a total amount of about 650 million UAH [4].

The study found that in difficult financial, economic and military-political conditions, the emergence of a new security structural and functional Post-Covid component did not significantly slow down the overall export of minerals in the 2019–2020 marketing year, which began to recover (details in Fig. 1). In general, the largest total volume of exports in terms of commodity items under the Codes (Ukrainian classification of goods) has been recorded for many years for the export of iron ore, which in 2019 was sold for more than 36 billion US dollars.

It is important to note that the main freelancer exchange lacks two of the most powerful players – road carriers (taxi drivers) and mining service providers, who are full-fledged participants in the gig economy (especially during seasonal works).

Table 2

SWOT analysis of the strengths and weaknesses of implementing the gig economy [3–7]

No	Characteristics	
	Advantages	Disadvantages
1	Assistance in modernizing the activities of the State Statistics Service and tax authorities	Difficulty in measuring the quantitative characteristics and overall size of the gig economy
3	Diversification of cash receipts, independence from a single source of income	Income instability
4	Savings in potential transfer costs, lunch purchases, etc. make it possible to create special accounts that will be used to finance private insurance companies	Social insecurity, lack of social packages
5	High-quality order fulfillment guarantees a high level of work activity and the formation of own mini-brand over time	Lack of branded employer support
6	A well-developed network of co-working spaces and outsourcing services reduces indirect costs	Lack of a workplace, legal, accounting, or human resources support

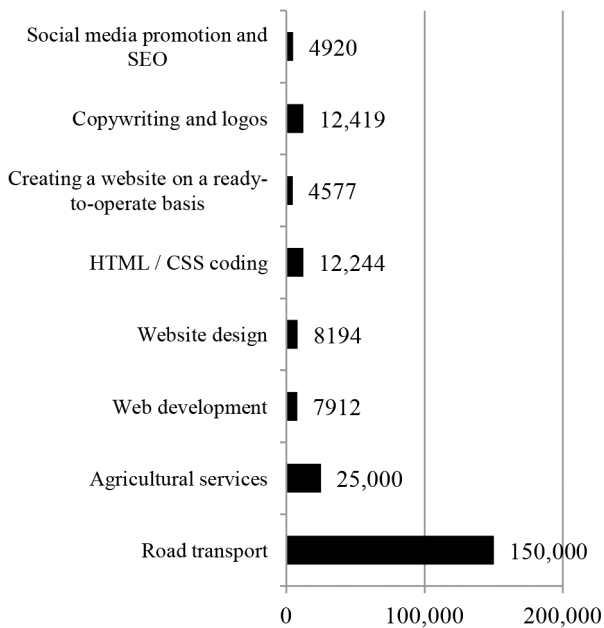


Fig. 1. The number of employees involved in the gig economy of Ukraine as of January 1, 2021 [4]

Road carriers have developed their own Internet sites, among which Uber and Uklon occupy 60 % of the taxi transportation market. There is no specialized site for the mining industry and these services are proposed either on open public ad sites (Aviso, OLX, and others), or on the ProZorro Internet site, where there is a specialized site and section. An even worse situation was recorded in the field of mining, in particular, we are talking about amber – a precious stone of national significance, whose uniqueness and value is legally confirmed by Resolution of the Cabinet of Ministers of Ukraine No. 827 dated December 12, 1994 [12].

Taking into account the fact that only in the northern part of Ukraine (Rivne and Zhytomyr regions) amber reserves amount to about 100 thousand tons, and official mining was concentrated in Ukrainian Amber State Enterprise and a subsidiary of Ukrburshtyn, it is obvious that since 1991, unauthorized mining and illegal sale of amber worth billions of hryvnias have flourished in Ukraine.

The first steps towards institutionalization of the gig economy in the field of amber mining were taken on December 19, 2019, when the Verkhovna Rada of Ukraine adopted the draft law On the Regulation of Amber Mining, which establishes criminal liability for illegal mining and introduces a single mechanism for reserving land plots for subsurface use before the auction on the ProZorro website (the right to mine amber for 5 years on plots up to 10 hectares) starts. As a result, only Rivne region has officially received more than UAH 32 million from Amber auctions to the budget over the past year [13].

In general, the mining industry has an important feature – each earned Hryvnia generates about UAH 2 in Ukraine’s gross domestic product, and one workplace provides three employed persons in other sectors of the economy. In 2017–2018, about a quarter of a million people were employed in the mining industry [4].

However, due to the loss of control over a significant part of the territory of Ukraine, since 2014, coal and metal ore mining has been systematically reduced by an average of 10–20 % annually. At the same time, state coal mining enterprises are able to meet the needs of Centrenergo Thermal Power Plant PJSC only by 25–40 %. Salt mining, minerals of which is also the prerogative of Donetsk region, has also decreased. Dependence on one salt producer is a threat to Ukraine’s food security.

Due to the loss of resources, there is a significant decrease in the economic performance of the fuel and energy complex of Ukraine. All these trends continued in 2020, in particular,

2,619 thousand tons of coal were mined, which is 193 thousand tons (7 %) less compared to December 2019. Mining of thermal coal amounted to 1,920 thousand tons and decreased by 175 thousand tons (8 %), coking coal amounted to 699 thousand tons and decreased by 19 thousand tons (3 %), and as a result, Ukraine spent almost UAH 25 billion on subsidized support for the coal industry during 2018–2019 [4].

Thus, taking into account innovative developments in the field of “Access Anytime and Anywhere”, it is advisable to outline strategic vectors for the development of the gig economy (Fig. 2).

In the context of all kinds of mining industry, it is worth noting that they are united by an important factor – the rural area where the corresponding production takes place. It is worth noting that an important factor is the maximum financial and economic decentralization of communities that need to effectively use the potential of rural areas.

Moreover, these branches of the national economy are systematically important, and the sustainable development of the respective communities, their economic, environmental, and social security depends on these branches.

Scientific progress, decentralization, the opening of the agricultural land market, geographical location, and the global crisis associated with COVID-19 have created unique conditions for Ukraine to implement its natural, human, and economic potential capacity.

Therefore, for quantitative and qualitative determination of strategic lines of the development of mining industries, it is proposed to use extreme properties of partial derivatives for continuous functioning of sustainable development of these industries $U=f(x, y, z)$

$$\text{grad}U = \max\left(\frac{\partial f(x, y, z)}{\partial l}\right) = \sqrt{\left(\frac{\partial f(x, y, z)}{\partial x}\right)^2 + \left(\frac{\partial f(x, y, z)}{\partial y}\right)^2 + \left(\frac{\partial f(x, y, z)}{\partial z}\right)^2},$$

where $\text{grad}U$ is the absolute value of U function gradient; x, y, z are continuous variables that correspondingly characterize the economic, social, and environmental situation; $\partial f, \partial x, \partial y, \partial z$ are partial derivatives. The proposed approach allows using gradient vector lines that increase (or decrease) to the maximum along the entire U function. The greatest increase in U function is determined in the direction of the gradient of this function at a given point, and the following system of differential equations is valid

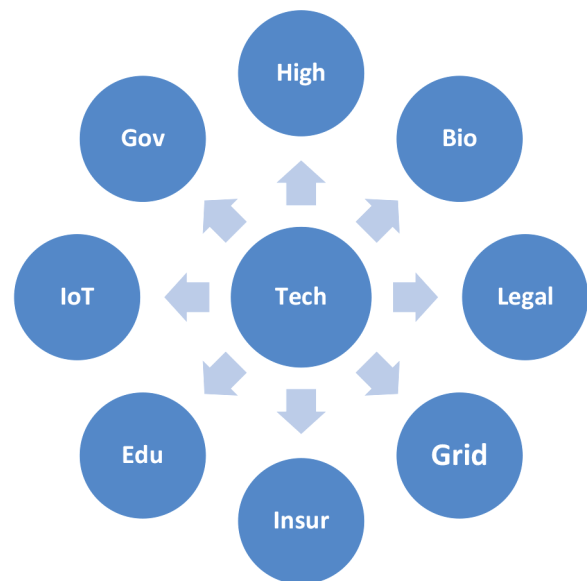


Fig. 2. Systematization of strategic gradients of gig economic development in the context of Access Anytime and Anywhere

$$\frac{\partial(x)}{\partial U} = \frac{\partial(y)}{\partial U} = \frac{\partial(z)}{\partial U}.$$

Continuing the calculations based on the Delphi method and the Miller scale based on the integration of SWOT analysis

and the SMART method, we obtain the following industry specifics of strategic management of the gig economy of mining industry in Ukraine (Table 3).

Results. Currently, among the recent institutional changes in the legal and security field, which affects the sustainable de-

Table 3

Expanded industry specifics of strategic management of the gig economy of mining industries [2–14]

No	SMART vector	Characteristics	Strengths	Weaknesses	Forecast
1	Specific	Territorial communities are heavily dependent on the development of mining industries. The introduction of innovations in mining will lead to mass robotization of production, which will provoke unemployment	Cloud storage technologies will allow working remotely with up-to-date large-volume data – Big Data, which will make the development of new deposits possible. Employment is being diversified. Creating a quantum computer and modern technologies will make it possible to forecast future optimal management decisions	The lack of proper Internet-connectedness slows down the development of the gig economy in areas and, accordingly, not all innovations are implemented in mining	The introduction of 5G will significantly accelerate the expansion of the gig-economic space
2	Measurable	The proposed method of numerical assessment of gradients of the development of the gig economy allows using indicators for determining the progress of achieving a goal. All indicators of sustainable development should be visualized using the integrated assessment method	Blockchain distributed ledger technologies will make it possible to simplify office management and storage of information simultaneously on a large number of servers using a hash function – a function of many variables, such as a sequence of random numbers, letters and symbols, as well as a Euclidean gradient division algorithm and open and closed digital signatures, which make it impossible to make changes to existing data	There is a possibility of creating a program that can simultaneously disable all registry chains Blockchain	Implementing pilot projects will help to determine the reliability of the system
3	Assignable	The principles of decentralization provide for the key performers of control functions being rural communities where mining takes place. It is this local institutional unit that is most interested in preserving environmental norms and socio-economic justice in the distribution of income from production, since members of the community live directly at the place of production. At the macro level, control over the development of the gig economy in local territories should be assigned to the system of trade unions, which needs to be modernized	The united territorial communities will automate the simplest manual and cognitive tasks through the introduction of computer-assisted learning technologies. When forming the strategy for the gig economic development of local territories, computer systems will help to make optimal decisions	Most territorial communities do not have the necessary means of digital communication. Significant investment in technical upgrades is required. The Covid-19 crisis will worsen the economic situation	Cooperation with international donors will help to carry out IT updates
4	Realistic	Using the example of the activities of the State Service of Ukraine for Geodesy, Cartography, and Cadastre, the feasibility of the first stage of intensive transition to the sixth technological structure in terms of implementation of Blockchain technologies is proved. In national economy of the developed countries, innovative gradients based on technological triggers: CRMtech, OGC, GPS, GIS, Digital-marketing, BioTech, FinTech, App-Base, Flexibility, Global, Remote, Job sourcing, In-house recruiting staff, Grid, e-ID, are actively introduced	In many countries, governments are engaged in institutionalizing the gig economy. For example, in the United States, California, the Gig Worker Law was adopted, which equated self-employed gig workers by rights and obligations with traditional workers	The domestic legal field is not yet ready for the institutionalization of millions of gig workers and needs to be significantly updated	Possible imitation of the US legal experience
5	Time-related	Given that the gig economy is a component of the national economy, taking into account the fact that the Cabinet of Ministers of Ukraine adopted a new National Development Strategy in 2021 [18], the period of formation and institutionalization of the gig economy will fluctuate between 2025–2030	In the context of the accelerated development of the gig economy, the National Economic Strategy for the period up to 2030 will be clarified in 2024. In particular, it provides for digitalization of all possible administrative services and important processes, deregulation of sanitary and epidemiological expertise, registration of exporters, etc.	The experience of implementing state programs indicates significant systemic problems with meeting deadlines	Accelerated development of the gig economy

velopment of Ukraine's mining industry, it is worth emphasizing the importance of the Law of Ukraine "On Amendments to Certain Legislative Acts of Ukraine to Strengthen Liability for Illegal Mining", in particular, "mining of local significance is recognized as a criminal offense". At the same time, in order to avoid threats to environmental security, unauthorized use of subsoil, conclusion of agreements that directly or covertly violate the right of ownership of subsoil, provides for a fine of one hundred to two hundred non-taxable minimum incomes [14]. Despite the positive consequences for the social component of sustainable development of the extractive industry, this law needs further research in the context of identifying threats to investment security, as well as the burden on related gig-companies involved in extraction processes.

Thus, the foresight of the basic scenario for the development of the gig economy, which is the most likely, given the adopted National Strategy of Economic Development for the period up to 2030, is the one according to which, it is difficult to imagine modern rural youth who dream of a "traditional way of life" in the 21st century. Thus, with this management policy, we predict a rather inertial development of the gig economy in mining industry. But the introduction of a special systems, which, based on Blockchain technology, will increase the role of trade unions, which will be able to unite gig workers into a single system and control working conditions, taking on certain social obligations.

However, the conducted systematic analysis of the state of the whole domestic complex of the mining industry shows that it is the leader among all sectors of the national economy in the context of the existing potential capacity and opportunities for implementing the gig economy, ahead of education, science, construction, insurance, and service sector.

Conclusions. Thus, the paper establishes the impact of the gig economic space on the socio-economic and ecological security of the mining industry, since in the conditions of changing the technological structure and introducing innovations in the automation of technological processes, about 70–95 % of employees will be dismissed. It is proposed to create robotic mini-plants on the basis of private peasant farms (PPFs), as well as provide an opportunity for the official mining of certain types of minerals to combat unemployment. At the same time, gig producers should be standardized and certified and unite on the principles of clustering into a single national system. In the context of the COVID-2019 crisis, which has activated the change in the system of technological structures, the most likely optimistic strategic scenario for the development of the domestic mining-economic system is the creation of a special remote MiningFreelance site for providing freelance services in mining of certain types of minerals (amber, coal, peat, clay, sand, and others) on the basis of the PrivatBank State Bank (which has the largest network of branches and the best online application). This application should be integrated with the DIA, ProZorro and Blockchain services, which will simplify obtaining of the relevant permits and provide a high level of information protection.

Considering Post Covid-19 effects to implement the safety gradient of sustainable development of the mining industry of Ukraine, all the necessary conditions are currently available for timely promotion of activities and financing of newly created gig production entities.

Firstly, almost all PPFs and territorial communities have land shares and the creation of an independent remote MiningFreelance site will guarantee sales markets since the order of goods will take place almost without intermediaries. Consumers order an approximate list of mining products through special mobile applications (or PCs), thereby guaranteeing sales.

Thus, the gig economy of mining industry will not only significantly reduce the cost of products, increasing the profitability of the business, since there will be no intermediaries between the buyer and the producer, but also will open a new

market of services – mining tourism. At the same time, there will be diversification of production, which will reduce threats to food security (in particular, in the process of salt production, which is monopolized).

Secondly, gig-economy will allow you to quickly move from partial to full automation of the production process, which is much easier to do at the micro level. And only then finished products are to be sold with minimal logistics costs in local markets (for example, providing coal to educational and medical institutions). The entire chain of transactions will be protected by the Blockchain registry, and all participants in the gig-economic space (producer, carrier and consumer) will be able to trace each supply chain of mining products (sand, clay, stone, etc.), as well as gain full access to the history of origin of products.

Thirdly, the above industry specification for strategic management of the gig economy of mining industry provides for significant financial costs that can be attracted not only from international organizations, but also by refusing state subsidies for coal production. This is about attracting approximately UAH 29 billion (this is how much the state plans to pay to coal producers in 2021–2025). This money will be enough to pay interest on loans for technical support of the newly created network of self-employed, responsible and motivated gig manufacturers, who will be able to provide high-quality services using the most modern technical means of production after special express training, for example, on the basis of Edutech – Complete Learning Solutions Powered by Technology and Central European Network for Sustainable and Innovative Economy.

Fourthly, gig-innovative changes in the country's economic system will contribute to the reanimation of the outstanding role of trade unions, which will be able to unite gig workers into a single system and control working conditions, promote higher wages, take on certain social obligations, and synchronize time and space parameters, increasing the targeting of state support. The proposed remote Freelance site will unite into a single powerful production structure, which will have a number of advantages over holdings, as it will be able to unify numerous innovations.

This innovative approach will gradually replace physical labor with mental or creative labor, there will be structural changes in education, medicine, transport and construction, which in the complex will not only lead to sustainable development of the mining industry, but also to national economic progress, which will revive other industries, strengthening the security of national economy.

Acknowledgements. *The article was written within the framework of the Central European Network for Sustainable and Innovative Economy, International Project (No – PPI/APM/2019/1/00047/U/00001/IIC) as well as a research internship at Marie Curie-Skłodowska University.*

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Гіг-економіка як безпековий градієнт сталого розвитку видобувної галузі

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Мета. Визначити рівень каузальності інноваційних процесів розширення гіг-економічного простору й соціальної, економічної та екологічної захищеності видобувної галузі України в умовах зміни системи технологічних укладів, спричиненої появою нової безпекової структурно-функціональної Post-Covid компоненти. Запропонувати типові сценарії сталого розвитку вітчизняної гіг-

економіки в контексті вдосконалення безпекової політики у видобувній галузі.

Методика. Для досягнення зазначеної мети використане сценарне планування, Дельфі, SMART, SWOT-аналіз і математичні методи – економетричний і градієнтний аналіз дослідження, що уможливають визначення скалярних величин і напрямів екстремальних інноваційних змін функцій гіг-економіки в контексті сталого розвитку видобувної промисловості України. Розрахунки проводилися на основі програмного пакету SPSS Data Analysis Software.

Результати. У роботі системно проаналізовані ключові безпекові показники науково-технічного прогресу в контексті сталого розвитку видобувної галузі та встановлено взаємно однозначний зв'язок існуючих соціально-економічних явищ та гіг-економічних процесів, що в останні роки асиметрично активізувалися під впливом Post-Covid наслідків. Окреслена безпекова специфіка тактичного й стратегічного управління гіг-економікою.

Наукова новизна. Запропоновано методичний підхід щодо кількісного та якісного визначення безпекових градієнтів розвитку видобувного господарства, що уможливає врахування трансформаційних Post-Covid наслідків, а також диверсифікує тактичне та стратегічне управління. Зокрема, пропонується використати інноваційну цифрову платформу CENSIE – «Central European Network for Sustainable and Innovative Economy».

Практична значимість. Використання запропонованого підходу сприятиме підвищенню ефективності стратегічного й тактичного управління кадровою політикою у видобувній галузі в умовах формування гіг-економіки, а також синхронізує часові та просторові параметри, підвищуючи адресність управлінських рішень. Запропоновано впровадження спеціальної дистанційної платформи «ВидобуванняФріланс» для надання фріланс-послуг домогосподарствам, фізичним особам-підприємцям і іншим виробникам, які будуть захищені технологією Blockchain на базі існуючої програми «ProZorro». При цьому Blockchain-технології дозволять підвищити роль профспілок, які зможуть об'єднати гіг-працівників у єдину систему та контролювати умови праці, взявши на себе певні соціальні зобов'язання.

Ключові слова: інновації, гіг-економіка, градієнт безпеки, бурштин, видобувна промисловість, Blockchain, Post-Covid наслідки

The manuscript was submitted 10.05.21.