

Comparison of the Quality of Life Using the Human Development Index Based on the Global Supply Chain

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Abstract— Quality of life and methods of its measurement are topics that are quickly becoming the subject of both professional and social discussions based on the global supply chain. The basic idea of this article is to compare the quality of life in the Russian Federation and Germany. These are powerful economies that offer an interesting confrontation. We also contribute to this comparison using Slovakia as an example of the confrontation of large and economically strong countries with a small country. The main indicator for expressing the quality of human life in the article is the Human Development Index (HDI), based on which we used a comparative analysis. The first part of the article provides a theoretical framework and characteristics of indicators. In the second part of the article, we analyzed the 10-year development of the selected countries' indicators. The results show a positive trend in the growth of quality of life, where Germany is clearly the leader among the selected countries, and we can state the gradual slow convergence of the Russian and Slovak economy to the German one.

Keywords— *Quality of life, HDI, comparative analysis, Russia, global supply chain, Germany, Slovakia.*

1. Introduction

Nowadays, when a professional and general attention is focused on the development of countries, the human development index is increasingly mentioned as one of the factors of measuring a human welfare. Since 1990, the United Nations Development Programme (UNDP) prepares reports about human development. The HDI was created to emphasize that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone [1-14]. This argument is reinforced by the fact that many studies deal with a human development and quality of life [2], [8], [15-22]. Soltes and Novakova evaluated a development

of values of the HDI index in Slovakia over ten years and compared with a development in the countries of the EU [11].

The relationship between the economic success and socio-economic indicators has always been discussed and investigated in the economic literature, for example Pourmohammadi and Valibeigi identified the interactions between quality of life indicator and regional development [9], [23-28]. Bechtel investigated the relationship between GDP and HDI index, Ulas and Keskin confirmed a positive correlation between HDI and economic performances [1], [18]-[21].

In the first part of the paper, we tried to characterize the index and to analyze the indicators that it works with. In the second part, we analyzed the values of the HDI of selected countries in the set time horizon and dealt with the nature of their development, or the facts that have a major impact on their development.

1.1 Human Development Index

The aim of UNDP was thus to create such an indicator which would represent the quality of human capital more effectively and more objectively. Man is controlled by his active needs, and the variety allows you to use entrepreneurs in various directions of stimulus of improvement of quality of human capital: from the creation of conditions to meet the lower biological needs, to creation of comfortable social and psychological environment [5]. Therefore, this index works not only with economic indicators but it also uses uneconomical indicators because their implementation provides better information value of the monitored index. The HDI is one of the aggregated indicators measuring the progress of society in three dimensions relating to health, education and living standards of the population. It means that the country can be a leader in economic statistics but people live there in anxiety, illiterate and without a possibility of education. For people,

it is much more important whether they live long and healthy, have unlimited access to education or to such a basic material as water in global supply chain. Or whether they can contribute to the country's development without any limitations as mentioned by sociologists who prepare the report. This index is standardized and internationally comparable if it is calculated by using the same

method. It reaches the values in the interval $<0,1>$ and based on it, it is possible to make the categorizations of countries into developed and developing and it uses 4 zones according to the level of reached index value and it is a very high human development, high human development, medium human development and low human development [13], [23].

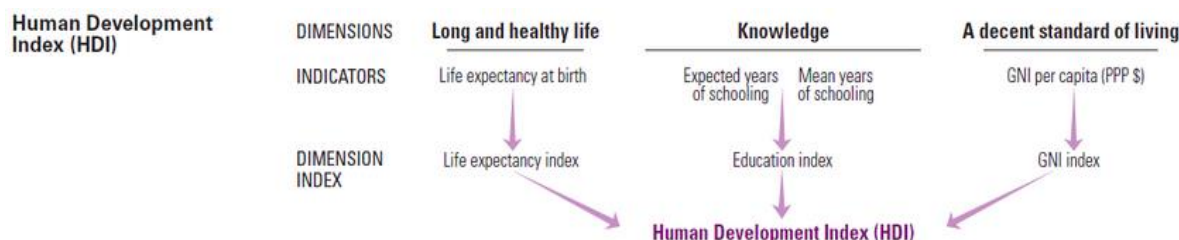


Fig. 1. Human development index and its components

Source: [14]

The health dimension is assessed by life expectancy at birth, the education dimension is measured by mean of years of schooling for adults aged 25 years and more and expected years of schooling for children of school entering age. The standard of living dimension is measured by gross national income per capita. The HDI uses the logarithm of income, to reflect the diminishing importance of income with increasing GNI. The scores for the three HDI dimension indices are then aggregated into a composite index using geometric mean [14], [25].

Kilimova pointed out the relationship between human development and quality of life through a comparative analysis of the HDI ranking of a number of countries during the economic crisis [4]. It is revealed that the quality of life becomes evident in the subjective satisfaction of population with life and possibility to achieve full potential; the quality of life is reflected in a number of objective characteristics. Being a complex category, the quality of life is a guarantee not only of human society development but also of human physical and social health. On the one hand, human potential and its development is the basis of social-economic growth, and, on the other, it is the basis of the population safety. Author used a comparative analysis of the HDI ranking of a number of countries during the economic crisis is presented. Nuhu et al. examined the effect of healthcare spending on the relationship between the HDI and maternal and neonatal mortality. Their results show that higher healthcare spending among countries with low HDI could improve outcomes of maternal and neonatal mortality [7], [24]. The study by van den Bergh and Botzen considers the HDI index as an alternative criterion for judging the welfare effects of climate policy [12].

On the other hand, Qiu et al. expressed potential defects of HDI and proposed a Bayesian factor

analysis model as an alternative to the HDI. In criticizing the nature of the HDI, Hou et al. proposed a different way of constructing the HDI in terms of capturing the pure flow of human development in the areas of material well-being, health, and education [3]. Based on a comparison, authors proposed the HDIF that replaces the HDI. HDI simplifies and captures only part of what human development brings. It does not reflect inequalities, poverty, human security, empowerment, etc. The HDRO offers additional composite indexes to replace some key issues of human development, inequality, gender inequality and poverty [14].

1.2 Inequality-Adjusted Human Development Index (IHDI)

While the HDI can be viewed as an index of average achievements in human development dimensions, the IHDI is the level of human development when the distribution of achievements across people in the society is accounted for. The IHDI will be equal to the HDI when there is no inequality but falls below the HDI as inequality rises. The difference between the IHDI and HDI is the human development cost of inequality, also termed – the loss to human development due to inequality. The IHDI combines a country's average achievements in health, education and income with how those achievements are distributed among country's population by "discounting" each dimension's average value according to its level of inequality. Thus, the IHDI is distribution-sensitive average level of HD. Two countries with different distributions of achievements can have the same average HDI value. Under perfect equality the IHDI is equal to the HDI, but falls below the HDI when inequality rises. The IHDI is calculated for 151 countries [15].

1.3 Gender Development Index (GDI)

The GDI measures gender gaps in human development achievements by accounting for disparities between women and men in three basic dimensions of human development—health, knowledge and living standards using the same component indicators as in the HDI. The GDI is the ratio of the HDIs calculated separately for females and males using the same methodology as in the HDI. It is a direct measure of gender gap showing the female HDI as a percentage of the male HDI. The GDI is calculated for 164 countries. Countries are grouped into five groups based on the absolute deviation from gender parity in HDI values. This means that grouping takes equally into consideration gender gaps favoring males, as well as those favoring females. The GDI shows how much women are lagging behind their male counterparts and how much women need to catch up within each dimension of human development. It is useful for understanding the real gender gap in human development achievements and is informative to design policy tools to close the gap [16].

1.4 Gender Inequality Index (GII)

Gender inequality remains a major barrier to human development. Girls and women have made major strides since 1990, but they have not yet gained gender equity. The disadvantages facing women and girls are a major source of inequality. All too often, women and girls are discriminated against in health, education, political representation, labour market, etc. - with negative consequences for development of their capabilities and their freedom of choice. The GII sheds new light on the position of women in 160 countries; it yields insights in gender gaps in major areas of human development. The component indicators highlight areas in need of critical policy intervention and it stimulates proactive thinking and public policy to overcome systematic disadvantages of women [17].

2. Methods

In this paper, basic scientific methods such as observation, the method of comparing, generalizing, analysis and synthesis were used. These methods of a cognitive cycle were used at the same time in several steps. The method of comparison was based on a systematic and purposeful perception of a subject and a given issue. One of the quantitative methods of processing the outputs was the use of contingency tables using Microsoft Excel which were used to evaluate needed information and outputs.

3. Results

3.2 Russian Federation

Russian Federation's HDI value for 2017 is 0.816 - which put the country in the very high human development category - positioning it at 49 out of 189 countries and territories. Over the past 3 years, life expectancy at birth in the Russian Federation has increased by 0,3 years, and the expected years of schooling have not changed. The GDI is calculated for 164 countries. The 2017 female HDI value for Russian Federation is 0.823 in contrast with 0.808 for males, resulting in a GDI value of 1.019, placing it into Group 1. The IHDI is basically the HDI discounted for inequalities. The 'loss' in human development due to inequality is given by the difference between the HDI and the IHDI, and can be expressed as a percentage. The Human inequality coefficient for Russian Federation is equal to 9.3 percent. Russian Federation has a GII value of 0.257, ranking it 53 out of 160 countries in the 2017 index. Russia is a developing country, which for two decades has passed the stage of the formation of a new civilizational model [6]. Partially identified imbalances are associated with the multistructural nature of the Russian economy and with territorial expanse [10].

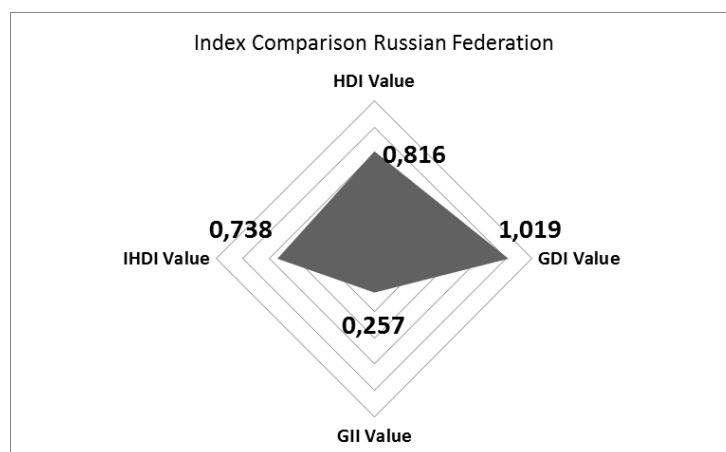


Fig. 2. Index Comparison - Russian Federation

3.3 Global Supply Chain

3.3.1. Germany

Germany's HDI value for 2017 is 0.936 - which put the country in the very high human development category - positioning it at 5 out of 189 countries and territories. Over the past 3 years, life expectancy at birth in the Germany has increased

by 0,4 years, and the expected years of schooling have not changed. The Human inequality coefficient for Germany is equal to 7.8 percent. The GDI is calculated for 164 countries. The 2017 female HDI value for Germany is 0.919 in contrast with 0.951 for males, resulting in a GDI value of 0.967, placing it into Group 2. Germany has a GII value of 0.072, ranking it 14 out of 160 countries in the 2017 index.

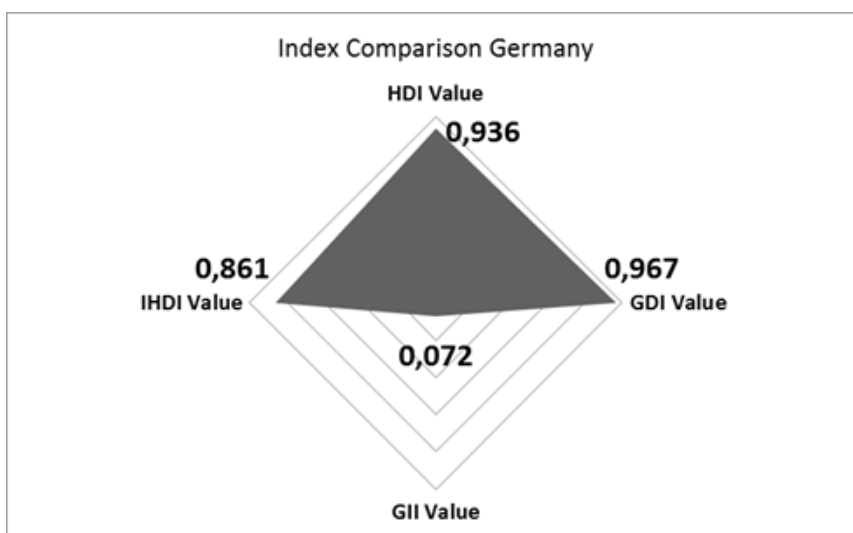


Fig. 3. Index Comparison - Germany

3.4 Slovakia

Slovakia's HDI value for 2017 is 0.855 - which put the country in the very high human development category - positioning it at 38 out of 189 countries and territories. Over the past 3 years, life expectancy at birth in the Slovakia has increased by 0,3 years, and the expected years of schooling have not changed. Slovakia's 2017 HDI of 0.855 is

below the average of 0.894 for countries in the very high human development group and below the average of 0.895 for countries in OECD. The Human inequality coefficient for Slovakia is equal to 6.7 percent. The 2017 female HDI value for Slovakia is 0.850 in contrast with 0.858 for males, resulting in a GDI value of 0.991, placing it into Group 1. Slovakia has a GII value of 0.180, ranking it 39 out of 160 countries in the 2017 index.

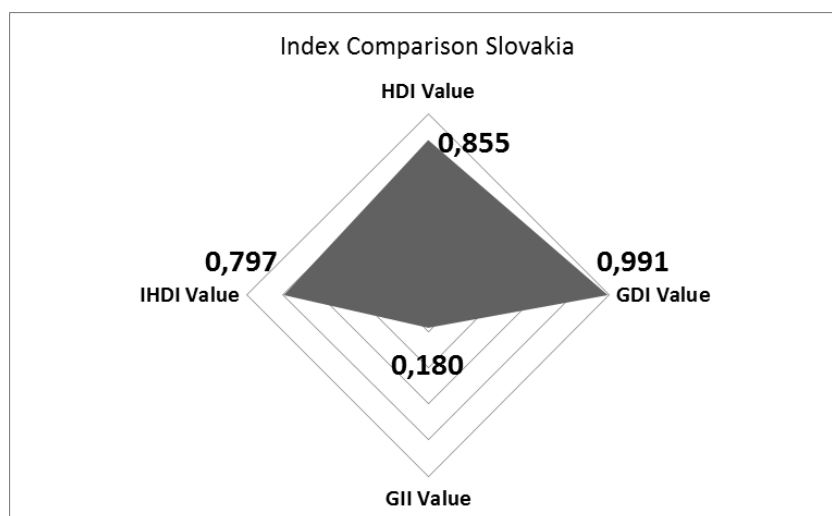


Fig. 4. Index Comparison - Slovakia

3.5 Comparison of Selected Countries

The value of the HDI index was increased in all three selected countries. As we can see in the chart, Germany achieved the highest values. Germany's HDI increased by 2.03% from 2007 to 2017, but it is the lowest percentage increase compared to other selected countries. From the overall view of the development of the HDI index in Germany, it can be stated that the lowest percentage increase in the monitored period is caused by the gradual slow convergence of the Russian and Slovak economy to

the German one. This is evidenced by the fact that, at the beginning of the period, the percentage difference between the HDI index of Germany and the Russian Federation was 18%, and at the end the difference between achieved values was 15%. A similar situation can be seen in the confrontation of Germany with Slovakia. Germany still has a leadership position in the comparison with the Russian Federation or Slovakia, it is represented by its 5th place out of all 189 countries. This facts is shown in Figure 5 and Table 1.

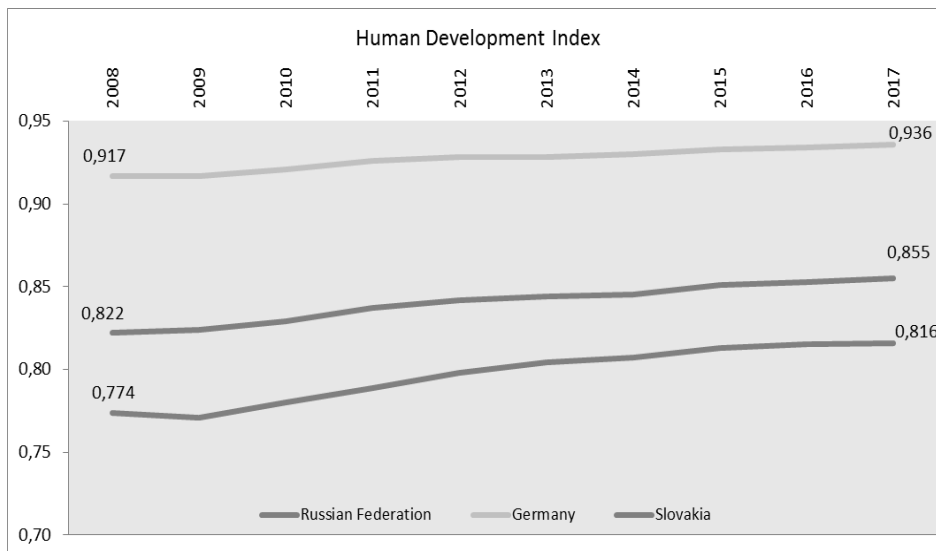


Fig. 5. Comparison of the HDI index of selected countries

The Russian Federation, compared to Germany and Slovakia, achieved the highest percentage increase of the HDI index in the monitored 10-years period. This increase represents growth of the HDI index by 5.15%. This fact also positively influenced the

Russian Federation's ranking advance to 49th place, although it is the lowest among the selected countries. The highest increase can be seen in the time interval 2009-2012, when the HDI index had increased by 3.50%.

Table 1. The HDI index of selected countries

Year	Human Development Index					
	Russian Federation		Germany		Slovakia	
	Value	Change In Rank (2012-2017)	Value	Change In Rank (2012-2017)	Value	Change In Rank (2012-2017)
2008	0,774	3	0,917	-1	0,822	-1
2009	0,771		0,917		0,824	
2010	0,780		0,921		0,829	
2011	0,789		0,926		0,837	
2012	0,798		0,928		0,842	
2013	0,804		0,928		0,844	
2014	0,807		0,930		0,845	
2015	0,813		0,933		0,851	
2016	0,815		0,934		0,853	
2017	0,816		0,936		0,855	

Source: author's calculations

Slovakia was the last monitored country to provide a supplementary view of the development of quality of life in the confrontation between the Russian Federation and Germany. At the beginning of the analyzed period, the value of the HDI index was 0.822. Ten years later, we see a significant 3.86% increase, which is the second largest percentage increase among the countries under review. This confirms the common feature of all selected countries, which is a positive trend that reflects Slovakia's 38th place in the ranking of all countries. The highest increase can be seen in the time interval 2009-2011, where the HDI index had increased by almost 2%. At the beginning of the monitored period, the percentage difference between the HDI index of Germany and Slovakia was 12%, and at the end of the period the difference between achieved values was 9%.

4. Conclusion

Based on the aim to examine the quality of life using the HDI index, on an example of two economically strong countries - the Russian Federation and Germany and one small country - Slovakia whose economic development is largely dependent on previous two countries. We defined the monitored period from 2008 to 2017, and we can state that the development of the HDI index was positive. As the HDI index reflects the quality of life, it is necessary to increase this index. The purpose of the article was to compare the obtained data with regard to the development of quality of life and to examine the various stages in which the selected countries were located. Nowadays, in an unstable situation in many spheres of life, it is difficult to predict how the individual factors affecting quality of life will behave in future periods in individual countries. Our opinion is that a more effective solution is not only long-term country strategies, but also operational and action plans to achieve early results. Although the selected countries have many common characteristics and in many spheres the directions of the countries are influenced by regulations and limitations, it is important to realize that each country must maintain its integrity. Growth in the value of the HDI index in all three selected countries over the monitored period can be positively assessed. It is also important to state that the percentage difference between achieved values of countries is decreasing. Each country should focus on the areas of improvement in the quality of life of its population, given its shortcomings. A good solution for improving individual indicators is to be inspired by strategies of countries at the top of the ranking, as Norway, New Zealand, Switzerland.

5. Summary

It is very difficult to objectively evaluate the quality of life in countries and there is no uniform method yet, or any indicator that would objectively indicate the state of the countries. But nowadays, there are several methods and indicators that to some extent reflect the quality of life in the countries. In the paper we used one of the offered indicators, the HDI index, which evaluates the quality of life in 189 countries of the world. Based on the HDI index, we realized a comparative analysis between the Russian Federation and Germany. We also offered a comparison of these strong economies with Slovakia. The paper offers a response to the question of what developments have been observed by the selected countries in the 10-year period (2008-2017), taking into account the criteria on which the HDI index is based. The processing of the issue creates space for a deeper discussion of the positive and negative aspects of the HDI index. Many factors influence the quality of life, future researches will be focused on other methods of assessing quality of life and comparing them with this study.

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