Human potential and capital of BRICS countries in sustainable development goals system

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Abstract. It is of great importance to recognize the potential of humanity at the national level and to strive to realize it in order to achieve sustainable development goals. The paper attempts to shed light on the features of human potential and human capital in BRICS countries through the lens of sustainable development goals. Furthermore, it illustrates the interconnection between human capital and economic growth. The Human Potential Index (HDI) and Human Capital Index (HCI) are presented as key indicators of human capital development and human potential in BRICS countries. We would like to respectfully propose a potential link between these indices and sustainable development goals. The research is based on an analysis of the relationship between the HDI and HCI, as well as the HCI and GDP (PPP) of the BRICS countries in 2024, with a view to identifying potential areas for further investigation. The results of the analysis indicate a high correlation between the level of development of human potential and human capital, with a Pearson correlation coefficient of 0.84 for the HDI and HCI of BRICS countries. The analysis, which is based on the con-struction of a positioning map, has allowed us to propose a tentative division of the BRICS countries into three groups. It would be fair to say that three countries (UAE, Saudi Arabia and Russia) are in a relatively privileged position in terms of their NSI and GDP (PPP) per capita. The group of countries with relatively low GDP (PPP) per capita and high HCI includes two countries: China and Iran. The group with low levels of both HCI and GDP (PPP) per capita includes the remaining five BRICS countries. The presented cross-country analysis could potentially serve as a tool for identifying potential avenues for human capital development, economic growth, and inter-country cooperation of the BRICS countries in the context of achieving sustainable development goals.

1 Introduction

In the current conditions of geopolitical instability and transition to a multipolar world, the problem of achieving sustainable economic growth is still relevant. At the same time, the modern stage of rapid development of new technologies creates new possibilities for the socio-economic development of states. However, in order to take advantage of them, it is

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necessary to develop human capital and increase the return on it. It is obvious that increasing the level of education, developing professional and social skills, improving health and social security will have a positive impact on increasing people's productivity.

On the way to achieving the goals of the 2030 Agenda for Sustainable Development, the global community has started to deviate from the path. While the 2019 sustainable development report outlined progress towards many of the sustainable development goals, the 2023 report changed the situation due to a series of global crises [1]. The COVID-19 pandemic, rising cost of living, armed conflicts and natural disasters have in many ways negatively impacted the multi-year progress of many sustainable development goals.

Back in 2015, the UN General Assembly adopted the resolution "Transforming our World: the 2030 Agenda for Sustainable Development", which includes 17 goals and 169 objectives (Resolution A/RES/70/1 [2]). As part of achieving these sustainable development goals, it is necessary to ensure a high standard of living for present and future generations. Thus, in modern conditions, the achievement of sustainable development goals poses serious objectives of socio-economic development, and the human being here appears as a key subject of sustainable development [3].

Overcoming the consequences of global crises and achieving sustainable development goals will largely depend on investments in health care and education, i.e. in human capital. In this regard, studying the state and place of human capital of different countries in the system of sustainable development goals is relevant.

This paper is devoted to the research of human development of BRICS countries in the context of SDGs implementation. The expanded membership of BRICS countries in 2024, strengthening their cooperation, leads to the fact that they have an increasing impact on global development.

2 Materials and methods

This research is based on the understanding of BRICS economies as socio-economic systems [4], functioning within the framework of the modern quest to achieve sustainable development goals. The key element of any national economy that plays an important role in achieving the SDGs is human capital. For its assessment and cross-country analysis we used HDI, which characterizes the accumulated potential capable of becoming human capital, HCI, which characterizes human capital directly, and GDP per capita, as a general indicator characterizing the result of the functioning of national economies.

Cross-country comparison of human development of BRICS countries was carried out on the basis of correlation analysis, as well as the compilation of a positioning map [5]. For the purposes of this research, the positioning map, more often used in marketing, makes it possible to divide the BRICS countries into groups based on the relationship between HCI and GDP per capita.

The UN Sustainable Development Goals 2023 report was an important source of information for the research [1].

This research focuses on the BRICS countries that became members on January 1, 2024: Brazil, Russia, India, China, South Africa, Iran, Saudi Arabia, UAE, Egypt, and Ethiopia. After the accession of new member countries, BRICS has expanded to ten countries with a population of 3.6 billion people, which is almost half (more than 45%) of the world's population. These countries account for more than 40% of the world's oil production and about a quarter of the world's exports of goods and almost 30% of the world economy as a whole.

The empirical basis for the BRICS HDI research is the Human Development-ment Report 2022 published by the United Nations Development Program. The HCI is provided by the World Bank to rank countries. Since HCI data are not updated annually, but every 2-

3 years, we chose the data for 2020 [6], which is currently the most relevant. We also used data on GDP(PPP) of BRICS countries provided by the World Bank Group for 2022 [7].

3 Results

3.1 Human capital and sustainable development goals

Sustainable development can be achieved only if human capital is formed, accumulated, developed and used effectively. The reproduction of human capital is preceded by the formation of its potential - the qualities of people, their knowledge, skills, and abilities that can influence the results of activity and productive activities in which they can be involved. Human capital itself directly affects economic growth. Here the assessment of human capital on a national scale is of great importance.

Different approaches, cost and non-value, can be used to assess human capital [8]. However, for comparison of national human capital it is better to use the non-value index approach, which can give a more objective idea of its level [9]. International organizations use two indices to rank countries by the level of human capital: the Human Development Index (HDI) and the Human Capital Index (HCI).

The Human Development Index (HDI), until 2013 the Human Development Index, has been published since 1990 by the United Nations Development Program. The HDI is a composite measure of average achievement in the key three dimensions of human development: a long and healthy life, education and a decent standard of living. It is the geometric mean of normalized indices for each of the three dimensions.

The HCI is presented by the World Bank to rank countries. In addition, HCI makes it possible to give an idea of "direct measurement of school quality and human capital" [10]. [10]. For this purpose, the HCI includes an educational component represented by harmonized scores of international tests for students.

Both HDI and HCI components are related to sustainable development goals. For example, the components assessing life expectancy and educational attainment in HDI and the components assessing survival, schooling and health in HCI [11] are directly linked to at least three global SDGs:

- SDG 3.2 - reducing neonatal mortality to 12 or fewer deaths per 1,000 live births and under-5 mortality to 25 or fewer deaths per 1,000 live births;
- SDG 4.1 - ensuring the possibility of equitable and quality primary and secondary education;
- SDG 3.4 - decrease premature mortality from non-communicable diseases by one-third through prevention, treatment and prophylactic measures.

In general, HDI and HCI emphasize a diverse range of socio-economic measures that can contribute to achieving the SDGs.

3.2 Comparative Analysis of Human Potential and Human Capital in BRICS Countries

To assess the impact of human capital on economic growth for BRICS countries, it is advisable to provide their comparative characterization by GDP per capita [12].

Figure 1 presents a comparative characterization of the BRICS member countries in 2024 by GDP (in purchasing power parity) per capita based on the data of The World Bank Group (based on data for 2022).

The UAE is the leader in terms of GDP per capita and Ethiopia is the outsider. If we analyze the BRICS countries by GDP (PPP) excluding per capita, China is the clear leader in 2022, with Ethiopia also ranking last.

Figure 2 shows the HDI values of BRICS countries in 2022, as presented in the UN Development Program 2024 report. The leader in HDI among BRICS countries is UAE and the outsider is Ethiopia. The trend of BRICS countries' leadership in GDP per capita and HDI is similar.

The HCI does not contain an indicator of living standards, but it does contain a qualitative characteristic of the level of education. In this regard, in our opinion, HCI will more objectively reflect the characteristic of human capital of the countries. The ranking of BRICS countries by this indicator will look somewhat different. Russia is in first place and Ethiopia is in last place. The UAE ranks second, China third, and Saudi Arabia only fifth. The penultimate place is occupied by South Africa.

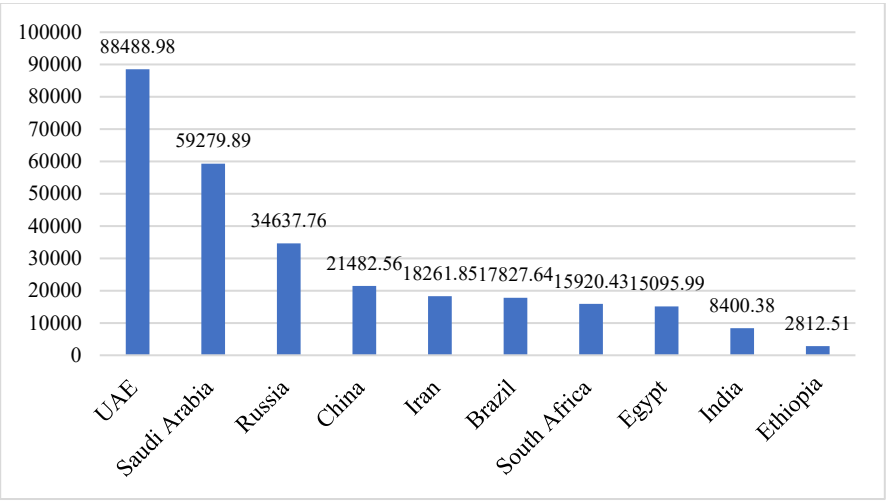

Fig. 1. GDP per capita at PPP in BRICS member countries in US$ in 2022.

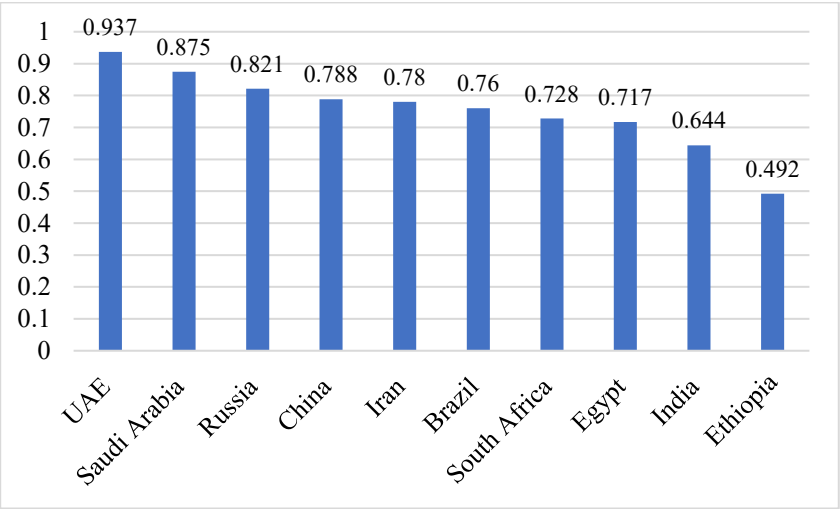

Fig. 2. HDI of BRICS countries based on the results of the 2024 report.

The Pearson correlation coefficient of HDI and HCI of BRICS countries was 0.84, which indicates a high dependence. In other words, a high level of human development affects human capital.

In order to assess the impact of human capital development on economic growth, it is necessary to compare countries not only by HCI, but also by GDP per capita.

R2 shows the proportion of variance of the dependent variable that is explained by the independent variable in the regression model. R2 is greater than 0.4, which indicates an average correlation between HCI and economic growth. Low quality of the model is noted when the value is less than 0.4.

The Pearson correlation coefficient between HCI and GDP per capita at PPP was 0.65, which indicates a fairly pronounced positive degree of their relationship for the BRICS countries.

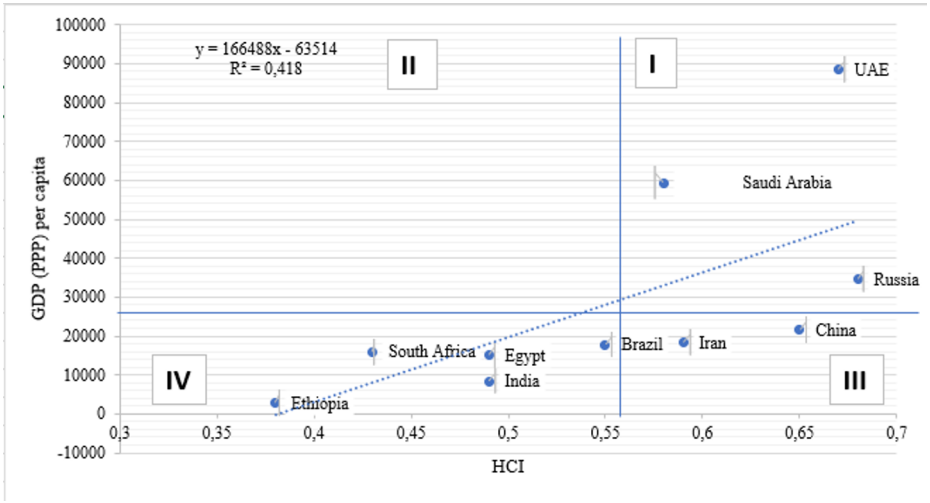

Fig. 3. Relationship between HCI and GDP (PPP) per capita of BRICS countries, 2022.

It is reasonable to present HCI and per capita GDP by PPP in the form of a positioning map for cross-country analysis of BRICS [13]. A positioning map is a graph on which each area corresponds to the important parameters to be analyzed. For this purpose, the average values of HCI and GDP per capita PPP for the whole set of BRICS countries are determined. GDP per capita by PPP is 28330.8 and HCI is 0.551. These average values are taken as the new origin of the co-coordinates (Figure 3).

The presented positioning map makes it possible to divide BRICS countries into groups based on the relationship between HCI and GDP per capita, in accordance with four quadrants.

In the upper right quadrant (I) there are 3 countries that have high HCI and GDP per capita. These are UAE, Saudi Arabia and Russia. While UAE and Russia have the highest HCI values (above 0.67 and 0.68 respectively), Saudi Arabia is only in 5th place among BRICS countries (with a value of 0.58). China and Iran overtake it in this value, but their GDP per capita is much lower than Saudi Arabia's.

In the lower left quadrant (III) there are 5 other countries that have relatively low HCI and GDP per capita in PPP. These are Brazil, Egypt, Ethiopia, India, South Africa and South Africa. All of these countries have HCI values of 0.55 and below. They are also the countries with the lowest PPP GDP per capita among the BRICS countries.

In the lower right quadrant (IV), characterized by relatively high HCI and low GDP per capita, there are two countries - Iran and China. The countries in this quadrant indicate the absence and full eco-economic returns from a sufficiently high level of human capital. For these countries, a significant problem is the involvement of highly educated people in the production system [14]. The reasons for the inhibition of the transformation of human capital into economic growth are that Iran has been under sanctions for more than 40 years, for China a certain problem is to overcome the regional bias in the provision of higher education and strengthening the link between science and education and production [15]. It should also be noted that China ranks 12th among 132 countries in the Global Innovation Index in 2023.

It is noteworthy that there are no countries in the upper left quadrant (II), which characterizes a high level of GDP per capita with a relatively low HCI. This indicates the importance of human capital in the socio-economic development of BRICS countries.

Cross-country analysis has shown that BRICS countries are quite heterogeneous in terms of both human capital development and per capita income. The UAE, Saudi Arabia and Russia are the leaders in terms of both human capital development and economic growth, while Ethiopia is the outsider. In view of the heterogeneity of countries in terms of human capital development, special attention should be paid to the state policy in the sphere of education, especially higher education, which is of the greatest importance for socio-economic development in the conditions of modern scientific and technological progress.

4 Conclusion

The cross-country analysis has revealed that there is considerable diversity among BRICS members in terms of human capital development and per capita income. This is reflected in the varying levels of inclusion in the international agenda for achieving the SDGs.

BRICS countries are exploring various avenues to address the challenge of human capital reproduction. It is largely a matter of economic model and the specifics of socio-economic development. For instance, in the UAE, a number of universities are exploring ways to attract qualified workers from other countries. Saudi Arabia is developing its own universities, taking into account the specifics of Arab countries, while actively developing ties with universities in the West. China's program for the development of "postdoctoral workstations" is designed to enhance the interaction between science, education, and the real sector. Russia is engaged in a number of initiatives designed to enhance the training of engineering professionals and to foster closer ties between universities and the high-tech sector. It is therefore clear that the state plays an important role in the development of human capital and the achievement of the SDGs, by initiating relevant support programs.

References

1. Global Sustainable Development Report 2023 Times of Crisis, Times of Change - Science for Accelerating Transformations to Sustainable Development. United Nations (2023)
2. Resolution adopted by the General Assembly on 25 September 2015. Transforming our world: the 2030 Agenda for Sustainable Development. UN Doc. A/RES/70/1 (2015)
3. P. Ferreira, C. Gabriel, S. Faria, P. Rodrigues, M. Sousa Pereira, Sustainability **12**, 2743 (2020)
4. J. Kornai, Revue détudes comparatives Est-Ouest **48(01-02)**, 239-296 (2017) DOI: https://doi.org/10.4074/S0338059917001097

5. D. Octavia, G. Yudoko, R. A. Nasution, Jurnal Sosial Humaniora (JSH) **1**, 94-111. (2020)
6. Human Capital Index 2020. World Bank Group (2022) http://worldbank.org/human-capital
7. The World Bank. GDP based on PPP valuation of country GDP (2022) https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?end=2022&start=2014&view=chart
8. K. Vithana, R. Jayasekera, T. Choudhry, Y. Baruch, The International Journal of Human Resource Management, 1-33 (2021) DOI: https://doi.org/10.1080/09585192.2021.1986106
9. M. B. Flek, E. A. Ugnich, Lecture Notes in Networks and Systems **155**, 1659–1669 (2021) DOI: https://doi.org/10.2991/iscfec-19.2019.81
10. World Bank. 2018 Measuring Human Capital World Bank, Washington, D.C. (2018)
11. T. V. Uskova, L. V. Babich, Regionology = Russian Journal of Regional Studies **29(4)**, 820-839 (2021) DOI: https://doi.org/10.15507/2413-1407.117.029.202104.820-839
12. E. Ugnich, A. Chernokozov A., M. Ugnich, E3S Web of Conferences **258**, 07053 (2021) DOI: https://doi.org/10.1051/e3sconf/202125807053
13. M. B. Flek, E. A. Ugnich, Perspekt. Nauki Obraz **58 (4)**, 671-691 (2022) DOI: https://doi.org/10.32744/pse.2022.4.39
14. A. A. C. Teixeira, A. S. S. Queirós, Research Policy **45(8)**, 1636-1648 (2016) DOI: https://doi.org/10.1016/j.respol.2016.04.006
15. E. Y. Charochkina, Y. V Vertakova, M. A. Molokova , *Human capital: Efficiency of formation in the process of global transformations of economy,* in Human and Technological Progress Towards the Socio-Economic Paradigm of the Future: Part 1, 121–128 (2020)