

DIGITAL ENTREPRENEURSHIP BUSINESS ENVIRONMENT MODELING AND ANALYZING

Iuliia Kostynets¹

¹*Doctor of Science (Economics), Professor, Professor of the Department of Marketing, Economics, Management and Administration, National Academy of Management, Ukraine, e-mail: yulia.kostynets@gmail.com, ORCID: <https://orcid.org/0000-0001-6427-675X>*

Citation:

Kostynets, Iu. (2023). Digital Entrepreneurship Business Environment Modeling and Analyzing. *Business model innovation in the digital economy: monograph*. Oŭ Scientific Center of Innovative Research. 2023. 208 p. pp. 141-151, <https://doi.org/10.36690/BM-ID-EU-141-151>



This monograph's chapter is an open access monograph distributed under the terms and conditions of the [Creative Commons Attribution \(CC BY-NC 4.0\) license](https://creativecommons.org/licenses/by/4.0/)



Abstract. *Based on the results of a strategic analysis of the development of the services market in the conditions of digital transformation of the economy, the prerequisites, factors and trends of the development of the services market in the national economy were determined, the environment of the services market in the conditions of the digital transformation of the economy was investigated, and the modeling of economic processes in the services market was carried out as a necessary condition for the effective management of its development. The analysis of the environment of the services market in the conditions of the digital economy through the PEST analysis made it possible to conclude that the factors of the political environment exert the greatest negative influence on the development of the market, which is caused by crisis phenomena in politics and the significant dependence of certain sectors of the intermediary services market on state regulation. The economic environment exerts the greatest positive influence on market development. Social and technical factors influence market development almost equally. The positive value of the integrated assessment indicates the predominance of trends of the positive overall impact of macro-environmental factors and indicates the possibility of market growth. The scientific principles of the cognitive approach to the analysis of the development of the service market were further developed, vector maps of alternative SWOT strategies were constructed for individual branch service markets; the conceptual and categorical apparatus of management theory by defining the concept of managing the development of economic systems; scientific-methodical approach to cognitive analysis, within which the structural-logical scheme of cognitive analysis of the market is applied.*

Keywords: *digital economy, digital entrepreneurship, business environment, PEST analysis, SWOT analysis, cognitive modelling.*

Digital entrepreneurship business environment concept. In the modern world, a digital society has actually formed - a modern person cannot imagine his existence without digital devices, information and computer technologies. The economy of this society has already acquired a digital character.

The date of the appearance of the term "digital economy" is considered to be 1994 - the publication of a well-known book by a Canadian economist and business consultant D. Tapscott "Digital Economy" (Tapscott, 1994).

In 1995, this term spread and went beyond the limits of scientific use thanks to the American computer scientist of the University of Massachusetts N. Negroponte (1995), who defined the ideology of the digital economy as "the transition from the processing of atoms, the constituent matter of physical substances, to the processing of bits, the constituent matter of program codes".

N. Negroponte (1995) argued that material substances, which are considered in the form of raw materials and products, have their own disadvantages, such as: the physical weight of products, the need for resources for their production, the use of areas for their storage, logistical costs and problems related to with transportation of goods. The advantages of the digital economy as a "new" type of economy, according to informatics, could be: the absence of physical weight of products, which is replaced by information volume, lower resource costs for the production of electronic goods, several times smaller area occupied by products (electronic media), as well as instant global movement of goods via the Internet.

The digital economy is also sometimes called the internet economy, the new economy, or the web economy. Increasingly, the "digital economy" is intertwined with the traditional economy, making a clear distinction more difficult (Negroponte, 1995). The digital economy began to develop in the late 1950s, and since the 1960s, digital innovations have been actively spreading around the world. The second phase of digitalization began around the mid-1990s, with the global spread of the Internet and mobile communications.

Today, we can talk about the third stage of digitalization, which is connected with the spread of digital currencies and distributed ledger technology in the world economy. Bitcoins and other digital currencies have already gained a place in the world financial market, their number (as well as the scale of operations with them) is increasing, as a result of which a new currency component of the world financial architecture is formed, which meets the requirements of the time. They have been in use since 2009, and to date have proven their demand and value.

Contemporary market in the conditions of digital transformation of the economy is characterized by rapid variability and uncertainty of the environment. In order to form reliable knowledge about the state and trends of the development of the market,

it is proposed to apply a structural and logical model of the research of the market by its sectors and as a whole, had been developed before (Kostynets, 2014).

To analyse the macro- and microenvironment, the PEST-analysis method was used, which was used to study four main groups of factors of the external environment: economic, legal, technological, and socio-cultural (Nandonde, 2019). The PEST-analysis method involves the assessment of four components, that is, four groups of factors influencing the development of the market: the political and legal environment, the economic environment, the socio-cultural environment, and the technological environment (Islam&Mamun, 2017).

According to the existing approaches, each component is evaluated by the method of expert evaluations according to the appropriate scale. However, taking into account the fact that each of the factors of each group affects the others. Therefore, there are relationships between them due to mutual influence. And this means that actually all the factors that are involved in the PEST analysis can be combined into a fuzzy cognitive map (FCM) and analysed by cognitive analysis (Glory&Kasper, 2021; Leyva Vázquez et al., 2018; Monshizadeh et al., 2023).

In macro-level management, the cognitive approach to modelling and managing the development of the economy is aimed at the development of formal models and methods that can be used during the intellectual process of solving problems thanks to the consideration of cognitive capabilities (perception, representation, cognition, understanding, explanation) in these models and methods. management subjects when solving management tasks.

The cognitive map is built on the basis of subjective perceptions of experts about the situation. The system of concepts of the development digital entrepreneurship business environment in Ukraine is given in the table 1.

From the table 1 we can draw a conclusion about the predominantly negative influence of factors of the political and legal environment on the processes of digital market development. Political risk has the greatest negative impact. Tax regulation has a significant negative impact. In fact, all factors of the political environment exert a negative influence on the development of the market, which is mainly due to the shortcomings of the state regulation of the development of this market.

Evaluating the impact of the economic environment allows us to draw conclusions that the factors of the "E" group exert both a negative and a positive influence on the development of this market. The greatest influence on the development of the digital market in Ukraine at the current stage is exerted by the factor of the exchange rate and its fluctuations, as well as the factor of the state of employment in the market in a whole, since the end consumers of many services are individuals who, in case of unemployment, have limited opportunities to use paid services. The structure and trends of GDP is an important indicator for the economic situation of the country as a

whole. Personnel as the main asset in the market is a factor of significant influence on the market. The inflation factor, which strongly affects the cost of resources, the cost of goods, works, and services, has the same impact assessment.

Table 1. A system of concepts of the digital entrepreneurship business environment in Ukraine

Group of concepts	Conventional designation of the concept	Name of concept	Influence on the development of the market
P - political and legal factors	E1	antimonopoly regulation	has a negative impact on the activities of market subjects with various prohibitions
	E2	tax regulation	A significant negative impact on the activities of market entities
	E3	legislation on environmental protection	Affects the regulation of the activities of enterprises in all markets
	E4	Legal regulation of export-import activities	legal regulation affects external national and foreign entities
	E5	The level of bureaucracy and corruption	complicates the development of the market, prevents quick decision-making
	E6	the presence of pressure groups lobbying the interests of individual market subjects in power structures	It negatively affects the development of the market as a whole
E –economic factors	E7	structure and dynamics of GDP	An indicator of the country's economic development
	E8	cost of capital	Capital is one of the resources in the market
	E9	price index	strongly affects the cost of resources, the cost of goods, works, and services
	E10	the state of employment in the market	strong impact, digitalization has the risk of increasing unemployment, correspondingly decreasing the level of employment and income, searching for alternative types of employment
	E11	availability/unavailability of credit resources	great impact on activity
	E12	the cost of labour in the labour market	personnel are the main asset in the market, the factor has a significant impact
	E13	investment activity	the activity of enterprises improves due to the inflow of investments and vice versa
S- soc ioc ult res	E14	changing standards of living and education	affects the economic development in direct proportion to the increase

Group of concepts	Conventional designation of the concept	Name of concept	Influence on the development of the market
			in the standard of living and the number of educated citizens
	E15	public attitude to business	Some groups of service consumers believe that the service provider does not make any effort, so there is nothing to pay for
	E16	employment structure	The presence of a tendency to increase the number of people employed in the service sector
	E17	age structure of the population	Different age groups use the services of different entities in different ways, depending on consumer preferences
	E18	family structure	Married / single, with or without children, have different values and needs, which affects the structure of demand for services
	E19	value system in society	For people, there is a different set of concrete, material things. Each person spends different amounts of money on clothes, food, etc.
	E20	stratification of society based on income	A significant stratification of population strata depending on the level of income determines consumer preferences and expectations
	E21	consumerism	Clients evaluate the quality of the service and can refuse services in case of dissatisfaction
	E22	Using the digital environment for both communication and work	blurring the boundaries between work and private life; however, increasing opportunities for digital neuromarketing
T – technological environment factors	E23	State and non-state expenditures on science and technology	significantly affects, because in modern conditions any enterprise uses IT
	E24	Services on cyber markets	Significant influence on the development of the services market and the level of digitalization
	E25	Patent and license protection of technologies	Insignificant influence due to existing influence in certain sectors of the market
	E26	Mass use of the Internet	Significant influence on the development of the services market
	E27	Mass use of social networks	Digitization of personal space
	E28	State of business digitalization	digitalization means increased individual capacity for successful work and opportunities for self-realization and achieving economic

Group of concepts	Conventional designation of the concept	Name of concept	Influence on the development of the market
			growth and development of the country's society in general
	E29	The level of digital competence of the population	Affects the possibility of introducing innovations for consumers

Source: developed by author based on experts' evaluation

Therefore, in the process of assessment, appropriate assessments of factors influencing the socio-cultural environment on the development of the market were obtained. In particular, it was established that the greatest influence on this process is exerted by such factors as the value system in society, since for people there is a different set of concrete, material things, and each person spends different money on clothes, food, and the factor of consumerism, since customers evaluate the quality service and in case of dissatisfaction can refuse services. Factors of the structure of employment and the age structure of the population exert a significant influence.

From the table 1 the conclusion follows that in the group of factors of the technological environment, the factor of mass use of the Internet has the greatest influence on the development of the market, which became possible due to the popularization of network technologies, wireless technologies of Internet communication and the reduction of tariffs for the services of Internet providers. The following factor is connected with this factor - the provision of services on cyber markets in the network, which is an innovative form of the market, and therefore has a significant impact on the development of the market. Patent and license protection of technologies as a factor of the technological environment exerts a minor influence due to the existing influence only in certain sectors of the digital market in Ukraine.

From Table 1, it can also be concluded that the most negative influence on the development of the market is exerted by the factors of the political environment, which is caused by periodic crisis phenomena in politics and the significant dependence of certain sectors of the market on state regulation. The economic environment exerts the greatest positive influence. Social and technical factors influence market development almost equally. The positive value of the integrated assessment indicates the predominance of trends of the positive overall impact of macro-environmental factors and indicates the possibility of market growth.

In order to analyse the system characteristics of the proposed cognitive model, it is necessary to determine the main system connections. The results of identifying cause-and-effect relationships between concepts characterizing the macro-environment of the market in the conditions of digital transformations should be

summarized in the integral system characteristics of the cognitive model (Monshizadeh, 2023).

Based on the binary matrix of the incidence of the digital market environment, on the basis of which the cognitive map of the macro-environment of the market in the conditions of the digital transformation of the economy will actually be a hypergraph, where the both individual concepts of this environment and subsets of these concepts. Such a hypergraph in this case is demonstrated on figure 1.

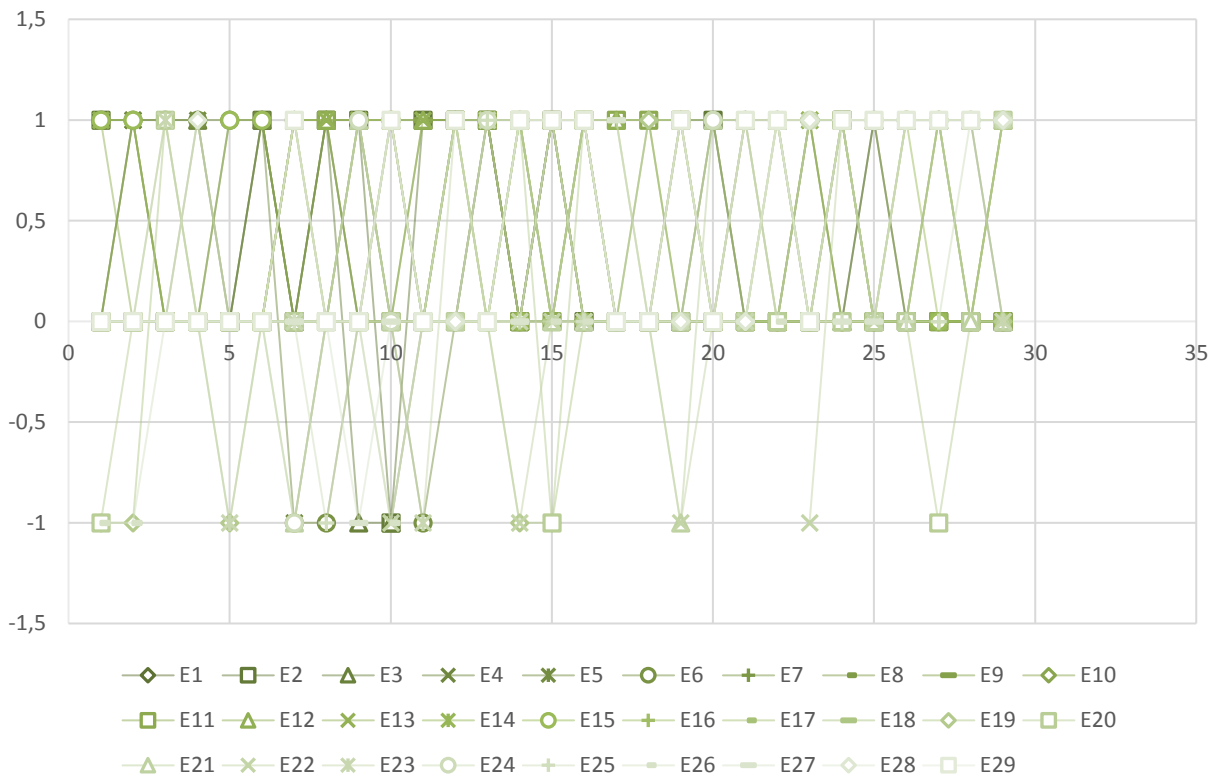


Figure 1. Visual representation of a subset of concept for digital entrepreneurship business environment modelling

Source: by author

In general, a fuzzy cognitive map is a causal network that will reflect a certain phenomenon and allows the following formal presentation (1):

$$G = (E, W), \quad (1)$$

where $E = E = \{e_1, e_2, \dots, e_n\}$ is a set of concepts, W is a binary relation on the set E that specifies the connections between them. The concepts e_i and e_j are considered to be related by the relation W (denoted by $(e_i, e_j \in W \text{ a} \circ e_i W e_j)$), if a change in the value of the concept e_i (cause) leads to a change in the value of the concept e_j (consequence). According to the terminology of cognitive analysis, in this case it is said, that the concept e_i affects e_j . At the same time, if an increase in the value of the concept-cause

leads to an increase in the value of the concept-effect, then the influence is considered positive ("strengthening"), while if the value decreases, it is negative ("inhibition").

Thus, the ratio W can be represented as a union of two disjoint subsets $W = W^+ \cup W^-$, where " W^+ " is a set of positive and " W^- " is a set of negative connections. The concepts themselves can be defined as relative (qualitative) indicators, as well as absolute, measurable (quantitative) indicators – population, cost, etc.

After carrying out a classification assessment of the main concepts, we will determine the result of the analysis of the macro environment. Based on the results of figure 1, we can see that the economic factors of the external environment have the greatest impact on the development of the services market, directly due to the increase in the unemployment rate (negative impact), GDP growth (positive impact) and changes in the NBU discount rate (its growth has a negative impact, because increases the value of credit resources), which in turn requires market entities to take appropriate actions, such as: increasing the range of services in the activities of intermediaries, increasing the cost of services, attracting investments, etc. Other factors, such as: legal, technological and socio-cultural, have a smaller impact, but require marketing management entities to respond to changes in the state of factors, develop and implement new programs, and look for ways to expand the scope of services.

Based on the analysis, it can be concluded that the economic environment is the biggest threat to the development of the services market, because the factors of this environment have the strongest influence on the development of the market. A significant influence is exerted by social, political, legal and technological factors of the macro environment (Dong & Jia, 2022).

An empirical SWOT analysis of the environment of the digital economy and identify its main opportunities and threats for Ukraine are represented in the table 2.

It is believed that digital development in general has a positive impact on the economy, business, society and life of the country as a whole. In particular, the digital economy is the basis of the Industry4.0 approach and the third wave of globalization. A characteristic feature of the digital economy is its connection with the on-demand economy, which involves not selling goods and services, but gaining access to them exactly at the moment when it is needed. Orders are received online and fulfilled offline.

However, in addition to opportunities for economic development, the digital economy has a certain number of threats to both socio-economic and socio-political spheres.

Table 2. Generalized SWOT analysis of implementation and development of the digital economy in Ukraine

Strength	Weaknesses
<ul style="list-style-type: none"> - increasing the accessibility of ordinary users to certain markets (goods or services), not only large companies; - reduction of transaction costs; - targeting a specific consumer and comprehensive use of information as a driving resource, taking into account the specific characteristics of a specific consumer in a specific place; - development of digital entrepreneurship, creation of appropriate (including analogy) infrastructures for the support and development of innovative activities, implementation of funding, stimulation and support mechanisms 	<ul style="list-style-type: none"> - Ukraine's significant lag in the development of digital technologies compared to EU countries; - low level of security of computer networks; - insufficient financial security of the population for full access to modern technologies; - an effective plan for the development of broadband access (broadband access) in Ukraine has not been created, under which primary attention would be paid to the elimination of areas of digital inequality; - modern Internet services are not implemented in all social life; - there is almost no state support for the modernization of the main means of production to modern digital and energy-efficient ones; - minimal control over improving the quality of training of engineering specialists in higher education; - control over the observance of rights to intellectual property objects is not fully ensured in order to stimulate the creation of high-quality domestic media content; - the demand for digital services and talented developers abroad is thousands of times higher than the demand for such services in Ukraine
Opportunities	Threats
<ul style="list-style-type: none"> - digital transformation of all spheres of life; - new specialists with modern knowledge, digital skills, capable of self-learning, solving complex tasks in a constantly changing environment are needed; - the consumer chooses the product relying on advice, personal experience and advertising, the seller does not have the opportunity to personally contact the buyer; - formation of consumers' motivations and needs in "digital technologies" 	<ul style="list-style-type: none"> - production and society will become more dependent on cyber-attacks; - redistribution of labour; - short-term decrease in labour productivity from the introduction of new technologies; - reducing the number of employees, in particular highly paid and low-skilled workers - the growth of technological unemployment; - temporary increase in inequality in income distribution; - significant changes in the regional structure of placement of productive forces, necessary education and qualifications of personnel, infrastructure; - a shift in social values and a change in society's priorities.

Source: by author

Thus, favourable conditions have not been created for the transition of all business entities to electronic systems of interaction (electronic document flow, customer relationship management systems, enterprise management systems), and IT outsourcing of Ukrainian IT companies and private specialists is the digitization of other economies. Accordingly, favourable and comfortable conditions for the creative self-realization of talented youth (highly qualified specialists, scientists, engineers) have not been created in Ukraine today in order to prevent mass migration abroad.

There is insufficient implementation of modern IT technologies and services in such areas of social life as: education, health care, security, environmental protection, housing and communal services, transport, etc.

The introduction of digital technologies is accompanied by certain challenges that society and the state must overcome in order to successfully implement the digital economy: short-term reduction in labour productivity from the introduction of new technologies; reduction in the number of employees, in particular highly paid and low-skilled workers, and the growth of technological unemployment; a temporary increase in the uneven distribution of income during the period of upgrading the qualifications of working people to the required level of qualification; significant changes in the regional structure of placement of productive forces, necessary education and qualifications of personnel, infrastructure; transformation of norms and rules (strengthening the protection of intellectual property rights, improvement of antimonopoly legislation, etc.), lifestyle (Lipsey, 2007).

In the conditions of the digital transformation of the national economy, in order to carry out successful business in the service sector and form a positive image (brand), enterprises operating in this area must fulfil all their promises made to the consumer, because under their influence, consumers' expectations of those benefits are formed services that may not materialize. In this aspect, it is necessary to professionally help consumers to positively evaluate the services provided to them. Considerable attention should also be paid to minimizing consumer risks in the services market, which are associated with the variability of services, the lack of guarantees and the complexity of individual operations, which deter or, on the contrary, stimulate the consumer to make a choice in favour of the services of the main competitor.

Conclusions. The analysis of the environment of the services market in the conditions of the digital economy through the PEST analysis made it possible to conclude that the factors of the political environment exert the greatest negative influence on the development of the market, which is caused by crisis phenomena in politics and the significant dependence of certain sectors of the intermediary services market on state regulation. The economic environment exerts the greatest positive influence on market development. Social and technical factors influence market development almost equally. The positive value of the integrated assessment indicates

the predominance of trends of the positive overall impact of macro-environmental factors and indicates the possibility of market growth.

References:

1. Dong, J., & Jia, H. (2022). SWOT Analysis: Growth of E-commerce Within the Context of Digital Economy. *BCP Business & Management*, 33, 508-518. <https://doi.org/10.54691/bcpbm.v33i.2834>
2. Glory I. E., Kasper K. (2021) Building a Fuzzy Cognitive Map from stakeholder knowledge: An Episodic, asynchronous approach, *Current Research in Environmental Sustainability*, Volume 3, <https://doi.org/10.1016/j.crsust.2021.100053>
3. Islam, F. R.; Mamun, K. A. (2017), Islam, F.M. Rabiul; Mamun, Kabir Al; Amanullah, Maung Than Oo (eds.). Possibilities and Challenges of Implementing Renewable Energy in the Light of PESTLE & SWOT Analyses for Island Countries", *Smart Energy Grid Design for Island Countries: Challenges and Opportunities, Green Energy and Technology*, Cham: Springer International Publishing, pp. 1–19, doi:10.1007/978-3-319-50197-0_1
4. Kostynets Y. (2014) Core factors of intermediary service market development. *Actual Problems of Economics*. 4. 172-177
5. Leyva Vázquez M.; Hechavarría Hernández J.; Batista Hernández N.; Alarcón Salvatierra J.A.; Gómez Baryolo O. (2018) A framework for PEST analysis based on fuzzy decision maps. *Revista Espasios*. Vol. 39 (Number 16).
- 6.
7. Monshizadeh F., Sadeghi Moghadam M.R., Mansouri T., Kumar M. (2023) Developing an Industry 4.0 readiness model using fuzzy cognitive maps approach, *International Journal of Production Economics*, Volume 255, <https://doi.org/10.1016/j.ijpe.2022.108658>
8. Nandonde, F. A. (2019). "A PESTLE analysis of international retailing in the East African Community". *Global Business and Organizational Excellence*. 38 (4): 54–61. doi:10.1002/JOE.21935
9. Negroponte N. (1995) *Being Digital*. NY: Knopf. 256 p
10. Richard G. Lipsey. (2007) Transformative Technologies in the Past Present and Future: Implications for the U.S. Economy and U.S Economic Policy/ ITIF Breakfast Forum
11. Tapscott, D. (1994) *Digital Economy*. New York: McGraw-Hill. 368 p.