Human Potential Innovatization Analysis: the System of Crisis Management Determinants Context

Liubov Halkiv[1], Oleh Karyy[1] , Ihor Kulyniak[1] , Yaroslav Kis[1] and Alexander Adamovsky[1]

[1]*Lviv Polytechnic National University, Stepan Bandera str, 12, Lviv, 79013, Ukraine*

Abstract

Innovatization in the modern world plays the role of a social progress driver, a factor in increasing the socio-economic security level and a stimulator of territorial social systems crisis-free development. The key role in innovation processes intensification is played by: education, knowledge, research activities. In this article, the authors form subsystems of indicators that characterize the education, knowledge, research components at the country level, carry out their integrated evaluation. Based on integrated assessments, the index of human potential innovatization was built and countries were clustered according to its value in 2018-2020. Contingency tables analysis proved that countries with a high human resource innovatization index are more likely to show a chance to further increase this level. With the help of correlation-regression analysis, it is proved that GDP per capita (the crisis state of the economy indicator) significantly depends on the value of the human potential innovatization index.

Keywords

indicators analysis system, human potential, innovation development, crisis management, cluster analysis, regression analysis, contingency tables analysis, content analysis, time-series analysis

1. Introduction

The issue of anthropocentrism in crisis management is not new. Thus, the founders of management theory stated that the key factors in crisis prevention at the enterprise level should include: the willpower of the leader, his leadership position, ability to quickly unite subordinates, stress resistance in extreme situations, and others. The development of science has expanded the field of research in crisis management but has not diminished the importance of the human factor. Today, in addition to the micro (enterprise) level, this issue is also actively studied at the meso (sectoral or regional) level; macro (state) level; megamacro (interstate formations) level; global (world) level. Its popularity is due to the growing role of human potential in the social transformation factors system. At this time it is a necessary task of empirical research implementation to develop crisis management science in terms of assessing the qualitative human potential characteristics in the context of the impact on crisis-free territorial social system development.

In a socially positive sense, crisis management considers a human in three ways: as the main object of protection in a crisis; as a factor in preventing (warning) crises in the tactical and strategic dimensions; as a direct generator, implementer, and controller of management decisions in crises. In a socially negative sense, a human can be seen as a crisis phenomena activator.

The new realities are marked by the establishment of an innovation paradigm, the core elements of which are: intelligence, knowledge, innovation. The world's leading economies have focused on

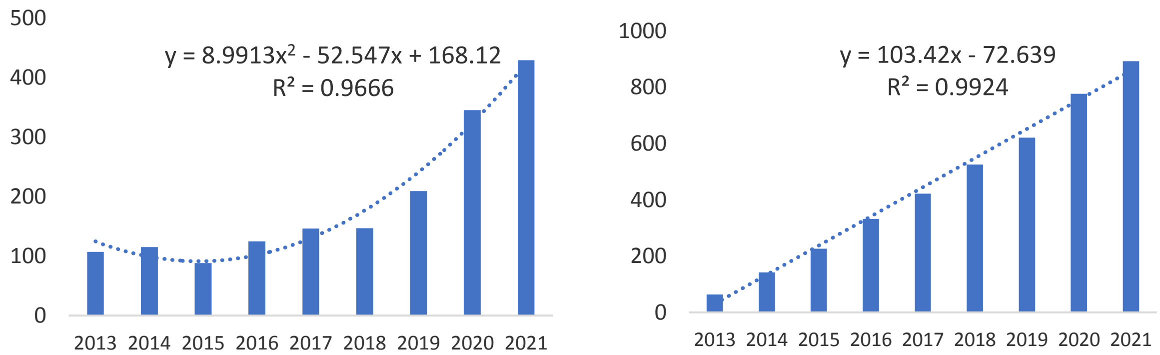
COLINS-2022: 6th International Conference on Computational Linguistics and Intelligent Systems, May 12–13, 2022, Gliwice, Poland
EMAIL: lubov.i.halkiv@lpnu.ua (L. Halkiv); oleh.i.karyi@lpnu.ua (O. Karyy); ihor.y.kulyniak@lpnu.ua (I. Kulyniak) yaroslav.p.kis@lpnu.ua (Y. Kis); oleksandr.m.adamovskyi@lpnu.ua (A. Adamovsky)
ORCID: 0000-0001-5166-8674 (L. Halkiv); 0000-0002-1305-3043 (O. Karyy); 0000-0002-8135-4614 (I. Kulyniak); 0000-0003-3421-2725 (Y. Kis); 0000-0003-3515-4635 (A. Adamovsky)

strategies to increase competitiveness through innovation. Achieving such a strategic goal largely depends on the qualitative characteristics of human potential. The system of human potential characteristics highlights subsystems that provide the opportunity to learn new things, accumulate knowledge, generate and implement innovations. The quality of such subsystems, providing competitive advantages to the country, helps to strengthen its economic security and, consequently, reduces the risks of economic crisis.

In this paper, the authors focused on building and testing a methodological approach to analyzing differences in the levels of innovatization of the country's human potential. Based on this, the authors aim to prove that high levels of human potential innovatization prevent the crisis of the country's economy.

2. Related Works

The crisis management system of determinants usually includes those that identify threats to the enterprise’s bankruptcy. However, the issue of the human factor is increasingly being raised in crisis management. Thus, the content analysis of the domestic researchers’ works in the crisis management field for 2020-2021 revealed that in today's realities, the focus of scientists is also determinants related to staff qualifications, stability, and security (L. Kartashova, M. Kirichenko, T. Sorochan [1] S. Kapitanets, N. Varenia, O. Korolchuk, T. Kulinich, O. Kilnitska, H. Holovchak [2]), with threats to the human capital of certain sectors of the economy (T. Charkina, D. Nechay, M. Mnatsakanyan [3]), with the country's legislative initiatives to reduce population losses (A. Borisov, E. Litvinovsky [4]), with the conditions of the coronavirus pandemic (T. Sergienko [5]), etc. In favor of human resources, importance in crisis management testifies an annual volume of the array of publications increase in the period between 2013-2021, the value of which was provided by information platforms Scopus and GoogleAcademy for relevant search queries (Figure 1).



query “human AND potential AND crisis”, English-speaking to Scopus

query “human AND crisis”, Ukrainian-speaking to Scholar.Google

Figure 1: Dynamics of the array of publications volume in 2013-2021
Source: created by the authors according to [6; 7],

Human potential in a broad sense, as rightly noted by T. Stepura [8], should be understood as an objectively determined, quantified integrated set of qualitative human qualities and associations of people that are formed and can be activated under certain conditions of their environment (life and work), and indicate the possible limits of their involvement in economic activity, consumption, self-development, as well as for further reproduction of human components and their associations for economic, social, spiritual progress, happy life, human development. Human potential, transforming into human capital, contributes to the economic development of the country, strengthens its social security [9; 10]. The authors of the National Report “Sustainable Human Development: Ensuring Justice” [11] state that there are the qualitative characteristics of human potential that form the basis for the adoption of a new “philosophy of economic growth” that maximizes social effects, increases socio-cultural values. According to N. Rushchyshyn et al. [12], A. Lutsenko et al. [13] to strengthen social security, public authorities must make significant efforts to establish effective mechanisms for fiscal regulation and financial security. In turn, according to many researchers [14; 15; 16], the level of financial and economic stability of the territorial social system provides opportunities for human development, helps to reduce its migration losses. A positive aspect of the implementation of the reform is the creation of incentives for territorial communities to use their social and economic potential effectively [17].

In the XXI century, the financial and economic security of territorial social systems, their crisis-free development is not possible without a solid foundation laid through effective innovation processes in various spheres of public life. The bearers of human potential are the generators of innovative ideas. The potential of the population of a certain territorial social system for innovation depends on the effectiveness of the education system in general, including the higher education system [18; 19]. There are many studies on the impact of innovation on the territorial social systems crisis-free development [20; 21]. According to D. Moleiro [22] the social structure, along with the territory, as a resource to be exploited, and the patterns of cooperation conceive impacts on regional innovation through the new social relationships enhanced by social innovation, as a model of local social innovation. The team of authors (O. Prokopenko et al. [23]) in this context operate with the concept of innovation security. One of the main factors that led to the introduction of innovations in the direction of social security is the the COVID-19 pandemic [24; 25].

Unlike other researchers who focus on the problems of studying human potential, crisis management, innovation development, the authors of this study focus on combining these three problems. They focus on analyzing the system of indicators, which reflects the human potential innovation, building integrated assessments of the country’s innovation level, and justifying the impact of this level on the crisis-free development of the economy.

3. Methods

In the course of the research, the authors used a set of scientific methods. In particular, to substantiate the feasibility of studying human potential in the system of determinants of crisis management, the authors used the methods of content analysis and bibliographic analysis. Their application allowed the authors to determine the volume of the array of publications presented on the information platforms Scopus and GoogleAcademy on the search queries “human AND potential AND crisis” and “human AND crisis”, respectively. This volume of publications was determined annually in the period from 2013 to 2021. The authors applied the dynamics modeling method to the obtained time series. The quality of the approximation of the empirical data dynamics model was evaluated by the value of the coefficient of determination (R^2). To calculate R^2, the authors used the method based on the trend line in a correlation field built on MS Excel sheet.

For the generalized assessment of human potential innovatization state in some countries, the method of integrated assessment was used, which provided for the procedure of components of the system of indicators standardization and averaging.

To assess the country's human potential level of innovation in the context of crisis management, we have built a methodological approach. The first stage involves an integrated assessment of the human potential innovation state in the form of an index. This index (*IIHP*) is based on the values of the system of indicators that form three subsystems (components): 1 – education (EC), 2 – knowledge (KC), 3 – research (RC).

EC covers 2 components:

- education (x_1),
- higher education (x_2).

KC covers 4 components:

- results of knowledge and technologies (x_3),
- intangible assets (x_4),
- field of knowledge workers (x_5),
- absorption of knowledge (x_6).

RC covers 3 components:

- cooperation between the university and the field of R&D (x_7),

- information and communication technologies (x_8);
- research and development (x_9).

The choice of components is determined by the availability of statistical information for 2018-2020, which was developed in the course of this study on the example of 26 countries: Switzerland (C-1); Sweden (C-2); USA (C-3); United Kingdom (C-4); Republic of Korea (C-5); Netherlands (C-6); Finland (C-7); Singapore (C-8); Germany (C-9); France (C-10); Japan (C-11); China (P-12); Brazil (C-13); Thailand (C-14); India (C-15); Bulgaria (C-16); Poland (C-17); Estonia (C-18)); Georgia (C-19); Lithuania (C-20); Moldova (C-21); Ukraine (C-22); Russia (C-23); Uganda (C-24); Zimbabwe (C-25) Bangladesh (C-26).

The direction of influence on the human potential innovatization of all components is stimulating. That is, the greater is each component of the system of indicators numerical value, the higher the level of human potential innovation.

Normalized values of indicators are calculated by the following formula:

$$NO_{Cit} = \frac{K_{Cit} - min(K_{it})}{max(K_{it}) - min(X_{Cit})}, \tag{1}$$

where NO_{Cit} – normalized level for the country with code *C* component indexed by *i* in the year *t*;
KCit – input numerical value for the country with the code *C* component indexed by *i* in the year *t*;
min(Kit) – minimum value of the set of countries component indexed by *i* in the year *t*;
max (Kit) – minimum value of the set of countries component indexed by *i* in the year *t*.

For the generalized (integral) assessment of *IIHP* indicators subsystems the method of averaging with the use of an arithmetic formula is applied:

$$\overline{\mathrm{K}} = \frac{\sum_1^n \mathrm{K_j}}{\mathrm{n}}, \tag{2}$$

where *Kj* – the value of the *j*-th component for indicators subsystem;
n – number of components.

Correlation analysis was applied to the obtained integrated estimates, which was implemented using the MS Excel “Data analysis” procedure, and the distribution was checked according was checked by the Shapiro-Wilk test of normality. To distinguish groups of countries by the level of human potential innovatization, the authors used the method of cluster analysis, which was implemented using the Statistica™ software.

To substantiate the chances of increasing the level of human potential innovatization with high-quality human potential, the method of four-cell contingency tables analysis was used, which involved the calculation of quadratic contingency (χ^2). The validity of the relationship between the level of human potential innovatization and the quality of human potential is based on Crammer's V test, and the substantiation of the level of the materiality of the conclusions is based on the exact value of the (bilateral) Fisher's exact test.

The method of regression analysis was used to assess the dependence of the gross domestic product of the country on the level of human potential innovatization. The parameters of the regression models were determined using the procedure “Data Analysis” MS Excel. The authors used tabular and graphical methods to compactly present and visualize the study data.

4. Results and Discussion

Understanding the conditions for activating the potential human development requires the processing of scientific approaches to understanding its structural composition. As is known, subpotentials (human potential components) are highlighted in the aggregate territorial social system human potential. The individual subpotential exists relatively independently. However, being under the influence of interaction with other subpotentials, as well as under the external environment influence of the total territorial social system human potential, the individual subpotential may change.

Even though the leaders of the social wing of potentialism theories have built a solid knowledge foundation in the field of human potential component structure, it is important to realize that the essential characteristics of its components remain ambiguous. This ambiguity is due not only to differences in the views of representatives of different scientific schools on the list of human potential components. It should be emphasized that different works of one scientific school supporters may vary approaches to the separation of human potential components.The main reason for the meaningful understanding of human potential structural composition is the ambiguity of human potential concept interpretation: Despite the repeated use of the phrase “human potential” in scientific and journalistic literature, today there is no single interpretation of this economic and social category [26].

In addition, the progress of scientific thought contributes to the diversification of views on the list of human potential components. Confirmation of this progress is the upward dynamics of scientific publications. Thus, the Scopus web platform search engine [6] on the query "human AND potential" on January 30, 2022, issued more than 5 million documents, including in recent years: 2013 – 89.3 thousand units; 2014 – 97.5 thousand units; 2015 – 104.8 thousand units; 2016 – 111.3 thousand units; 2017 – 118.5 thousand units; 2018 – 127.0 thousand units; 2019 – 138.7 thousand units; 2020 – 159.4 thousand units, 2021 – 173.3 thousand units.

In this study, we will focus on changes in human potential, which is referred to as innovatization. Human potential innovatization should be understood as the process of its components transformation into those that can provide production, accumulation, translation, multiplication of innovations. This process at the macro level requires the state policy and its national security main directions coordination. It is a question of the external and internal interests of the country’s vectors changing to transform innovation into a key basis of social life.

To build integrated estimates, the procedure of the system of indicators components normalizing was used. The normalized values of indicators for 2020, calculated according to formula (1) for the set of researched countries, are given in Table 1. These numerical values vary from 0 (minimum level of the indicator for the country from their set) to 1 (maximum level of the indicator for the country from their set).

Table 1

Normalized values of the system of indicators for the researched set of countries in 2020

C-	1	2	3	4	5	6	7	8	9	10	11	12	13
x_1	0.80	1	0.74	0.79	0.81	0.84	0.97	0.72	0.78	0.84	0.68	0.94	0.69
x_2	0.68	0.61	0.52	0.71	0.71	0.56	0.73	1	0.79	0.61	0.17	0.28	0.27
x_3	1	0.90	0.84	0.80	0.70	0.80	0.81	0.80	0.75	0.63	0.65	0.81	0.23
x_4	0.81	0.70	0.60	0.70	0.81	0.60	0.45	0.43	0.71	0.74	0.59	1	0.24
x_5	0.94	0.98	0.88	0.72	1	0.72	0.83	0.86	0.80	0.74	0.80	1	0.51
x_6	0.69	0.67	0.80	0.51	0.73	1	0.54	0.97	0.51	0.61	0.81	0.77	0.46
x_7	1	0.87	0.97	0.83	0.61	0.94	0.97	0.91	0.87	0.63	0.71	0.59	0.27
x_8	0.88	0.93	0.95	1	1	0.96	0.91	0.99	0.92	0.96	0.95	0.72	0.74
x_9	0.87	0.84	0.88	0.77	1	0.74	0.75	0.80	0.83	0.73	0.85	0.67	0.39
C-	14	15	16	17	18	19	20	21	22	23	24	25	26
x_1	0.50	0.37	0.60	0.77	0.78	0.65	0.69	0.69	0.82	0.73	0	0.49	0.13
x_2	0.45	0.40	0.48	0.49	0.66	0.56	0.57	0.38	0.59	0.69	0.16	0.29	0
x_3	0.14	0.44	0.44	0.40	0.50	0.16	0.30	0.29	0.45	0.29	0	0.04	0.05
x_4	0.29	0.26	0.53	0.25	0.46	0.22	0.26	0.49	0.52	0.28	0.04	0	0.06
x_5	0.38	0.21	0.47	0.49	0.60	0.27	0.46	0.28	0.41	0.49	0	0.02	0.01
x_6	0.63	0.38	0.32	0.45	0.32	0.16	0.15	0.12	0.28	0.45	0	0.07	0.07
x_7	0.54	0.42	0.31	0.21	0.42	0.11	0.53	0.05	0.37	0.40	0.32	0.05	0
x_8	0.48	0.52	0.72	0.80	0.88	0.54	0.74	0.61	0.44	0.80	0.16	0	0.36
x_9	0.19	0.37	0.13	0.37	0.27	0.06	0.21	0.03	0.23	0.45	0.01	0	0.04

Source: calculated by the authors

Generalized assessment for indicators, subsystems and values of *IIHP* for 2018-2020 for the set of researched countries are given in Table 2.

Table 2

Integral assessments of indicators, subsystems and values of *IIHP* in 2018-2020

C-	*EC*			*KC*			*RC*			*IIHP*		
	2018	2019	2020	2018	2019	2020	2018	2019	2020	2018	2019	2020
1	0.672	0.716	0.741	0.812	0.855	0.858	0.868	0.909	0.915	0.821	0.864	0.870
2	0.694	0.759	0.803	0.724	0.789	0.813	0.850	0.878	0.880	0.776	0.825	0.841
3	0.455	0.571	0.628	0.632	0.725	0.781	0.915	0.935	0.930	0.738	0.801	0.830
4	0.692	0.728	0.749	0.593	0.657	0.681	0.886	0.873	0.867	0.734	0.761	0.771
5	0.650	0.736	0.757	0.678	0.723	0.809	0.850	0.877	0.868	0.751	0.793	0.830
6	0.668	0.612	0.700	0.797	0.770	0.779	0.870	0.864	0.879	0.815	0.794	0.815
7	0.768	0.821	0.849	0.667	0.707	0.658	0.868	0.853	0.873	0.767	0.784	0.775
8	0.878	0.838	0.859	0.742	0.751	0.763	0.914	0.897	0.899	0.834	0.826	0.834
9	0.616	0.773	0.783	0.656	0.675	0.693	0.844	0.869	0.870	0.735	0.772	0.782
10	0.637	0.675	0.729	0.570	0.637	0.679	0.720	0.752	0.771	0.644	0.692	0.726
11	0.507	0.449	0.427	0.603	0.652	0.715	0.826	0.849	0.834	0.691	0.717	0.736
12	0.548	0.557	0.611	0.815	0.857	0.895	0.610	0.661	0.657	0.694	0.736	0.758
13	0.387	0.441	0.477	0.303	0.323	0.360	0.431	0.522	0.465	0.369	0.424	0.420
14	0.381	0.455	0.475	0.305	0.331	0.359	0.380	0.447	0.404	0.346	0.396	0.392
15	0.299	0.342	0.385	0.205	0.253	0.320	0.441	0.525	0.435	0.320	0.384	0.378
16	0.454	0.488	0.540	0.416	0.391	0.440	0.316	0.405	0.389	0.376	0.408	0.428
17	0.556	0.601	0.631	0.364	0.394	0.398	0.366	0.486	0.460	0.386	0.458	0.452
18	0.621	0.675	0.720	0.481	0.505	0.469	0.501	0.536	0.521	0.505	0.538	0.520
19	0.497	0.540	0.606	0.179	0.246	0.201	0.191	0.286	0.238	0.220	0.296	0.262
20	0.522	0.571	0.630	0.310	0.344	0.295	0.472	0.491	0.493	0.406	0.434	0.420
21	0.523	0.566	0.536	0.385	0.312	0.293	0.209	0.233	0.229	0.322	0.305	0.291
22	0.609	0.619	0.703	0.425	0.400	0.412	0.287	0.320	0.349	0.384	0.389	0.416
23	0.646	0.712	0.710	0.375	0.390	0.378	0.496	0.577	0.549	0.459	0.509	0.491
24	0.126	0.125	0.079	0.044	0.051	0.010	0.154	0.198	0.164	0.102	0.124	0.086
25	0.474	0.520	0.389	0.046	0.047	0.033	0.000	0.060	0.017	0.073	0.105	0.065
26	0.049	0.000	0.067	0.030	0.046	0.047	0.072	0.195	0.133	0.051	0.107	0.087

Source: calculated by the authors

The correlation coefficient was used as a measure of the three *IIHP* subsystems indicators integral assessment level harmonization. Its calculation was performed with the help of the procedure "Data Analysis" *MS Excel*, and numerical values are presented in Table 3. The maximum correlation is observed between the subsystems of the indicators of the *KC↔RC*. The minimum value of the correlation coefficient (0.646) was obtained in 2019 for the subsystems of *EC↔RC* indicators. The results of correlation analysis indicate the presence of a close relationship between the components of *IIHP* and the harmonization of integral assessments of indicator subsystems (EC, KC, RC).

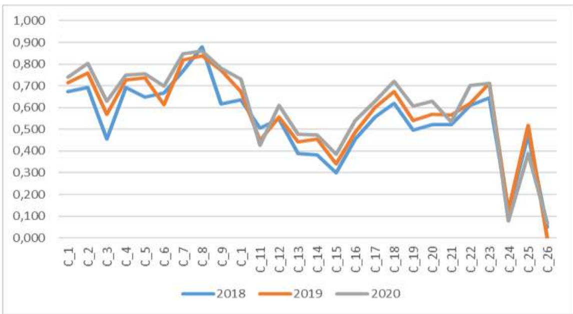
Table 3

Correlation coefficients between subsystems of *IIHP* indicators

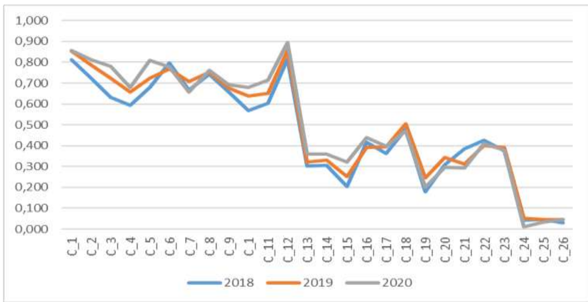
Subsystem	EC			KC			RC		
	2018	2019	2020	2018	2019	2020	2018	2019	2020
EC	1	1	1	0.766	0.722	0.727	0.680	0.646	0.718
KC	0.766	0.722	0.727	1	1	1	0.895	0.921	0.937
RC	0.680	0.646	0.718	0.895	0.921	0.937	1	1	1

Source: calculated by the authors

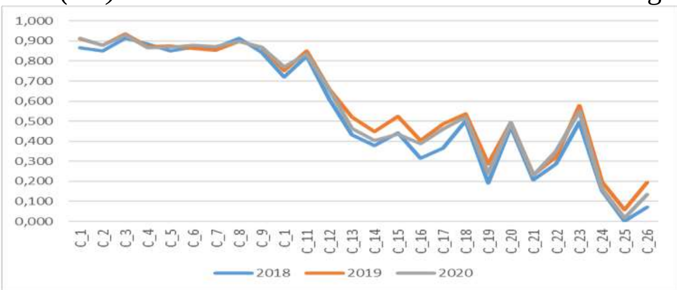
Graphical representations (Figure 2) allow us to think about the possible harmonization of integral assessment values of the three *IIHP* indicators subsystems: education, knowledge, research.



education *(EC)*



knowledge *(KC)*

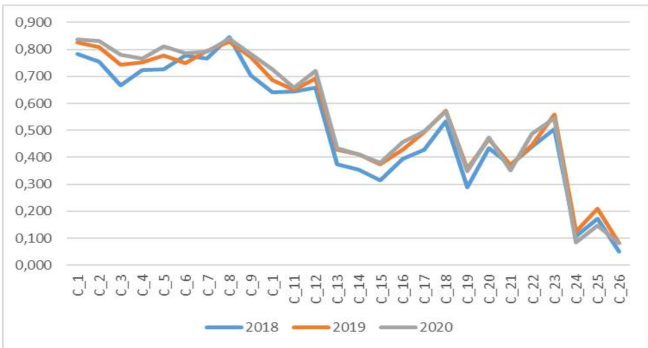


research *(RC)*

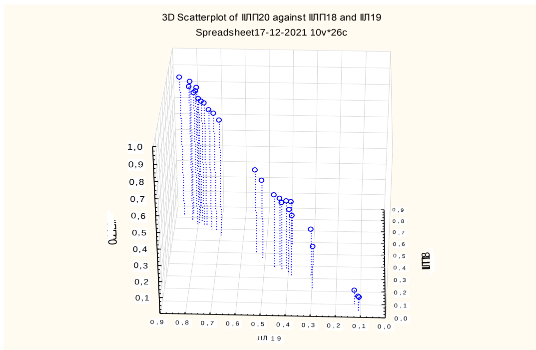
Figure 2: Integral component assessment *IIHP* in 2018, 2019, 2020

Source: compiled by the authors

On the one hand, the dense connection between the *IIHP* components serves as a basis for *IIHP* construction by averaging its components by formula (1). The obtained averaging results are presented in Table 4 and are shown in Figure 3. On the other hand, such a close relationship serves as a warning for the use in the regression equation of these indicator subsystems as factor variables due to their multicollinearity.



two-dimensional



three-dimensional

Figure 3: IIHP visualization in 2018, 2019, 2020

Source: compiled by the authors

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Before performing a regression analysis that would describe the relationship between the level of human innovatization and the state of the economy, the distribution of *IIHP* was checked by the Shapiro-Wilk test of normality. The chosen criterion is more informative for small sample sizes in comparison with the Kolmogorov-Smirnov test and the Lilliefors test. The materiality level of the Shapiro-Wilk test obtained using the Statistica™ software ($p_{(2018)}=0.021$; $p_{(2019)}=0.013$; $p_{(2020)}=0.008$) was insufficient ($p < 0.05$) to accept the hypothesis about the normality of the distribution (Figure 4).

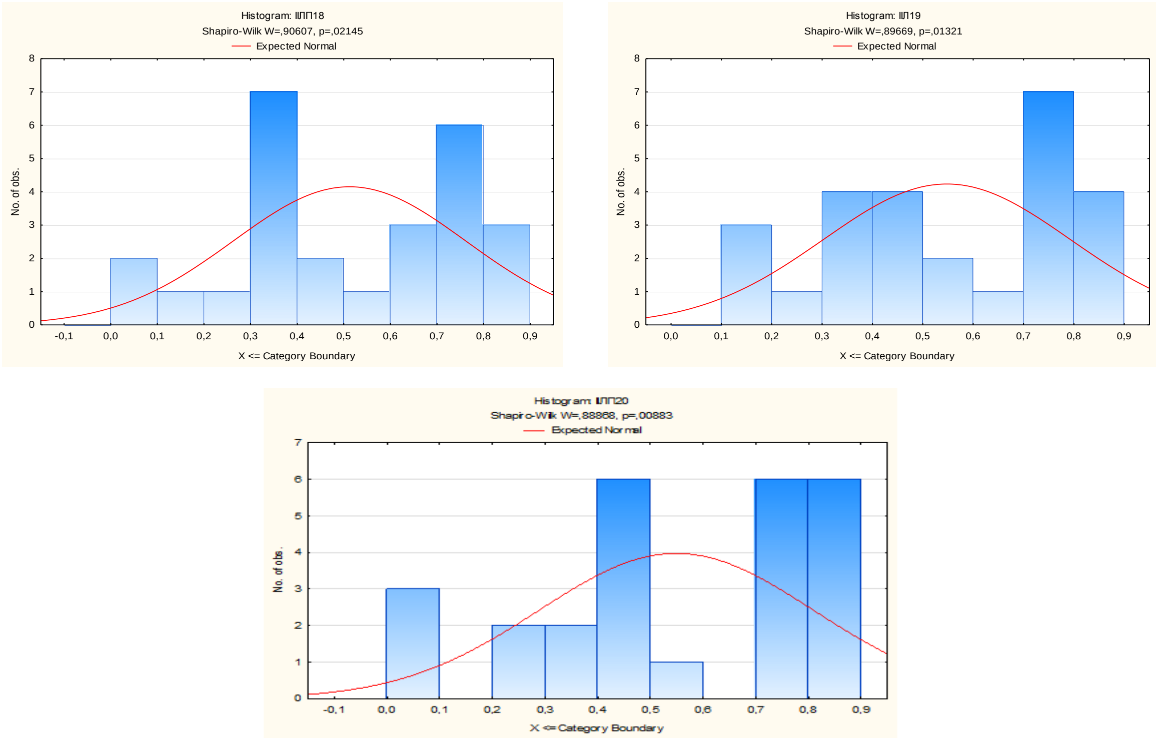


Figure 4: Verification of IIHP distributions for normality according to the Shapiro-Wilk test in 2018, 2019, 2020

Source: compiled by the authors

The second stage envisages the clustering of countries using the Statistica™ software. Based on the analysis of *IIHP* three-dimensional graphical representation (Figure 3) and the research of its dendrogram, the decision was made to divide the set of countries into three clusters: H – high level of development, A – the average level of development, L – low level of development.

The results of cluster analysis are presented in Table 4.

Table 4

Countries clustering by IIHP and its rate of change

	Switzerland	Sweden	United States	United Kingdom	Korea	Netherlands	Finland	Singapore	Germany	France	Japan	China	Brazil	Thailand	India	Bulgaria	Poland	Estonia	Georgia	Lithuania	Moldova	Ukraine	Russia	Uganda	Zimbabwe	Bangladesh
	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_1	C_11	C_12	C_13	C_14	C_15	C_16	C_17	C_18	C_19	C_20	C_21	C_22	C_23	C_24	C_25	C_26
2018	H	H	H	H	H	H	H	H	H	H	H	H	A	A	A	A	A	A	L	A	A	A	A	L	L	L
2019	H	H	H	H	H	H	H	H	H	H	H	H	A	A	A	A	A	A	A	A	A	A	A	L	L	L
2020	H	H	H	H	H	H	H	H	H	H	H	H	A	A	A	A	A	A	A	A	A	A	A	L	L	L
Rate of change in 2020,%																										
2018	6.0	8.4	12.5	5.0	10.4	0.0	0.9	0.0	6.4	12.7	6.4	9.2	13.7	13.1	18.1	14.0	17.0	3.0	19.4	3.6	-9.5	8.4	7.0	-15.7	-10.5	7.6
2019	0.8	1.9	3.6	1.4	4.6	2.6	-1.3	1.0	1.2	4.8	2.6	2.9	-1.1	-1.1	-1.4	5.0	-1.4	-3.3	-11.4	-3.3	-4.5	7.0	-3.5	-30,7	-38,0	-18,4
Д	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0

Source: calculated by the authors

Table 4 data shows that during the period 2018-2020 the value of *IIHP* in the countries of cluster *H* increased. Its slight decrease over the last year in Finland does not serve as an indicator of the crisis, as this country is consistently in the group of leaders. On the other hand, the negative rate of change in *IIHP* in the L-cluster countries is a marker of the human innovatization problem.

To substantiate the conclusion that countries with a high level of *IIHP* tend to further increase it, the method of four-cell contingency tables analysis was used. Previously, an additional indicator (P) was introduced, which takes 1, if in 2020 compared to 2018 and 2019, the rate of *IIHP* change took a positive value. Otherwise, P = 0 (Table 4).

Data from the analysis of the four-cell table formed based on grouping countries by the value of *IIHP* in *2020* (*<0.5 and >=0.5)* and the value of *P* (*0* and *1*) are given in Table 5 Statistical characteristics testify that between *IIHP* and *P* detects a statistically significant relationship. Thus, the chances of *IIHP* growth are many times higher in countries with high innovation potential.

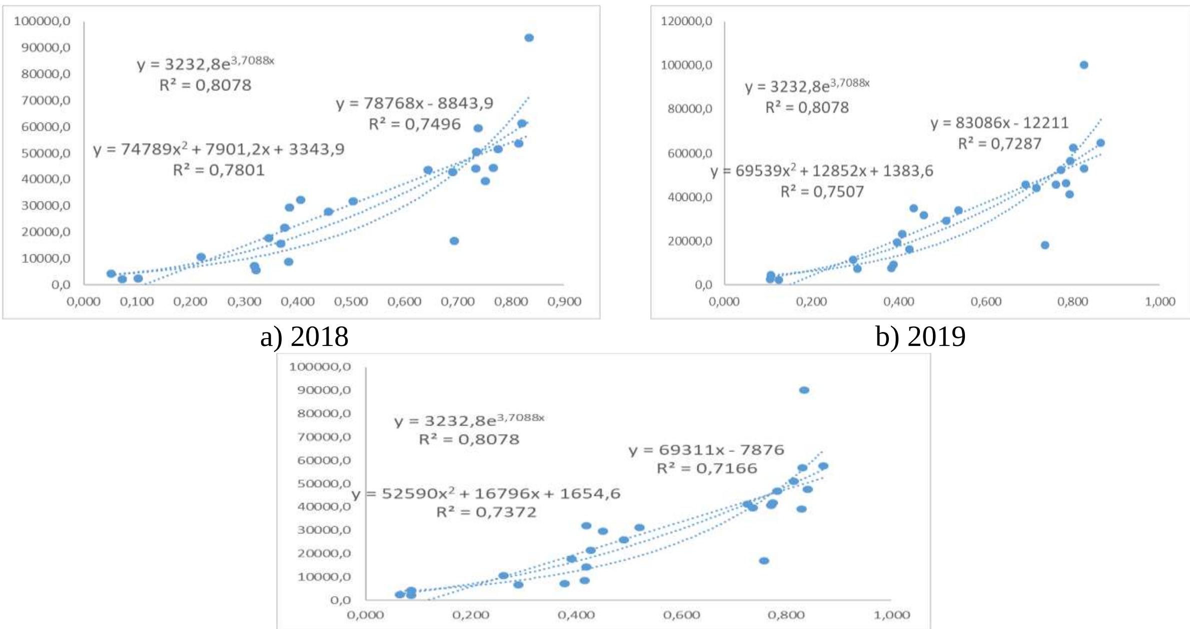
Table 5

Analysis of the distribution of countries by *IIHP and P*

P; IIHP 2020 <0.5		P; IIHP 2020 >=0.5		χ2	Cramer's V	Fisher's exact test
0	1	0	1	15.4	0.772	0.0001
6	6	2	12			

Source: calculated by the authors

At the third stage, the impact of human resource innovation analysis on the economic crisis was carried out. The value of GDP per capita in USD was chosen as an effective feature for the regression analysis at purchasing power parity (GDPpp). The results of regression analysis are presented in Figure 5.



a) 2018 b) 2019

c) 2020

Figure 5: *Models of GDPpp dependence on IIHP*

Source: calculated by the authors

The results of modeling show that there is a close and direct relationship between the state of the country's economy and the level of human innovatization. Thus, human potential innovatization should be considered as a factor in preventing the crisis of the economy.

5. Conclusions

The human potential issue is gaining popularity in the research of the scientific field – crisis management representatives. In the framework of this area, the main focus is on the socially positive role of humans (the object of protection in a crisis; crisis prevention factor; crisis manager). In modern conditions, crisis-free development of countries is not possible without effective innovation of their businesses. The engine of human potential is the bearer of innovative change.

Despite the difference in approaches of scientists to the component structure of human potential, in its structure, we can identify components that can promote innovative development: education; knowledge; research. In this publication, the authors presented scientific results related to the construction and approbation of a methodological approach to analyzing differences in the levels of human potential innovatization of in countries. In an empirical analysis of the 9 components of the three human potential subsystems (education; knowledge; research) according to 26 countries' data, the authors proved that there is a direct and tight connection between the integrated assessments of these components. The authors also scientifically substantiate that the generalized values of these components at the country level in the form of the human resource innovatization index are inversely correlated with the crisis in the economy.

Based on the results of regression analysis revealed that countries with a high level of human potential innovatization are not only much more likely to increase the value of GDP per capita in USD, in terms of purchasing power parity. In addition, countries with a high level of human potential innovatization are more likely to show a chance to further increase innovative human assets.

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