рівнем цифрової інтенсивності та впровадження таких технологій, як Cloud, Big data, Artificial intelligence.

Останнім часом Німеччина запровадила ряд стратегій і ініціатив для підтримки цифрової трансформації компаній, а також розгортання передових технологій. Частину заходів розроблено спеціально для МСП.

Новизна проведеного дослідження полягає у систематизації результатів впровадження німецьким бізнесом цифрових інновацій. Німецька практика свідчить про різний рівень зацікавленості бізнесу у цифрових технологіях залежно від типу інновацій, сфери діяльності та розміру компаній. Результати дослідження можуть бути корисними при визначенні напрямів цифрової трансформації українського бізнесу в умовах післявоєнної відбудови.

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USING SIMULATION MODELING IN THE ANALYSIS OF PROCESSES IN THE INTERNATIONAL ECONOMY

S.V. DYADUN, PhD in Engineering (Mathematics and Computer Sciences), associate professor
V.N. Karazin Kharkiv National University, Kharkiv, Ukraine

The report attempts to use simulation modeling methods not just in the economy, to create simulation models of all kinds of economic processes, but also in the global economy as a whole.

The world economy is much more dependent on politics, on relations between states, than even on the level of development of industry, productive forces, the availability of a raw material base, the development of advanced modern technologies, infrastructure, agriculture, transport networks, etc. factors. For example, we see to which kind of redistribution and change in the balance of economic opportunities leads to an artificial game with a sharp increase and decrease in oil production (which even led to the collapse of the USSR), gas and oil prices, also earthquakes, droughts, crop failures, even coronavirus, etc.

Mankind should listen to global challenges, to a variety of warnings, and try in every possible way not to unleash wars among themselves, but to be ready to meet (if it really comes true) impending global dangers: earthquakes, droughts, melting glaciers, rising sea levels, flooding many islands, coasts of countries, and even whole states, tsunamis, all kinds of diseases and infections, lack of drinking water and food shortages, and as a result, possible famine, inevitable wars for these resources and survival. We are not talking about blind faith in the predictions of Nostradamus, who predicted a surge of these cataclysms already from 2027-28, Edgar Cayce, etc., but

humanity should always be ready for them, and listen to many of their predictions and predictions of the Bible that have already come true. Therefore, humanity should use the means and resources available to it to prepare and prevent all such possible cataclysms, and not to war, destroy each other in various parts of the planet, huge destruction, thereby leading up to the possible destruction of their own such a beautiful planet.

Simulation modeling is the most effective method for studying large technical, economic and social systems, and often the only practically accessible method for obtaining information about their behavior under various disturbances, i.e. even under conditions of risks and super-uncertainty. Simulation modeling reproduces the process of functioning of the system in time, and various phenomena that make up the process are simulated while maintaining their logical structure and sequence of flow in time. This allows to obtain information about the states of the process at certain points in time from the initial data, which makes it possible to evaluate the characteristics of the systems. When the results obtained when reproducing the system functioning process on a simulation model are realizations of random variables and functions, then to find the characteristics of the process, it is required to reproduce it multiple times with subsequent statistical processing of information.

The modeling result largely depends on the adequacy of the initial conceptual (descriptive) model, on the obtained degree of similarity of the description of the real object, the number of model implementations, and many other factors. In some cases, the complexity of the object does not allow not only to build a mathematical model of the object, but also to give a fairly close description, and it is promising here to single out the most difficult mathematical description of the part of the object and include this real part of the physical object in the simulation model. Then the model is implemented, on the one hand, on the basis of computer technology, and on the other hand, it is a real part of the object. This significantly expands the capabilities and increases the reliability of the simulation results.

The simulation system allows you to explore the simulation model, given in the form of a certain set of individual block models and relationships between them in their interaction in space and time during the implementation of any process. Three main groups of blocks can be distinguished: blocks that characterize the process of functioning of the system being modeled; blocks reflecting the external environment and its influence on the process being implemented; blocks that play an auxiliary role, ensuring the interaction of the first two, and also perform additional functions for receiving and processing simulation results. In addition, the simulation system is characterized by a set of variables, through which it is possible to control the process under study and a set of initial conditions, when it is possible to change the conditions for conducting a computer experiment. The simulation system is a means of conducting a computer experiment, and the experiment can be repeated many times, planned in advance, and the conditions for its implementation may be determined. A computer experiment with a simulation model allows you to explore the features of the process of functioning of the system in any conditions. The simulation model has the flexibility of varying the structure, algorithms and parameters of the system being modeled, which is important from the point of view of finding the optimal system variant.

With the help of simulation modeling, knowing even the approximate values of the economic indicators of individual states, it is possible to play on models and calculate the consequences of certain actions both in global politics and when influenced their from outside. It is clear that due to the complete unpredictability of many phenomena and decisions, the continuous dynamics of changes in events on the political map of the world, we cannot talk about achieving a high degree of adequacy of such models, but they can be useful in forecasting and analyzing all kinds of events, when analyzing processes in international economy, for a clearer understanding and prevention of possible negative, sometimes even irreversible, consequences.

METAVERSE AS A COMPONENT OF THE INNOVATION STRATEGY OF CREATIVE INDUSTRY COMPANIES

V. VLASOVA PhD (Economics), Associate Professor, Associate Professor of the Department of Management, Public Management and Administration,
State University of Infrastructure and Technologies, Kyiv, Ukraine

Metaverse is rapidly gaining popularity both among technicians and representatives of creative professions. At the same time, many marketing managers struggle to grasp the scale of this new universe [1]. There is still no single definition of this concept. Business owners who want their companies to be innovative and creative should already use the potential of the metauniverse and integrate it into their business processes. Accordingly, for this, it is necessary to revise the strategies. This especially applies to creative industries that have been actively developing in Ukraine recently. The undisputed leader in creative industries is the IT sector, which increases its export potential every year [2].

There are four main areas that show up in the metaverse (beyond entertainment): meta-life, meta-space, meta-business, and meta-society [1,3]. Let us describe these areas and give examples, Figure 1.

Matthew Bell notes that "a metauniverse is a large-scale and interactive network of real-time 3D virtual worlds that can be synchronously and permanently accessible to an unlimited number of users with an individual awareness of presence and continuity of data such as identity, history, rights, objects, communications, and payments" [1,3].

When implementing an innovative strategy in companies of the creative industry, it is essential to obtain the following:

1. It allows people from different locations to work together in a virtual environment. It is possible to use Microsoft Mesh and Facebook Horizon Workrooms tools.

2. Companies can use the metaverse as a creative catalyst to turn passive consumers into creative agents who create a shared experience in the metaverse or develop it further with their friends.

3. Virtual real estate is considered as a real investment object.