UDC 331.1

Viktoriia KOLOMIIETS[1*], Maryna FESENKO[2], Olga ZOLKINA[3]
1* Professor of Accounting and Economic Analysis, Doctor of Economics, docent, MELITOPOL INSTITUTE OF PUBLIK AND MUNICIPAL ADMINISTRATION OF THE «CLASSIC PRIVATE UNIVERSITY», e-mail: vik2005vik@meta.ua, ORCID: 0000-0003-3427-8986

2 Director, Doctor of Economics, professor, MELITOPOL INSTITUTE OF PUBLIK AND MUNICIPAL ADMINISTRATION OF THE «CLASSIC PRIVATE UNIVERSITY», e-mail: ra_va@ukr.net, ORCID: 0000-0003-2288-3388

3 Director, Master of Finance and Credit, BUSINESS INDUSTRY LLC, e-mail: ola1993ola@meta.ua, ORCID: 0000-0003-2642-6520

METHODICAL TOOLS FOR DETERMINING THE LEVEL OF HUMAN CAPITAL DEVELOPMENT

Annotation. Methodical tools for determining the level of human capital development have been developed. The managerial approach to measuring human capital aims to gain more management tools. The author hypothesized that there is an interdependence between the human capital index and the development of the country's institutional system. A selection of indicators has been made for describing the dependence of human capital development on the development of the institutional system of the country, which included political, legal, economic, social, institutional systems, using the expert method of analysis. Based on the hypothesis, an analytical model for assessing the development of human capital has been worked out, which was used to calculate the level of human capital development. The model proposed by the author takes into account the development of the country's institutional system and allows to find out correlation between human capital development and the country's institutional system, which allows to develop forecasts of the dynamics of human capital development from political, legal, economic, social, institutional changes and determine public policy. It is steadily increasing. For multifactor models or phenomena, it is expedient to use methods of multiple correlation-regression analysis, which allows to study and quantify the internal and external consequence correllations between model-forming factors and to establish patterns of functioning and development trends of the studied performance trait. In a real economy conditions, there are probabilistic interdependence between performance and factors. The main task of correlation and regression methods of analysis is to analyze statistical data to identify the mathematical dependency between the studied features and to establish a comparative estimate for the density of the interconnection.

Keywords: institutions, institutional content, human capital; methodical tools, the human capital index

Statement of the problem

The effective functioning of human capital becomes the main tool with help of which it is possible to implement the strategic objectives of the state. The purpose of the article is to implement an analytical characteristic of human`s capital practice in Ukraine and other countries, indicators of human capital development, determining the place of Ukraine on the background of other countries. There is no single system of indicators for the chatacterization of human capital. The author`s system in this research is formed and analytical characteristics of practice of human`s capital functioning in Ukraine and other countries of the world are considered. Analysis of the characteristics of human`s capital functioning in Ukraine and other countries of the world showed a relatively low level of the studied indicators.

Analysis of recent researches and publications

The last four decades of studying the human capital as a component of national wealth have been in focus of world-class experts – G. Becker [5], J. Mincer [8] and T. Schulz [9] (50-70 years of XX century), I. Fisher [6, p. 225–243].

N. Bryukhovetska, I. Buleev, D. Bohynia, O. Borodina, N. Golikova, V. Geets, O. Grishnova, I. Kalenyuk, E. Libanova, V. Mandibura, L. Chernobay, A. Chukhno, Y. Shiron and others have been studying various aspects of human capital.

Observations at the world level bring analytical considerations about the progress of mankind beyond economic growth, firmly assigning to man and his well-being a central place in development policy and strategy [1, p. 2].

Today, the priority in the effective

DOI: https://doi.org/10.15802/rtem2022/268135

management of resources is given to human capital, because it is a stock of knowledge, skills, competencies and abilities of people that can create private, social and national well-being [3].

The impact of human capital on economic development is observed not only for individual countries but also for entire regions [10, p. 2700–2702].

Economic opportunities can play a constructive role in human capital to support growth [4, p. 3]. At the same time, it was recognized that human capital stimulates and ensures the formation of man`s economic capacity, enterprise, nation.

Thus, the functioning of human capital becomes the main way by which it is possible to implement the strategic objectives of the state.

Requirement in building strong human capital for the rapid development of a country is still an unresolved problem. This study helps to solve this issue.

Formulation of the purpose of the article

The goal of this article is to make scientific and practical recommendations for the use of methodological tools to determine the relationship between human capital development and the system of institutional development of the country, calculation`s results of the correlation matrix.

The main material of the research

The implementation of the goal set in this study provides an analytical description of human`s capital in Ukraine and developed countries on certain indicators.

Researches on the measurement of human capital is divided into five stages [2]: Stage 1: development of the basic concept and its theoretical substantiation. Stage 2: development of basic measurement models for academic research and development. Stage 3: research of interest in development of the topic of researchers and business. Stage 4: drop of academic and business interests due to lack of understanding of easy and basic level of research and lack of understanding of researcher`s resources. Stage 5: from 1981 till today, when international interst has grown in both theory and practical use.

Theoretical and methodological studies provided the basis for determining indicators that describe the impact of factors on the development of human capital, and their grouping (Table 1).

Table 1

Indicators of factors influencing the human`s capital development of the national economy by groups*

** Author`s development*

Groups						
Political and legal factors	Economic factors	Social factors	Organizational-administrative and information-communication factors	Scientific and technological factors	Institutional factors	
regulatory policy	level of GNI per capita level of investment	birth rate	competitiveness Index of Countries	number of new technologies	freedom of business freedom of the labor	
level of corruption	level of investment	mortality rate	competitiveness of Employees	costs of innovation	market monetary freedom of trade	
level of bureaucracy trade	minimum wage	health care costs	Internet Access	costs of science	freedom of investment financial freedom	
economic policy	level of consumer prices	culture costs	computer Support Access	costs of research	fiscal health government spending	
efficiency of law-making	unemployment rate	environmental efficiency	access to Communication Systems	costs of energy-saving technologies	tax burden government decency	
law level	labor migration rate	index pension replacement rate	provision of Communication Systems	protection of intellectual property	efficiency of the judiciary property rights	

DOI: https://doi.org/10.15802/rtem2022/268135

An acceptable measure of human capital can be based on an equation where the cost of labor, wages, and other benefits will be proportional to the economic benefit, such as turnover or gross profit. But this approach does not take into account the opportunities created by human capital for business development or measuring the benefits of developing practices and processes. The general problem is to measure the value of hidden values: how hidden factors in creating the value of human capital, such as rare skills, unique knowledge, skills, social skills, implicit knowledge, could be better used for national development if they are recognized and identified.

Authors hypothesized an interdependence between the human capital index and the development of the country's institutional system. It is offered to describe this contact by means of the model presented on Figure 1.

$$HCI \begin{cases} RP\uparrow, LC\downarrow, LB\downarrow, TEP\uparrow \in PLI \\ UR\downarrow, IL\uparrow, MS\uparrow, LCP\downarrow \in GEI \\ BR\uparrow, MR\downarrow, HCC\uparrow, CC\uparrow, IEI\uparrow, PRR\uparrow, LM\downarrow, GE\uparrow \in GSI \\ CIC\uparrow, CE\uparrow \in GOAI \\ NNT\uparrow, CI\uparrow, CS\uparrow, CR\uparrow, CEST\uparrow, 3I\uparrow \in GSTI \\ AI\uparrow, CS\uparrow, ACS\uparrow, PCS\uparrow, ART\uparrow \in GICI \\ FB\uparrow, FLM\uparrow, MF\uparrow, FT\uparrow, FI\uparrow, FF\uparrow, \\ FH\uparrow, GS\uparrow, TB\downarrow, GD\uparrow, GJ\uparrow, PPR\uparrow \in GII \end{cases}$$

where HCI – human capital index, RP – regulatory policy, LC – level of corruption, LB – level of bureaucracy, TEP – trade and economic policy¸ PLI – group of political and legal indicators, UR – unemployment rate, IL – investment level, MS – minimal salary, LCP – level of consumer prices, GEI – group of economic indicators, BR – birth rate, MR – mortality rate, HCC – health care costs, CC – culture costs, IEI – environmental efficiency index, PRR – pension replacement rate, LM – labor migration rate, GE – gender equality, GSI – group of social indicators, CIC – competitiveness index of countries, CE – competitiveness of employees, GOAI – group of organizational and administrative indicators, NNT – number of new technologies, CI – costs of innovation, CS – costs of science, CR – costs of research, CEST – costs of energy-saving technologies, PIP – protection of intellectual property, GSTI – group of scientific and technological indicators, AI – access to the Internet, CS – computer support, ACS – access to communication systems, PCS – provision of communication systems, ART – availability of radio and telecommunications , GICI – group of information and communication indicators, FB – freedom of business, FLM – freedom of the labor market, MF – monetary freedom, FT – freedom of trade, FI – freedom of investment, FF – financial freedom, FH – fiscal health, GS – government spending, TB – tax burden, GD – government decency, GJ – efficiency of the judiciary, PPR – protection of property rights, GII – a group of institutional indicators.

Fig. 1. Factors influencing the development of human capital *
** Author`s development*

The group of political and legal indicators includes: regulatory policy, level of corruption, level of bureaucracy, trade and economic policy. Group of economic indicators includes the unemployment rate, level of investment, minimum wage, level of consumer prices. The group of social indicators includes the birth rate, mortality rate, health care costs, culture costs, environmental efficiency index, pension replacement rate, labor migration rate, gender equality.

A selection of indicators describing the dependence of human capital development on the development of country`s institutional system, which included political, legal, economic, social, institutional, using the expert method of analysis.

When calculating the reliability of these indicators, the value of the Cronbach's alpha coefficient was 0.78, which confirms the consistency of the characteristics within the group and the possibility of combining them into a single group. The relationship between the indicators showed that the variance between them is at an acceptable level in the range of 0.25-0.55.

The Cronbach's alpha coefficient shows the internal consistency of the characteristics that

DOI: https://doi.org/10.15802/rtem2022/268135

describe one object, but is not an indicator of the homogeneity of the object. The coefficient is often used in expert assessments when constructing tests and to verify their reliability.

The standardized Cronbach's alpha coefficient is calculated by the formula: $a_{st} = N \times \hat{r}$, where N is the number of test components, $\hat{r}$ is the average correlation coefficient between the components.

Cronbach's alpha can take values: > 0.5 – low consistency, > 0.6 – questionable consistency, > 0.7 – sufficient consistency, > 0.8 – good consistency, > 0.9 – very good consistency.

- Based on the hypothesis, an analytical model for assessing the development of human capital of the national economy was developed [12], which is used to calculate the level of human capital development of the national economy:

$$\text{LHCD} = \sum_{i=1}^{n} GPL_i \times \left(\sum_{j=1}^{m} GE_j / m \right) \times \left(\sum_{k=1}^{p} GS_k / p \right) \Big/ \sum_{l=1}^{q} GI_l \ , \qquad (1)$$

де LHCD – рівень розвитку людського капіталу;
GPL_i – *i*-тий показник групи політико-правових показників;
GE_j – *j*-тий показник групи економічних показників;
GS_k – *k*-тий показник групи соціальних показників;
GI_l – *l*-тий показник групи інституціональних показників.

Model (1) proposed by the author takes into account the development of country's institutional system and allows to establish the interdependence between human capital development and the country's institutional system, which allows to develop forecasts of the dynamics of human capital development from political, legal, economic, social, institutional changes and determine public policy. Its steadily increasing.

For multifactor models or phenomena, it is advisable to use methods of multiple correlation-regression analysis, which allow to study and quantify the internal external consequences between the model-forming factors and to establish patterns of functioning and development trends of the studied performance trait. In a real economy, there are probabilistic (stochastic) relationships between performance indicators and factors. The main task of correlation and regression methods of analysis is to analyze statistical data to identify the mathematical relationship between the studied features and to establish with the help of correlation coefficients a comparative estimate of the density of the relationship, which has a certain numerical expression.

The indicators of human capital index of 157 countries [7] are taken as actual data, which was sorted into 3 groups according to the level of HCI, indicators of the development of the institutional system of the country [7], based on the components of economic freedom. From each group build a matrix of 3 tables. The table shows the indicators of the human capital index for countries with a high level of GNI per capita.

High index of human capital development is observed in such developed countries as Japan (3rd place), Finland (5th place in the ranking), Australia (7th place in the ranking). Comparison with the data on the human development index according to the UNDP report gives the following result. Not in all cases does the human capital index correspond to the human development index, which is explained by the different methodology for determining indicators, which was also developed by completely different world institutions – the United Nations within the UNDP and the World Bank in the document "Human Capital Development Project". In some cases, the data differ significantly. Thus, if Norway ranks first in the human development index, the human capital index ranks only 18. Former Soviet Union countries Estonia and Lithuania rank 30th and 35th respectively in terms of HDI and 29th and 37th respectively in terms of HCI.

Indicators characterizing the development of the institutional system for building a matrix for countries with a high level of GNI per capita have been analyzed [7].

The indicators of the human capital index for countries with an average level of GNI per capita ahave been analyzed [7].

This group includes Ukraine, which took 50th place in this ranking of the World Bank. At the

DOI: https://doi.org/10.15802/rtem2022/268135

same time, China in the ranking located near Ukraine – 46th place. Turkey ranks 53rd. The countries of the former Soviet space – Moldova, Kyrgyzstan, Armenia, Tajikistan – are holding 75, 76, 78, 89 places, accordingly.

Data on human development for countries with an average level of GNI per capita are shown. Comparison of these data with data on the human development index according to the UNDP report gives the following result. In some cases, the data differ significantly. According to the UNDP, Ukraine ranks 88th according to the UNDP, which is taken into account as an average indicator of the level of human development. In the group of countries with an average level of GNI per capita among the former countries of the Soviet Union outlined above, Armenia holds the highest city 83 (5 positions higher than Ukraine).

Indicators that characterize the development of the institutional system for building a matrix for countries with an average level of GNI per capita are analyzed [11].

The indicators of the human capital index for countries with a low level of GNI per capita are analyzed [7].

This group includes the poorest countries in the modern world - Mozambique, Guinea, Madagascar, Chad, Ethiopia. In the ranking of the human development index, they rank from 152 to 189.

The data characterizing the development of the institutional system for the construction of a matrix for countries with a low level of GNI per capita have been analyzed [11].

Conclusion

As part of the study, methodological tools were developed to determine the level of development of human capital.

В. М. КОЛОМІЄЦЬ[1*], М. М. ФЕСЕНКО[2], Ольга ЗОЛКІНА[3]

1* професор закладу вищої освіти, д.е.н., доцент, Мелітопольський інститут державного та муніципального управління «Класичного приватного університету», e-mail: vik2005vik@meta.ua, ORCID: 0000-0003-3427-8986

2 директор, д.е.н., професор, e-mail: ra_va@ukr.net, ORCID: 0000-0003-2288-3388

3 директор, магістр з фінансів та обліку, ТОВ «БІЗНЕС ІНДУСТРІЯ», e-mail: ola1993ola@meta.ua, ORCID: 0000-0003-2642-6520

МЕТОДИЧНИЙ ІНСТРУМЕНТАРІЙ ВИЗНАЧЕННЯ РІВНЯ РОЗВИТКУ ЛЮДСЬКОГО КАПІТАЛУ

Анотація. Розроблено методичний інструментарій визначення рівня розвитку людського капіталу. Управлінський підхід до вимірювання людського капіталу спрямований отримати більше інструментів управління. Автором висунуто гіпотезу про наявність зв'язку між індексом людського капіталу та розвитком інституціональної системи країни. Проведено відбір показників, що описують залежність розвитку людського капіталу від розвитку інституціональної системи країни, до яких увійшли політико-правові, економічні, соціальні, інституціональні, із застосуванням експертного методу аналізу. На підставі висунутої гіпотези розроблено аналітичну модель оцінки розвитку людського капіталу, за допомогою якої розраховується рівень розвитку людського капіталу. Запропонована автором модель враховує показники розвитку інституціональної системи країни та дозволяє встановити взаємозв'язок між розвитком людського капіталу та інституціональної системи країни, що дає можливість розробляти прогнози динаміки рівня розвитку людського капіталу від політико-правових, економічних, соціальних, інституціональних змін та визначати державну політику щодо його сталого підвищення. Для багатофакторних моделей чи явищ доцільно використовувати методи множинного кореляційно-регресійного аналізу, які дають змогу вивчити та кількісно оцінити внутрішні і зовнішні наслідкові зв'язки між утворюючими модель факторами та встановити закономірності функціонування і тенденції розвитку досліджуваної результативної ознаки. В умовах реальної економіки між результативними показниками та чинниками діють вірогідностні зв'язки. Основне завдання кореляційного і регресійного методів аналізу полягає в аналізі статистичних даних для виявлення математичної залежності між досліджуваними ознаками і встановлення порівняльної оцінки щільності взаємозв'язку.

Ключові слова: інституції, інституційний зміст, людський капітал, методичний інструментарій, індекс людського капіталу

DOI: https://doi.org/10.15802/rtem2022/268135

REFERENCES

1. Jahan, S. & al. (2018). Indeksy i indikatory chelovecheskogo razvitiya: Obnovlennyye statisticheskiye dannyye 2018 dr. [Human Development Indices and Indicators: Updated Statistical Data 2018] etc. Retrieved from http://hdr.undp.org/sites/default/files/2018_human_development_statistical_update_ru.pdf. (in Ukrainian).
2. Rekun, I. (2018). Instytutsional'na transformatsiya ekonomichnoyi bezpeky.[Institutional transformation of economic security]. M. Radieva (Ed.), A. Tkach, V. Kolomiiets & al., *Transformatsiyni protsesy v ekonomitsi: instytutsional'nyy kontekst [Transformational processes in economics: institutional context] (pp. 218-278).* Melitopol': TOV «Kolor Prynt». doi: https://doi.org/10.32901/978-966-2489-64-4/2018. (in Ukrainian).
3. Freeman, E. M. & Freeman, I. M. (2018). Chelovecheskiy kapital kak faktor konkurentosposobnosti predpriyatiya. [Human capital as a factor of enterprise competitiveness]. *Skhidna Yevropa: ekonomika, biznes ta upravlinnya]*. 2(13). 150-153. (in Ukrainian).
4. Ali, M., Egbetokun, A., & Memon, M. (2018). Human capital, social capabilities and economic growth. *Economies, 6*(2), 1-18. doi: https://doi.org/10.3390/economies6010002.
5. Becker, G. S. (1964). *Human Capital*. N. Y.: Columbia University Press.
6. Fisher, I. (1930). The application of mathematics to the social sciences. *Bull. Amer. Math. Soc., 36*(4), 225-243. doi:10.1090/s0002-9904-1930-04919-8.
7. Index of economic freedom. The Heritage Foundation. (2018). Retrieved from https://www.heritage.org/index/pdf/2018/book/index_2018.pdf.
8. Mincer, J. (1981). *Human Capital and Economic Growth*. NBER Working Paper. Retrieved from http://www.nber.org/papers/w0803.pdf.
9. Schulz, T. W. (1961, march). Investment in Human Capital. *American Economic Review, 51*, 1-17.
10. Siddiqui, A., & Rehman, A. (2016). "The Human Capital and Economic Growth Nexus: in East and South Asia", *Applied Economics, 49*(28), 2697-2710. doi: https://doi.org/10.1080/00036846.2016.1245841.
11. The Human Capital Project. World Bank. (2018). Retrieved from https://openknowledge.worldbank.org/bitstream/handle/10986/30498/33324RU.pdf?sequence=13&isAllowed=y.
12. Tkach, A., Kolomiiets, V. & Radieva, M. (2019, marz). Institutional platforms transformation of the economy. *Baltic Journal of Economic Studies, 2, 289–293.* Riga: Publishing House "Baltija Publishing". doi: htp://dx.doi.org/10.30525/2256-0742/2019-2-2-289-293.

Стаття надійшла до редакції: 28.05.2022
Received: 2022.05.28

