

Paradigm of a Country Competitiveness Under Conditions of Digital Economy

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Abstract: The article discusses rating of Ukraine and its neighboring countries by the Global Index of competitiveness of countries. It analyzes dynamics of alterations of indices of Belarus, Hungary, Moldova, Poland, Russian Federation, Romania, Slovak Republic and Ukraine in the ratings of countries by the level of digitalization of economy. It presents a polygon model of competitiveness of countries by the indices of competitiveness of digital economies. The research suggests the researched to be focused on problematic aspects, especially, on those causing their low indices in digital economy. Poland should pay its most attention to solve problems connected with the lack of labor, automation of industrial operations and factor of virtual reality. Moldova is recommended to apply the instruments of Gig-Economy with their ability to change the general character of employment. All suggested recommendations for improvement of ratings lie in improvement and unification of legislative basis for raising cyber security as well as the level of readiness of centralized bodies to react adequately on cyber attacks and cyber incidents on the national level.

Keywords: Digital economy, competitiveness, Labor Freedom, Trade Freedom, Monetary Freedom, Index of Economic Freedom, Global Cyberlaw Tracker, E-Participation Index, Global Cyber Security Index.

INTRODUCTION

The competitiveness of the digital economy has recently become a priority for the development of EU countries. This is proven by a number of documents that have been developed and approved: "A Digital Agenda for Europe" (EUR-Lex 2010a), "The EU's New Digital Single Market Strategy" (EUR-Lex 2015), European Broadband: Investing in Digitally Driven Growth (EUR -Lex 2010b), "The EU's New Digital Single Market Strategy" (EUR-Lex 2015), "Building a European Data Economy" (EUR-Lex 2017), "The Age of Artificial Intelligence: Towards a European Strategy for Human-Centric Machines" (European Commission 2018).

The need to build a ranking of the competitiveness of the digital economy is a key driver of the economic transformation of business, government and society as a whole, helping them understand what to focus on, how to build priorities, and focus their resources on the best practices of digital transformation.

The key trend of current phase of all world states economic development effecting the level of competitiveness is a rapid spreading of digital technologies and development of digital economy. Positive effects of digitalization lie in guaranteeing economic development of competitive positions on the market by means of automation of industrial processes, lowering of costs, increase of labor productivity, administrative

efficiency, etc. A number of researchers study state competitiveness avoiding the factor of digitalization: Bochko O.Yu., Feyer O.V. (2019) researched rating of Ukraine on the background of global rating of competitiveness vi researched theoretical and methodological principles of international competitiveness and made an analysis of their current trends. Methodological fundamentals of current models of international competitiveness of countries and regions are highlighted by Antoniuk L.L. (2006). Some researchers focus on digitalization as on the vital component of the paradigm of digital transformation (Hrybinko O., 2018) and foundation of the enterprise competitiveness under conditions of digital economies (Ustenko M., Ruskyrh A., 2019).

To raise the level of competitiveness of our country we should be concentrated on the application of different digital methods. This will greatly contribute to our economy development. For every Ukrainian digitalization means a full access to digital infrastructure and perfect public and social services. Our country, nevertheless, lacks a single state normative and categorical apparatus regulating all relations in the sphere of digital economy. This situation, therefore, provokes quite a number of problems (Vinnyk O., 2017) connected with unification of special digital economy terminology and their confirmation in a single normative and legal act. The need in specifying digital economy terminology is grounded by Strutynska I.V. (2019). The researcher arrives at the conclusion that digital transformation of state economy will provoke digital transformation of business and its active participation in the development of digital economy of the country. Digital economy is developed with colossal rapid-

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ness transforming radically the very gist of business. It materializes, demonetizes and democratizes all branches of national economy (Hudz O.Ye., 2018). Digital economy is the newest vector of reconstruction of traditional economy (Putsenteilo P.R., Humeniuk O.O., 2018) and gets the ability to guarantee its rapid growth. The scholars also state that digital economy is based on data, mobility, cloud services, the freshest information, digital education focused on training specialists of radically higher level and digital medicine focused on cutting costs in giving services and improving them. (Putseteilo P.R., Humeniuk O.O., 2018).

Digital economy has a colossal effect on the development of national and international economies (Karcheva H.T., Ohorodnia D.V., Openko V.A., 2017) and provides challenges and abilities of digital transformation (Artemyeva I.O., 2019).

Peculiarities of the development of digital economy in Ukraine focused on the indices of digitalization according to the instruments of estimation of the development of digital economy and society within European Community (the so called digital panel) are studied by Zhekalo H.I. (2019). The given direction of research was also joined by Maletska O.I. and Shilberg H.V. (2019) who distinguished Ukraine prospects in digital economy. Some researchers analyze global ratings of estimating foundation and development of digital economy and the position of Ukraine there. Our research is a logical accessory to the mentioned above ideas. We analyze there positions of the countries neighboring with Ukraine in the rating illustrating their competitiveness of digital economies.

Analysis of digital economy needs discussion of such a concept as a protectionism in different forms. Digital neo-protectionism is in the focus of attention of Panchenko V., Reznikov N. and Bulatova O. (2020). These researchers state that digital neo-protectionism is an instrument of public interference and is directed at economic strengthening of the country by means of the development of new comparative advantages under conditions of digital economy foundation. The given approach is implemented through a complex of stimulating and discriminative measures. Stimulating measures foresee stimulation, foundation and development of new sectors, designing new means of production, producing new commodities, suggesting new services and promoting new business models. On the other hand, discriminative measures mean introduction of various barriers for digital trade including censorship, filtration, localization instruments and regulation for the sake of protecting privacy.

Trends of digital economy foundation, in our opinion, should be considered as an economy of new business models and new markets and guarantees competitive supply of commodities and services. (Kulynych M., 2019).

The mentioned above researchers made a colossal contribution to the development of theoretical and methodological positions of digital economy. Nevertheless, in spite of a rather great number of researchers dealing with competitiveness and digital technologies, the problem of competitiveness of Ukraine under conditions of digital economy has not been completely examined up till now.

This problem is vital and actual and our article is aimed at some of its aspects, in particular the level of competitiveness of Ukraine under conditions of digital economy. The results of our research will contribute to the developments initiated by Ukrainian and foreign scientists working within theoretical and methodological area of formulating the indices which will be able to determine systematically the level of competitiveness of different countries in digital economy.

Our research was made in two directions. Firstly, we studied and examined determinants of the development of indices of competitiveness of the country. Secondly, we researched and analyzed determinants of digitalization. The article comprises three parts. The First part studies indices of competitiveness of the countries. The Second part discusses indices of the countries digitalization. And, finally, the Third part suggests a polygonal model of competitiveness of countries by the indices of digitalization which effect the level of competitiveness of neighboring countries.

Our scientific article solves the following problems:

- Researching position of Ukraine and its neighboring countries in the rating of global index of competitiveness of countries;
- Comparison of the position of Ukraine and its neighboring countries in the general ratings of competitiveness of countries;
- Analysis of dynamics of modifications of indices of the countries under research in the rating of countries by the level of digital economy;
- Construction of the polygonal model of competitiveness of countries by the indices of competitiveness of digital economy.

The principal positions of the scientific novelty of our research lie in working out of the conceptual area of the long-term development of competitiveness of countries by indices of digitalization and, thus, we present here our system of scientific opinions on the content and methodology of transformation of digital economy according to the challenges of digital transformation.

This article continues the research of domestic and foreign scientists in the direction of building a polygon of the competitiveness of countries based on indicators of the competitiveness of the digital economy, pointing to the best practices of neighboring countries of Ukraine, which have to a certain extent similar resources: informational, economic, digital and can be an example for Ukraine to follow in this direction.

MATERIALS AND METHODS

Competitiveness of the country is a complex and multi-form concept reflecting a totality of comparative advantages in various spheres (economic, political, digital, information, etc.) Their combination formulates more stable position of the state in the rating of indices of competitiveness for the corresponding period comparing with the determined competitors. To estimate competitiveness of the country by the indices of digitalization we suggest our methods of calculat-

ing integral index. The gist of methods lies in plotting the following matrix:

$$X = \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \dots & \dots & \dots & \dots \\ x_{m1} & x_{m2} & \dots & x_{mn} \end{bmatrix} \quad (1)$$

where x_{ij} – value of j -ro index in i -country.

Each line of the given matrix demonstrates real value of indices of competitiveness of the chosen countries. Each column suggests names of the chosen criteria and indices for the whole totality of the objects of research.

The initial data for the estimation of competitiveness, as a rule, are not similar and they are characterized by different values (units and dimensions). Therefore, we unify them by the following formula.

$$Z_{ik} = \frac{x_{ik} - \bar{x}_k}{S_k} \quad (2)$$

where Z_{ik} – standardized value of a characteristic k for i -country; x_{ik} – value of characteristic k for i -i country; \bar{x}_k – arithmetical mean of the characteristic k ; S_k – standard deviation of the characteristic .

The value Z_{ik} , thus, has a zero mean value and a unitary variance.

The suggested approach foresees the application of global indices of competitiveness of the country. Generally, according to the theory of the Polish researcher V.Plut (1980) all indices are divided on stimulators (their enlargement means the increase of the value of the resulting index) and unstimulators (their enlargement means decrease of the value of the resulting characteristic). Division of characteristics on stimulators and unstimulators precedes the plotting of the “standard” of each criterion and index of competitiveness which may be determined by the vector $E=(e_1, e_2, \dots, e_n)$:

$$e_i = \max z_{ij} \quad (3)$$

In other words, j - is a component of the standard E – the best normalized value of j - index in the analyzed totality of objects.

The next step is a determining vector “anti-standard” $A=(a_1, a_2, \dots, a_n)$:

$$a_j = \min z_{ij} \quad (4)$$

Thus, j -compound of the vector A – the worst normalized value of j -index in the analyzed totality of objects. Accordingly, for any i - country standardized value of j -index meets the condition.

$$a_j \leq z_{ij} \leq e_j \quad (5)$$

The distance between standard and anti-standard is determined by the formula:

$$d = \sqrt{\sum_{j=1}^n (e_j - a_j)^2} \quad (6)$$

The distance standardized vector of competitiveness of the country to anti-standard is determined by the formula:

$$d_i = \sqrt{\sum_{j=1}^n (z_{ij} - a_j)^2}; i=1,2,\dots, m, \quad (7)$$

The higher value d_i , the further anti-standard (near standard) is i -country. At this $d_i \leq d$, d_i will be equal d_i only when i -country has maximum value in each value.

Taking into consideration all the said above, we suggest the following value as an integral index of the level of the country competitiveness in the indices of digitalization:

$$W_i = (d_i / d) * 100 \%; i=1,2,\dots, m, \quad (8)$$

Thus, the value W_i reflects in per cents the level of efficiency of i -enterprise concerning the standard ($0 \leq W_i \leq 100$).

Taking into consideration the fact that initial indices of the competitiveness estimation have various specific weights one should make their hierarchical structure. The first index should have much larger index of a specific weight.

Let $p_j = (j = 1, 2, \dots, n)$ – specific weight of j -index of competitiveness. Moreover, $\sum_{j=1}^n p_j = 1$.

We introduce here diagonal matrix P .

$$P = \begin{bmatrix} p_1 & 0 & \dots & 0 \\ 0 & p_2 & \dots & 0 \\ 0 & 0 & \dots & 0 \\ 0 & 0 & \dots & p_n \end{bmatrix}; \sum_{j=1}^n p_j = 1, \quad (9)$$

Multiplication of matrix X on matrix P results in matrix x :

$$\tilde{x} = \begin{bmatrix} x_{11} & p_1 & x_{12} & p_2 & \dots & x_{1n} & p_n \\ x_{21} & p_1 & x_{22} & p_2 & \dots & x_{2n} & p_n \\ \dots & \dots & \dots & \dots & \dots & \dots & \dots \\ x_{m1} & p_1 & x_{m2} & p_2 & \dots & x_{mn} & p_n \end{bmatrix}, \quad (10)$$

Where \tilde{x}_{ij} – weighted value of j -index of competitiveness for i - enterprise. Methods of all other calculations stay the same, except on the alteration of matrix X on matrix \tilde{x} .

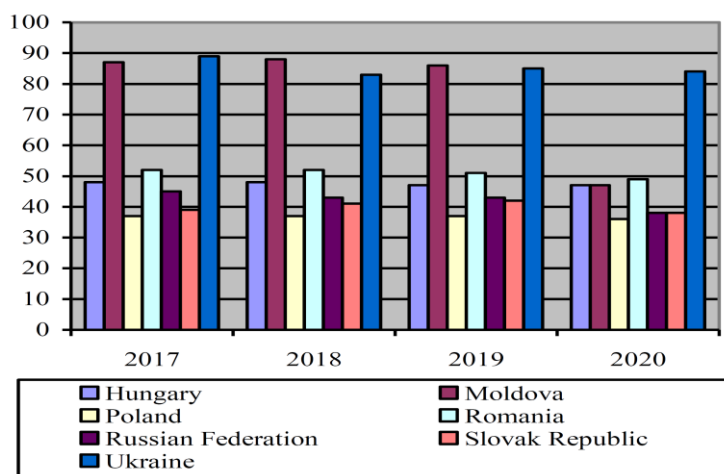


Fig. (1). Dynamics of Alteration of Global Competitiveness Index for 2017-2020.

The advantages of the given methods are the opportunity of analysis of large volumes of data, consideration of stimulant and unstimulant impacts on the chosen characteristics on the final result, possibility of combination and applying criteria and indices and different levels of specific weights and objects of research on various levels.

Our polygon model of competitiveness is the graphical scheme of connecting estimations of positions of the output of enterprises and their competitors by the most important parameters and allows to compare those parameters. Each axis of the coordinative plane characterizes a certain factor. Quantitative value of every mentioned above factor is depicted in the form of dots. Having connected all dots we get our polygon model of competitiveness. The advantages of this method is its simplicity and demonstrativeness in determining distinctions among competitors by means of a certain criterion. In spite of the fact that polygon method is rather popular, it has some drawbacks. As all the mentioned above factors are suggested to discuss as equivalent ones for estimation, we, then, do not have the opportunity to determine correctly generalized index of competitiveness (Syta Ye.M., 2019).

Method of radars is based on constructing a polygon model with axes which correspond to indices of competitiveness. When using the given method we divide the circle on equal sector. The number of sectors correspond to the number of indices of competitiveness of the output. Enlargement of the value of index corresponds to removal from the centre of the circle. To compare countries-competitors radars are placed on a single circle.

RESULTS AND DISCUSSION

1. Research of Global Level of Competitiveness

Our state administration and business structures should obtain correct guidelines and indices corresponding to world guidelines and trends to be able to choose their correct strategies. Ratings of determining competitiveness indices of economies and digital technologies are, then, of a prime importance. We mean here such leading international institutions as: World Bank, European Bank of Reconstructions

and Development, UNO organizations, etc. Those institutions recommend to use advanced methods of researching world economy competitiveness under conditions of COVID-19 pandemia and global digital transformation.

The competitiveness of Ukraine on the world market is of great practical importance for improving its economic position: substantiation and use of the best advanced practices of digitalization and transformation of modern society, development of Ukraine for the short and long term, increasing authority in the international environment. The country's international digital competitiveness provides new opportunities that allow the state to develop in the field of digitalization, circular economy, innovation, investment and provide effective protection against cyber attacks.

The most wide-spread index here is, perhaps, the world rating of competitiveness basing upon 334 criteria chosen in the result of all-round examination with the use of various economic sources and current scientific publications. Those criteria are regularly reviewed and refreshed and react on each new theoretical idea, research, data and development of digitalization (World Competitiveness Ranking).

To determine Ukraine Competitiveness Ranking we shall compare our country data with the data of its neighboring countries: Belorussia, Hungary, Moldova, Poland, Romania, Russian Federation, Slovak Republic. Dynamics of alteration of Global Competitiveness Index is presented in Fig. (1).

As we see, according to Fig, the best positions occupied by Ukraine were in 2017. In the group of the researched countries Ukraine was a leader in 2017, but in 2019 Moldova obtained the higher results. The worst indices among others belonged to Poland. For the last three years the situation has been preserved unchanged. In 2020 the positions of Moldova regarding the Global Competitiveness Index are changing in a negative direction. Even with the Covid-19 pandemic, Ukraine maintains a leading position. However, a significant obstacle to the development of the Global Competitiveness Index in Ukraine is the presence of high administrative restrictions for entering and exiting the foreign market. The indicators of Poland and Hungary are quite unchanged during the studied period.

Table 1. Index of Economic Freedom in 2017-2021 (According to 2021_IndexofEconomicFreedom).

Country	2017	2018	2019	2020	2021	Index Deviation in 2020-2021
Belarus	71,3	74,1	75	76,4	75,9	4,6
Hungary	64	61,8	61,1	60,2	59,9	-4,1
Moldova	65,9	66	67	68,1	66,2	0,3
Poland	67,8	67,2	65,4	62,6	61,6	-6,2
Romania	65,9	65,2	63,1	58,6	59,7	-6,2
Russian Federation	74,8	77	78,4	80,2	84,1	9,3
Slovak Republic	64,9	63,9	61,3	55,3	55,6	-9,3
Ukraine	62,1	62,7	66,1	61,3	63,5	1,4

Table 2. Index of Labor Freedom.

Country	2017	2018	2019	2020	2021	Index Deviation in 2021 - 2017.
Belarus	74,6	73,1	75,3	74,8	75,7	1,1
Hungary	64,4	68,7	64,7	64,6	64,8	0,4
Moldova	38,9	39,9	39,0	37,0	39,2	0,3
Poland	61,5	63,9	63,9	62,0	66,1	4,6
Romania	62,5	66,8	64,5	63,0	63,6	1,1
Russian Federation	50,8	52,0	52,5	52,1	55,4	4,6
Slovak Republic	54,4	54,0	53,4	52,6	52,2	-2,2
Ukraine	48,8	52,8	46,7	48,3	48,7	-0,1

Calculation of the named above index is based on the methods integrating the latest statistic data of international organizations and polls of managers. We shall try to research Ukraine competitiveness by the indices of competitiveness of digitalization in the group of the countries including Ukraine and its neighbors.

2. Research of the General Economic Ranking of Competitiveness

For economy of each country Index of Economic Freedom is of an extreme importance, as this index illustrates the level of protecting various rights within conducting business. This index considers the following indices: of protection of ownership rights, legal efficiency, honesty and transparency of authorities. Economic freedom is characterized by conducting balanced budget policy securing various public costs and preventing state default. Economic freedom includes conditions for business and conducting foreign trade (import and export). Dynamics of alterations of Index for 2017-2021 is presented in Table 1.

Thus, according to Table 2, Hungary worsened its position on 4,1 points, Poland and Romania on 6.2, Slovak Republic on 9,3 points. Improvement of their positions in case with

Index of Business Freedom is observed with Russian Federation (9,3 points) and Belorussia on 4,6 points, correspondingly. Though Ukraine improved its positions on 1,4 points, it did not manage to reach the highest level of 2018. Improvement of the given index for Ukraine is possible only under conditions of liberalization of conducting business and providing transparency of authorities and domination of law. These conditions both guarantee businessmen support in force majeure situations with COVID-19 pandemia and strengthening Ukrainian economy in total and accelerating its growth.

Another index having a colossal importance is Index of Labor Freedom which considers different aspects of normative and legal base of labor market in the country. The given index considers norms of minimum wages, laws forbidding discharging of workers, demands for severance pays and measured normative limits concerning recruiting and the worked time. Dynamics of Index for 2017-2021 presented in the Table 2.

According to the data of Table 2 we may say that Index of Labor Freedom increased on 4,6 points in Poland and in Russia, on 1,1 in Belorussia and Romania. Negative trends of Index of Labor Freedom are observed in Slovak Republic.

Table 3. Index of Monetary Freedom.

Country	2017	2018	2019	2020	2021	Index Deviation in 2021-2017
Belarus	60,4	62,3	67,0	69,8	70,2	9,8
Hungary	91,7	91,6	81,8	79,9	78,8	-12,9
Moldova	72,0	73,2	73,5	72,0	71,5	-0,5
Poland	84,7	85,0	82,1	82,0	80,8	-3,9
Romania	83,6	82,8	82,7	78,1	77,7	-5,9
Russian Federation	57,3	60,8	65,1	68,2	67,3	10,0
Slovak Republic	81,1	81,0	78,6	75,9	74,8	-6,3
Ukraine	47,4	60,1	58,6	63,0	65,8	18,4

Table 4. Index of Trade Freedom.

Country	2017	2018	2019	2020	2021	Index deviation in 2021 - 2017
Belarus	80,6	81,4	76,4	82,0	76,0	-4,6
Hungary	87,0	86,9	86,0	86,4	84,0	-3,0
Moldova	80,0	78,3	78,0	78,0	76,8	-3,2
Poland	87,0	86,9	86,0	86,4	84,0	-3,0
Romania	87,0	86,9	86,0	86,4	84,0	-3,0
Russian Federation	75,2	79,4	77,8	77,8	74,0	-1,2
Slovak Republic	87,0	86,9	86,0	86,4	84,0	-3,0
Ukraine	85,9	81,1	75,0	81,2	79,2	-6,7

Another index determining, in our opinion, rating of competitiveness of the country is Index of Monetary Freedom. Index of Monetary Freedom is a cumulative index of parameter of measure of tariff and non-tariff barriers effecting import and export of commodities and services. . It lies in rapid reaction on price tendencies which, probably, appear independently. Index of monetary freedom is based on two the most important indices: level of inflation and price policy, Dynamics of Index of Monetary Freedom for 2017-2021 is presented in Table 3.

According to Table 3 the fastest rates of this index data for 2017-2021 are observed in Ukraine (18,4 points). For the period under research positions were improved by Russia and Belorussia (on 10,0 and 9,8 points, accordingly). As far as Hungary is concerned, its position dropped on 12,9 points. Index of Monetary Freedom has a close connection with Index of Trade Freedom. Countries with the higher level of trade freedom secure their adequate development, because their markets get better opportunities to accelerate and strengthen dynamic increase through effective distribution of resources, development of costs and introducing innovations. Dynamics of Index of Trade Freedom for 2017-2021 is presented in Table 4.

Thus, according to the data of the Table 4, we observe worsening of values of Index of Trade Freedom in all countries under research. The worst values of Index of Trade Freedom decreasing are observed in Ukraine (on 6,7 points) and in

Belorussia (on 4,6 points). Trade freedom should be implemented according to agreements on free trade among two and more countries or parties. These agreements became the basic element of international trade policy from the moment of foundation of World Trade Organization 25 years ago, (David Hyperlink 2021).

3. Research of Indices of Digital Economy

Digital economy foresees digital transformation of all spheres of life and gives them a considerable economic and social effects opening fresh powerful opportunities both for the state and public. (Pugachevska K.J., Pugachevska K.S., 2018).

Digital economy is characterized by functioning of Cyberlaw providing conditions of solving a number of problems connected with current threats and dangers. Cybercrimes often formulate threats for vitally important infrastructure and are made by means of computer systems or computer nets and other means of access to virtual space against computer systems, computer nets and computer data.

A vital function in digitalization is displayed by Index of Cyber Security. Generally, Cyber Security got global scale. It is characterized by methods of defending various branches of activity connected with monitoring challenges caused by dealing with computer nets, their confident, total and available operations.

Table 5. Indices of the Level of Digitalization, 2020 (Systemized by Soumitra Dutta and Bruno Lanvin.

Country	Global Cyberlaw Tracker	E-Participation Index	Global Cyber Security Index
Belarus	75	74,07	50,57
Hungary	100	66,67	91,28
Moldova	75	75,31	76,78
Poland	100	96,3	93,86
Romania	100	82,24	76,29
Russian Federation	25	86,42	98,06
Slovak Republic	100	69,14	92,36
Ukraine	100	80,24	65,93

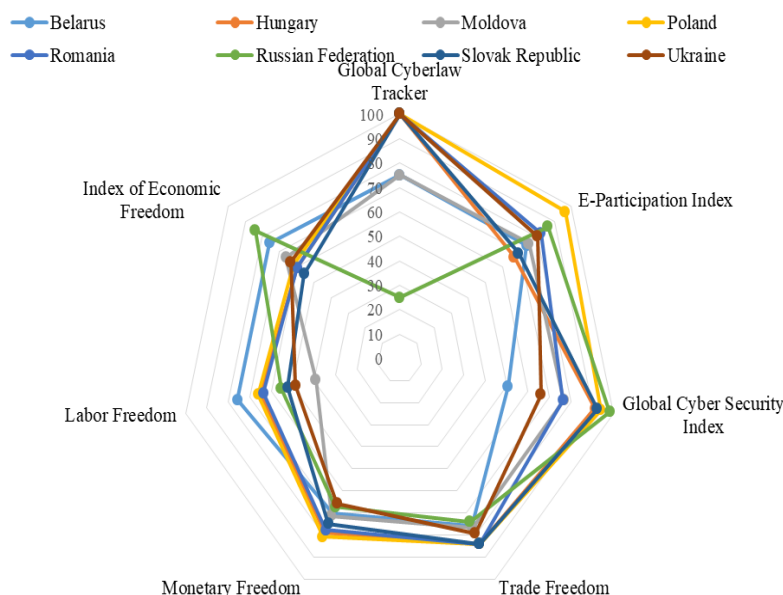


Fig. (2). Polygon Model of Competitiveness of Digital Economy of Countries.

Digital economy is also characterized by Index of Electronic Participation (EPI). It proves to be the key index for determining the level of administration power as one of the basics of the stable development. EPI is valued by means of analysis of the level of national portals of electronic administration or other administrative platforms dealing with giving actual information to people, public consultations and accepting decisions.

Data of discussed above values for 2020 are systemized in the form of Table 5.

Thus, digital economy provides transition of all economic branches of the country into digital technologies being focused on the best positions in the rating of competitiveness of a country. Traditionally, digital economy is considered as production, trade and provision of products by electronic nets.

Goldfarb, Avi, and Catherine Tucker (2019).point to the following five concepts mostly effected by digitalization: search costs, replication costs, transportation costs, tracking costs, and verification costs. Nevertheless, those are not all spheres of life with ability to get a positive effect of digitali-

zation. We should stress here, that digital economy is not able to function as a separate and independent instrument or an institute of national system of activities. It should distinctly monitor some standards and rules regulated by normative and legal acts, mostly for protecting rights of consumers and state management and for the adequate level of cyber security. Therefore, one should pay the prime attention to raising the level of competitiveness of digital economy.

4. Research of the Level of Competitiveness of Digital Economy of Countries

To determine the level of competitiveness of digital economy of countries we take into consideration the indices which are vital for determination of the level of their development. We choose here the main indices which, in our opinion, show the level of competitiveness of digital economy of a country: Labor Freedom, Trade Freedom, Monetary Freedom, Index of Economic Freedom, Global Cyberlaw Tracker, E-Participation Index, Global Cyber Security Index.

On the basis of the given indices and application of Exsel program we formulate a polygon model of competitiveness of digital economy of a country (Fig. 2).

We shall determine the area of a radar of the country- stand-ard.

$$S = \pi R^2 = 3,14 \times 100 = 3140$$

The area of different countries in a polygon model of competitiveness of digital economy of countries is determined by the formula

$$S_{radar\ i} = \frac{\pi}{I} \sum_{i=1}^n r^2 ()$$

Accordingly:

$$S_{\text{Belarus}} = x (75^2 + 74,07^2 + 50,57^2 + 75,9^2 + 75,7^2 + 70,2^2 + 76^2) = 16087,58 \text{ (cm}^2\text{)}$$

$$S_{\text{Hungary}} = x (100^2 + 66,67^2 + 91,28^2 + 59,9^2 + 64,8^2 + 78,8^2 + 84^2) = 19660,62 \text{ (cm}^2\text{)}$$

$$S_{\text{Moldova}} = x (75^2 + 75,31^2 + 76,78^2 + 66,2^2 + 39,2^2 + 71,5^2 + 76,8^2) = 15305,86 \text{ (cm}^2\text{)}$$

$$S_{\text{Poland}} = x (100^2 + 96,3^2 + 93,86^2 + 61,6^2 + 66,1^2 + 80,8^2 + 84^2) = 22353,12 \text{ (cm}^2\text{)}$$

$$S_{\text{Romania}} = x (100^2 + 82,24^2 + 76,29^2 + 59,7^2 + 63,6^2 + 77,7^2 + 84^2) = 19416,83 \text{ (cm}^2\text{)}$$

$$S_{\text{Russian Federation}} = x (25^2 + 86,42^2 + 98,06^2 + 84,1^2 + 55,4^2 + 67,3^2 + 74^2) = 16981,32 \text{ (cm}^2\text{)}$$

$$S_{\text{Slovak Republic}} = x (100^2 + 69,14^2 + 92,36^2 + 55,6^2 + 52,2^2 + 74,8^2 + 84^2) = 18740,39 \text{ (cm}^2\text{)}$$

$$S_{\text{Ukraine}} = x (100^2 + 80,24^2 + 65,93^2 + 63,5^2 + 48,7^2 + 65,8^2 + 79,2^2) = 16952,16 \text{ (cm}^2\text{)}$$

Calculations of the areas of the levels of competitiveness of digital economy of countries is systemized in the form of Table 6.

Table 6. Rating of Countries by the Level of Competitiveness of Digital Economy.

Country	Areas of Polygons	Rating of Countries by the Level of Competitiveness
Belarus	16087,58	7
Hungary	19660,62	2
Moldova	15305,86	8
Poland	22353,12	1
Romania	19416,83	3
Russian Federation	16981,32	5
Slovak Republic	18740,39	4
Ukraine	16952,16	6

Thus, according to Table 6, the highest position in the formulated rating of countries by the level of competitiveness of digital economy is taken by Poland with the largest area of a polygon (22353,1). The worst achievements are got by Moldova (15305,86). Ukraine is not able to demonstrate the best results, either, having obtained the 6th position in the group of countries under research.

CONCLUSION

To raise the level of competitiveness of digital economy one should recommend the countries to be focused on their problematic aspects, especially on those indices having the low values. To improve its indices, Poland should be concentrated on solving problems connected with the lack of labor force. Within digitalization problems one must pay more attention here to automation of industrial operations and consider more actively the factor of virtual reality. Computer technologies must be implemented at the working places in complicated industrial operations, in new methods of work, communication and cooperation within a single enterprise. Technologies of artificial intellect foresee abilities of calculative means to solve independently complex industrial problems. Due to constant increase of computers efficiency and development of technologies of machine training, large volumes of digital data became a rich material of artificial neuron nets.

To improve index of Labor Freedom is a must for the researched countries, especially for Moldova with its last positions by the given index. This country should apply instruments of Gig –Economy with its opportunities in radical modifying the very character of employment. Gig-Economy is characterized by a large number of short-term and temporary working positions occupied by independent contractors. It also allows to employ free-lancers by means of digital platforms. This sort of employment gets its advantages both for organizations and contractors. The gist of this phenomenon lies in transition from engaging people on the full-time working positions by one employer to temporal projects of different companies applied by a single independent worker.

The most important task facing Ukraine is to improve its Global Cyber Security Index. One should regulate legislative basis, provide the country with implemented and planned projects on this point, raise the level of readiness in reacting on cyber attacks and pay maximum attention to the centralization of headquarters of the forces of deployment dealing with cyber incidents on the national level.

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