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Influence of Human Development Index to the State Economy in V4 Region*

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ABSTRACT

Along with economic development, it is the human development index that is needed for the final assessment of the country's position. Chronologically, not only personal statements of people about their satisfaction, but also information of an objective type was assigned to quality of life indicators. Due to the mentioned contribution is orientated to the indicator of the UN Development program, dealing with problems of human development, consisting of Human Development Index (HDI). The contribution analysis mentioned indicator according to three areas, orientated to the development of the indicator in the frame of chosen countries. The goal of the contribution is achieved through the evaluation of the development of life quality in V4 countries, in the context of HDI using. The research also includes an overview of the key factors that affect the calculation of the index, the approximation of individual components of the index and their importance, development, influence. In the analytical part, a thorough analysis of secondary information sources is performed using higher statistics. The results of the contribution show specifications in individual time periods, offering possible influences to the analyzed indicator. Together with economic development it is necessary for final evaluation of the country position. Due to its relevance it present also proper tool for qualitative and high informative value of monitoring. To maintain prosperity and competitiveness is extraordinary important the country could know its position.

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INTRODUCTION

In last decades, but also in developing countries, the quality of life has come to the forefront in recent decades, among other indicators. Interest in this issue has been aroused primarily by significant political, social, economic changes and, last but not least, technological progress. In general, there are a relatively large number of quality of life models. Many of them are therefore very different in structure and concept. According to Johnston et al. (1994) quality of life is a state of well-being of an individual or group that can be perceived or identified by "observable" indicators. Since 1990, the United Nations Development Program (UNDP) has published human development reports containing the Human Development Index (HDI). It was created to emphasize the fact that people and their abilities should be the ultimate criterion for assessing a country and therefore not just economic development itself. We rank the human development index among the aggregated indicators measuring the progress of society in three dimensions related to the health, education and living standards of the population.

The aim of the paper is to analyze the quality of life in selected EU countries using the human development index. In addition to the above, the Human Development Index also meets the three basic characteristics of indicators, which are relevance, credibility, legitimacy and is therefore one of the examples of the possible use of aggregated indicators. Along with economic development, it is the human development index that is needed for the final assessment of the country's position.

To understand the concept, we can look into history and follow its development from a given perspective. In the literature, we often find inconsistencies between when and how the term first appeared. According to Spilker, the beginning dates back to the 1930s, when the term was still associated with the medical environment. From an economic point of view, the concept of quality of life was mentioned by Ordway and Osboron in 1953-1954 (Kacmarova, 2013). Social indicators have been used since the 1960s and describe objective living conditions in society (Ferriss, 2006). The concept of behavioral economics is currently one of the fascinating fields of integration of psychological phenomena into economic models, so that they predict more accurately and reliably human behavior and decision-making (Heckova et al., 2019).

Chronologically, not only personal statements of people about their satisfaction, but also information of an objective type was assigned to quality of life indicators. They included material indicators such as money, sufficient food and quality of accommodation and intangible indicators such as social relations, health and the quality of the environment in which they live (Bacova, 2008). In the 1980s, we can say that the issue is stagnating, but the approach to quality of life indicators is gradually changing, the greatest influence can be attributed to the growing relativism and individualism in the social sciences. It has been shown that a deeper theoretical and philosophical foundation is lacking, and that an empirical approach to capturing quality of life is not enough (Gullone, 2002). Since the 1990s, the study of quality of life has been further developed, where we see an effort to unify and thoroughly define the theoretical foundations as well as to create appropriate ways of measuring quality of life (Veenhoven, 2000). Above all, such development is intended to create opportunities that will make it possible to increase people's abilities so that they have the opportunity to live a life that they value themselves. Therefore, the primary preconditions are a long and healthy life, access to education, access to the means to actually live a dignified life, but also the opportunity to actively participate in the life of the community.

Presently diagnosis of the life quality in the country, as well as prediction of its failure, becomes much discussed theme. To maintain prosperity and competitiveness is extraordinary important the country could know its position. Adequate managerial decisions could not be done without detail analysis of the country. The important assumption for effective decision, leading the representatives of the country means qualitative, complex and timely diagnosis, supported by detail analysis of negative factors, threatening the country existence (Horvathova and Mokrisova 2019).

1. LITERATURE REVIEW

The area of the HDI and life quality is studied in literature by number of authors. The well-known Human Development Index (HDI) encompasses only three rather basic aspects of human welfare. Ranis et

al. (2011) aims to go beyond this, by identifying 11 categories of human development, according to which the HDI are shown to be worse indicators of the extended categories of human development for OECD countries than for developing countries. Chakravarty (2003) characterizes a general measure of human development index achievement, which contains the UNDP human development index as a special case, regarded as a generalized human development index. The general index allows calculation of the percentage contributions of individual attributes to overall achievement and hence to identify the attributes that are more/less susceptible to achievement. The factors that affect individuals' concepts of QOL are physical health, psychological status, and level of independence, social relationships, personal beliefs and environmental characteristics. QOL somewhat describes the status of the people living in a country or region, and is nowadays considered an acceptable theoretical framework for examining the living conditions of different societies. In addition to economic issues, QOL affects the statuses of a society's individuals, taking into account exogenous factors such as infrastructures, social organizations, social relationships, environment etc. (Koochi et al., 2017)

McGillivray (1991) used simple statistical analysis, questioning the composition of the HDI and its usefulness as a new index of development, concluding HDI fails to provide insights into inter country development level comparisons which preexisting indicators, including GNP per capita, alone cannot. Noorbakhsh (1998) discusses a modified index for measuring human development testing the robustness of the suggested index. The new index is then used to delineate, with some justification, different groups of countries at various levels of human development. Also McGillivray and White (1993) confirmed HDI contribution to the assessment of development levels differs markedly among country groups. Hagerty et al. (2001) testified availability and utility of the index in various countries, found their using is limited but possible for determination of public policies. Neumayer (2001) proposes to qualify a country's human development as potentially unsustainable if the net depreciation of its manufactured and natural capital stock is bigger than its investment, linking the human development index with sustainability. There is connections between economic growth (EG) and human development (HD) (Ranis et al., 2000), when countries initially favoring economic growth lapse into the vicious category, while those with good HD and poor EG sometimes move into the virtuous category. Where choice is necessary human development should be given sequencing priority. Hagerty (2000) studied evidence for social comparison effects of income on subjective well-being (SWB), showing that the range and skew of the income distribution in a community affects a person's happiness, and that decreasing the skew (inequality) of the income distribution in a country increases average national SWB. Both studies strongly support social comparison effects of income within a community.

2. METHODOLOGY AND RESEARCH METHODS

The aim of the paper is to analyze the quality of life in selected EU countries using the human development index. The research also includes an overview of the key factors that affect the calculation of the index, the approximation of individual components of the index and their importance, development, influence. In the analytical part, a thorough analysis of secondary information sources is performed using higher statistics. We chose the V4 countries as selected EU countries. Contribution also contains an analysis of the influence of individual components of the index, possible variants of development as well as final proposals. We based our research on the definition of the UN Development Program (2018), which defines human development as a process of expanding human possibilities. We also used the construction of the human development index in such a way that the human development index is formulated as a measure of a country's shortage or deficit in each of three separate areas - life expectancy (x_1), education (x_2) and adjusted income (x_3). It further defines the following as a deficit indicator for country j with respect to the variable x_i as

$$I_{ij} = \frac{\max_k \{x_{ik}\} - x_{ij}}{\max_k \{x_{ik}\} - \min_k \{x_{ik}\}}$$

The index is compiled so that each single deficit indicator for country j , $i = 1,2,3$, lies between 0 and 1. The average deficit index for country j from the three areas is defined as a simple unweight average of z_{ij} :

$$I_j = \frac{1}{3} \sum_{i=1}^3 I_{ij}$$

The deficit in the human development index for country j is subsequently defined as the average deficit. Thus, if H_j is the human development index for a country is j , we have by definition $1 - H_j = I_j$ or $H_j = 1 - I_j$.

The V4 region is the name of a grouping of four countries in the Central European region, between which there is a relationship of common interest. This community includes the Czech Republic, Poland, the Slovak Republic and also Hungary. As these countries draw on the same cultural, social, historical aspects but also on many other values, their common goal of cooperation is to preserve and strengthen the countries. V4 cooperation has become the most clearly profiled initiative in the Central European region. The group has also gained a good reputation as a catalyst for integration processes, as one pragmatically functioning form of multilateral cooperation in the region and as a symbol of stability in the region. The data had been obtained from worldwide database Eurostat (2018) and Euroekonom (2010).

Table 1. Classification of the countries according to the HDI development

Scale	Level of human development
0,000 - 0,499	Low
0,500 - 0,799	Medium
0,800 - 0,899	High
0,900 - 1,000	Very high

Source: own processing according to UN Human Development Report, 2018

In assessing the V4 countries, we relied on the 2009 UN Human Development Report, which divides countries into four groups: countries with low, medium, high and very high levels of human development (Hopkins, 1991). The values given in Table 1 are the basis.

3. RESULTS

3.1 Czech Republic

The values of the indicator of gross national income per capita in purchasing power parity range from 100 to 75,000. From the collected data we can observe that the Czech Republic from 1990 to 2015 at gross national income per capita in purchasing power parity increased from 19 965 up to 28,144 units this shift is up to 8,179 units. As we observe with this partial indicator from 1991 to 1994, the values range from 17638 to 17971, which are the lowest values that the Czech Republic has achieved with this indicator. After 1994, the values increased and increased by almost 10,000 over the course of twenty years.

The expected number of years of education was at the beginning of the observed period, i. j. in 1990 only 11.9 and gradually over the next three years the values decreased by 0.1. The scale of this indicator ranges from 0 to 18. As the value at the beginning of recording was 11.9, we can say that the Czech Republic, despite a not very high number, has not been one of the worst countries in terms of the V4 countries since 1990. During the years 1990 to 1993, the value does not exceed 12. The values from

1990 to 1997 have an increasing tendency. In 1998, a decrease compared to the previous year from 13.3 to 1.9 is a difference of 0.4 units. However, an increase of 0.5 units is recorded in the following year. We can evaluate this positively, as the average year-on-year shift is 0.2.

The average number of years of schooling ranges from 0 to 15. As with the previous two indicators, the value at the beginning of the observed period is the lowest, with a value of 10.9. However, it should be noted that this value is high enough, taking into account that the maximum value in this indicator is 15. The following year, a value was recorded with an increase of 0.2 and the Czech Republic maintained this trend in growth until 1994, where it reached the value of 11.8. After the mentioned year 1994 the value exceeded 12 and in most of the following years from 1995 to 2001 it remained approximately at the value 12. After 2001 there was an increase to 13.0 but not permanent, this increase lasted 4 years and after 2005 again the value reached the number 12. The Czech Republic has maintained such a value for a long time until the end of the period monitored by us.

With the partial indicator of the average life expectancy at birth, we range from 20 to 85. In the development of this indicator in the Czech Republic, we observe an increase of 7 years. In 1990, at the beginning of our collected data, the country reached a value of 71.8. Among the V4 countries, this number was the highest. Among the data, we only observe an increase in this indicator without interruption and without any irregularities. We can evaluate the development of this indicator positively in all monitored periods.

In the table Kendall Tau - Czech Republic, we evaluated the dependencies of individual sub-indicators and how they affect the overall human development index. It is clear that as these sub-indicators contribute to the calculation of the total HDI, there is a relationship between these indicators. In the Gretl program, we used the Kendall-Tau calculation to find out how strong the dependence is between the individual indicators in the case of the Czech Republic. This finding was necessary for the targeted direction of our proposals. In the presented table we see that the closest to the value of 1, which is significant for us in the method we use, is the indicator Expected number of years of education with the value of 0.986000963. Another indicator with the second highest weight is the average life expectancy at birth and only in third place is the economic indicator, Gross National Income per capita in purchasing power parity. With the lowest value, i.e. the indicator that least affects the overall HDI, we present the average number of years of schooling.

Table 2. Kendall Tau Correlations – Czech Republic

AVERAGE	Kendal Tau Correlation HDI - Health, average life, average years of education, HDI V4 Marked correlations are significant at $p \leq 0,01$				
	<i>average life at birth</i>	<i>average years of schooling</i>	<i>assumed years of schooling</i>	<i>gross national pension per inhabitant in purchasing power parity</i>	HDI
<i>average life at birth</i>	1	0,53098332	0,99283225	0,953528713	0,985374
<i>average years of schooling</i>	0,53098332	1	0,53685171	0,430384203	0,648833
<i>assumed years of schooling</i>	0,99283225	0,53685171	1	0,949678253	0,98601
<i>gross national pension per inhabitant in purchasing power parity</i>	0,953528173	0,430384203	0,949678253	1	0,944913
HDI	0,985373813	0,648833224	0,986000963	0,944913461	1

Source: own processing according to program Gretl

3.2 Poland

In the range of values from 100 to 75,000 for the partial indicator of the value of gross national income per capita in purchasing power parity, Poland reached the value of 9,614 in 1990, i.e. at the beginning of the observed period, which is due to economic strength, state size and position in the V4 group low value. However, the increase from 1990 to 2015 is significant, and even more so. We are talking about a total increase plus 14,503 units. Interestingly, the Czech Republic started with a value of 19,965, but Poland did not approach this value until 2008, when it reached 19,734. Although it is clear from the data collected that these are positive and progressively evolving values, as in the case of the Czech Republic. Republic as well as in the case of Poland, it must be stated that these are lower values in the case of Poland. The best values developed after 2004, where the positive development is the most seeming and visible.

Another partial indicator analyzed by us is the expected number of years of education; it ranges from 0 to 18. In the case of Poland, the value starting in 1990 is 12.3 and during the next two years this value is unchanged. In 1994, there was a change of an incremental nature by 0.6. At first glance, the gradual development trend is seemingly stable, as the changes took place on average at three-year intervals. After 2004, the situation stabilized slightly at around 15.0 - 15.4. The growing development trend was violated only in 2004, when a decrease in value was recorded from 15.5 in 2003 to 14.8 in 2004. Fortunately, this trend did not continue in the following period, and since 2005 we have only observed an increase in values. The total increase of the given indicator from 1990 to 2015 is 4.1.

The average number of years of schooling is expressed on a scale from 0 to 15. Compared to other V4 countries, Poland, with an initial value of 9.8 in 1990, is in the penultimate place. Only Hungary was worse off. From 1992 to 1999, we can observe a stabilization of the value in the range from 10.1 to 10.9. During these eight years, the increase is gradual every year by 0.1, which represents a 10% increase. Since 2000, growth has been slower but still positive. Since 1990, we have only seen an increase in values without any interruption. Regarding the values achieved in measuring the average number of years of schooling, we state that the development was either positive or stable from year to year, i.e. we observed an increase or the same value compared to the previous year.

For the indicator of average life expectancy at birth, the values range from 20 to 85 years. In the case of Poland, we start at 70.9 in 1990. During the period under review, we can state an increase of more than 7 years, which is similar to the case of the Czech Republic. The overall development of this indicator was similar, and in the end, from the analyzed data, we can say that it was only an increase. From 1991 to 1995, the value reached from 71.0 to 71.8. Subsequently, from 1996 to 1997, we observe a gradual increase of 0.4. The development after 1997 reached the value of 73.0. On average, by the end of the period under review, the values had increased by 0.4 until 2015, when Poland reached 77.6.

The Kendall Tau - Poland table presents the dependencies closest to the value of 1, with the average life expectancy at birth being up to the value of 0.993837121. Another indicator that represents a very strong dependence is the average number of years of schooling. The following are values that have lower values, namely gross national income per capita in purchasing power parity, which reaches the value of 0.979950865. Indicator The expected number of years of education according to our calculation in the Gretl program reaches the value of 0.973124054, which is the weakest dependence.

Table 3. Kendall Tau correlations – Poland

AVERAGE	Kendal Tau Correlation HDI - Health, average life, average years of education, HDI V4 Marked correlations are significant at $p \leq 0,01$				
	<i>average life at birth</i>	<i>average years of schooling</i>	<i>assumed years of schooling</i>	<i>gross national pension per inhabitant in purchasing power parity</i>	HDI
<i>average life at birth</i>	1	0,98375768	0,949745166	0,992065188	0,993837121

<i>average years of schooling</i>	0,983757678	1	0,954899931	0,970254281	0,991052325
<i>assumed years of schooling</i>	0,949745166	0,954899931	1	0,916997326	0,973124054
<i>gross national pension per inhabitant in purchasing power parity</i>	0,992065188	0,970254281	0,916997326	1	0,979950866
HDI	0,993837121	0,991052325	0,973124054	0,979950865	1

Source: own processing according to program Gretl

3.3 Slovakia

When analyzing the values of gross national income per capita in purchasing power parity, we also range from 100 to 75,000 in the values of the Slovak Republic. Gross national income per capita in purchasing power parity was recorded at the beginning of the period under review with a value of 14,319, which is compared to the V4 countries as the third best result. In 1990 the value is 14,319, but in 1991 the value has a declining tendency, namely 12 143. An interesting finding is that while in countries such as the Czech Republic and Poland the values increased over time in the Slovak Republic, we do not see such a trend in the first years. However, the increase occurred during the years from 2000 to 2015. However, we cannot talk about a continuous increase. In 2009, the value was 23,115, at which we observe a decrease compared to 2008, in which the value was 2, 4191 by 1,076 units. The decrease in values is also recorded in 2011 compared to 2010. Overall, we can evaluate the development as positive, because during the years from 1990 to 2015 there was an increase of 12,445 units, which is comparable to the increase in gross national income per capita in purchasing power parity e.g. with Poland (Slovakian statistics and demography, 2007).

The following partial indicator, which we analyzed in the V4 countries and in the Slovak Republic, was the expected number of years of education. This indicator ranges from 0 to 18. At the beginning of the period we monitored, the Slovak Republic led appropriately to its position among other countries. The initial value was 11.6 in 1990, but also in 1991. Until 1999, we observe a gradual increase to 13.3. This value was the same for two consecutive years in 2000 and 2001. The recurring increase is interrupted by 15.0 in 2009, which was stable for the next four years. In 2013, we can record a low increase of 0.1, but this trend was not maintained and the years 2014 and 2015 had a value reduced to 15.0. Although in later years the values were without significant progress, we can still rate the development period as positive, because even in the case of the Slovak Republic there is an obvious improvement of 3.4. However, this value of improvement is the lowest among the V4 countries.

The partial indicator, the average number of years of schooling, is expressed in values from 0 to 15. Among the analyzed countries, Slovakia ranked behind the Czech Republic with final values. At the beginning in 1990, Slovakia reached a value of 10.8, which is only 0.1 less than in the case of the Czech Republic. In contrast to Poland with a value of 9.8 and Hungary with a value of 8.7, in 1990 we were among the stronger countries in this respect. In terms of time, the values increased until 1995, where they fell from 11.4 by 0.2 to the value in 1996 to 11.2. In the same proportion, the year 1997 had a decreasing tendency, where the value decreased to 11.0. The declining trend lasted until 2001 to 10.1. In 2002, it rose to 10.3 and rose to 12.1 until 2011. After the years 2011 to 2014, when it remained in the same values of 12.1, in 2015 it increased by another 0.1 to 12.2.

As in the assessment of other countries, in the case of the Slovak Republic, we ranged in the range of indicators of average life expectancy at birth between values from 20 to 85 years. In 1990, with a value of 71.2, the Slovak Republic was, as with the indicator of the average number of years of schooling, closely

behind the Czech Republic. During the years from 1990 to 2015, we observe an increase of 5.2. The increase in values was significant over time without any fluctuation. The largest shift was in 1997 from 72.6 to 72.9 in 1998. Subsequently, 10 years later, a positive development of 0.3 was recorded again between 2007 and 2008.

Table 4. Kendall Tau correlation – Slovakia

Slovakia					
AVERAGE	Kendal Tau Correlation HDI - Health, average life, average years of education, HDI V4 Marked correlations are significant at $p \leq 0,01$				
	<i>average life at birth</i>	<i>average years of schooling</i>	<i>assumed years of schooling</i>	<i>gross national pension per inhabitant in purchasing power parity</i>	HDI
<i>average life at birth</i>	1	0,573754441	0,974140989	0,964422983	0,982759399
<i>average years of schooling</i>	0,573754441	1	0,459915001	0,656271119	0,666787795
<i>assumed years of schooling</i>	0,974140989	0,459915001	1	0,949783655	0,96424251
<i>gross national pension per inhabitant in purchasing power parity</i>	0,964422983	0,656271119	0,949783655	1	0,992435378
HDI	0,982759359	0,666787795	0,96424251	0,992125378	1

Source: own processing according to program Gretl

The strength of the dependence of individual indicators in the table Kendall Tau - Slovak Republic can be assessed as follows. We show the strongest dependence in the case of gross national income, which reaches a value of up to 0.992135378. Another strong indicator is the average life expectancy at birth. The third strongest indicator appears to be the expected number of years of education, which has a value of 0.96424251, which is still a value with a very strong impact. The lowest value achieved in this calculation was the value of the average number of years of schooling.

3.4 Hungary

The last country we analyzed is Hungary. When evaluating the achieved values of national income per capita in purchasing power parity, our values should range from 100 to 75,000. This indicator was achieved in the values of 15 986 in 1990 from the beginning of the period value declining character. From 1993 we can state a gradual increase until 1995. In 1996, according to the data collected, we found a slight decrease of 46. From the following year, which means in 1997, the indicator has retained its gradually increasing character. In 2015, the value of gross national income per capita in purchasing power parity was 23,394, which is an increase of 7,408 compared to the first observed year 1990. However, the resulting value is the lowest achieved value compared to the Czech Republic, the Slovak Republic and Poland.

Another indicator analyzed in the assessment of Hungary's position is the expected number of years of education. This indicator measured on a scale from 0 to 18 is at the level of 11.1 in the first observed year, i.e. in 1990. In terms of the countries we compare and analyze, this number is at its lowest value compared to other V4 countries. With a gradual increase in 1996, this value reached the level of 13.2. The following year the value decreased by 0.1. However, since 1998, this value has started to develop in a positive direction again. In 2003, the value reached the level of 15.3. After a slight decrease in 2004 to

2005, the value returned to 15.3 until 2012. In 2013, it increased to 15.8, but during the following year and 2015 it was only in the values of 15.6. In general, however, we can state an increase of 4.5 over the entire period analyzed by us.

The average number of years of schooling ranges from 0 to 15. Hungary is in last place when comparing the 1990 data, as the value for the year is only 8.7. Gradually, however, these values developed, as in other countries, and as early as 1995, Hungary reached a value of 10.0. From 1990 to 1998, this value had an increasing tendency to 10.3. In the given period it increased by 1.6. This was followed by three years of a slight decline, when the value remained at the level of 10.2. The year 2011 with a value of 11.7 held the value from 2010, but the year 2012 reduced this indicator by 0.1 and ended at a value of 11.6. Since 2002, we can state another increase, this increase ended in 2015 at 12.0. The overall increase was by 6.3.

The average life expectancy at birth, which ranges from 20 to 85, was at the beginning of the observed period 1990 in Hungary at the lowest level among the analyzed countries. The difference between the Czech Republic, i.e. the country with the highest value of 72, and Hungary with a value of 69.4 is 2.6. The overall development of this indicator has developed relatively slowly. Until 2015, the values did not equalize. The difference between the best rated country, the Czech Republic and the worst rated country, Hungary, is up to 3.3. Although the values were still growing in no year, they did not match another V4 country. In the last year of our analysis, Hungary reached a value of 75.3. However, the progression between the initial value is noticeable at 5.9.

Table 5. Kendall Tau correlations – Hungary

Hungary					
AVERAGE	Kendal Tau Correlation HDI - Health, average life, average years of education, HDI V4 Marked correlations are significant at $p \leq 0,01$				
	<i>average life at birth</i>	<i>average years of schooling</i>	<i>assumed years of schooling</i>	<i>gross national pension per inhabitant in purchasing power parity</i>	HDI
<i>average life at birth</i>	1	0,927093063	0,915222063	0,833066957	0,932933251
<i>average years of schooling</i>	0,927093063	1	0,893438218	0,872253816	0,95385491
<i>assumed years of schooling</i>	0,915222063	0,893438218	1	0,903333198	0,97507085
<i>gross national pension per inhabitant in purchasing power parity</i>	0,833066957	0,872253816	0,903333198	1	0,955066295
HDI	0,932933251	0,95385491	0,97507085	0,955066295	1

Source: own processing according to program Gretl

In the table Kendall Tau - Hungary we can see that all values are very strong. However, the value of the indicator, the expected number of years of education, is the strongest indicator. The second high-strength indicator is gross national income per capita in purchasing power parity, which in the case of Hungary is 0.955066295. As the third indicator with a lower value, we analyzed the indicator of the average number of years of schooling. The lowest value in our table is the average life expectancy at birth.

In the following section, we performed an analysis of the main indicator, i.e. the human development index, as well as the other four indicators, which in our opinion are significant for determining the quality of human life. In addition to evaluating the development of the human development index, it was necessary

to analyze other sub-indicators, which we believe are needed to further clarify the understanding of quality of life. The dimensions in which it is necessary to consider when assessing the quality of life are:

- health - we analyzed this indicator in terms of average life expectancy at birth;
- education - we described the importance of education in the dimension of the average number of years of schooling, but also in the expected number of years of education;
- economic variables The economic aspect chosen by us, which we analyzed in the following section, was gross national income in purchasing power parity.

3.5 Human Development Index

The development of the human development index indicator is on the rise. As we can see in the graph (Figure 1), the Czech Republic appears with the highest values. The HDI in Czech Republic increased by 3.31%, from 1995 to 1999. This presents a significant increase and the highest 5-year cycle. In the next five years, we observe an increase of 2.31%, which is 0.84. In 2009, the increase is only 1.42%, but in 2014 we see a higher increase, namely 1.63%. By 2015, the index reached 0.878, which is the highest value index of all countries and the overall percentage increase was 11.85%.

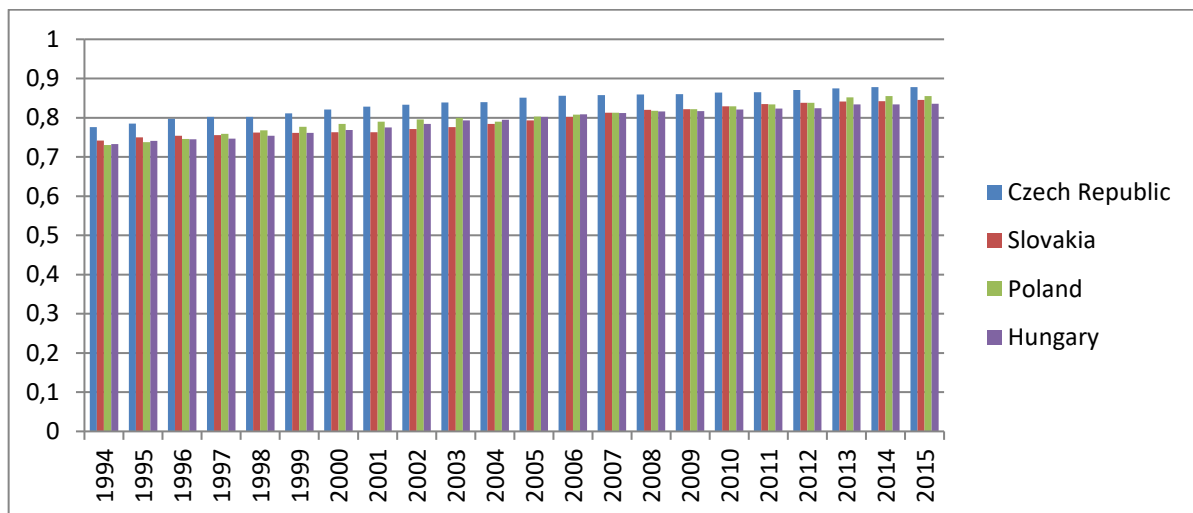


Figure 1. Trend of HDI development in V4

Source: own research.

Another country is the Slovak Republic, which at the beginning of the period analyzed by us reached a human development index of 0.75. After five years, we see a significant progress of 1.47%. In the next five years, the increase is higher by 2.75, which is a higher increase compared to the Czech Republic in 2004. In 2009, we observe a significant increase, namely 3.66%, which is the highest increase of all V4 countries for the period 2005-2009. By 2004, the index had moved another 1.57% and in 2015 it reached 0.845. The overall shift of the human development index in the Slovak Republic was by 12.67%, which we consider to be a better value than achieved by the Czech Republic.

Poland, as the third country in the Visegrad Group, reached an index value of 0.738 in 1995, which, however, was the lowest value among the countries. In the next five years, however, the index gradually grew and the increase was up to 5.28%, which is the highest number that was achieved in this period. Until 2004, the increase was in the normal value, namely 1.66, which was the lowest increase, but in 2009 Poland strengthened again, namely by 2.37% to 0.822. Another increase in 2014 was 2.77%. Poland reached a value of 0.855 in 2015, which represented an increase of 15.85% from the value in 1995, namely 0.738.

The last country analyzed was Hungary, which at the beginning of 1995 reached an index value of 0.741 and by 1999 had risen by 2.7% to 0.761. Another increase, the highest among the four countries, was in 2004 at 3.38%. In 2009, a shift of 1.87% to 0.817 was recorded, but it was still the lowest value in the V4 area. Hungary strengthened its human development index by 1.58% by 2014, but still reached its lowest level. By 2015, the index had reached a value of 0.836, which we evaluate an increase of 12.85% compared to 1995. This increase is the second highest among the Visegrad Group countries.

4. DISCUSSIONS

From the point of view of the statistical evaluation of the first country, i.e. the Czech Republic, it is important to be aware of the need to increase the value of the expected number of years of education. Equally important is the increase in the indicator of the average life expectancy at birth. Only the third important indicator is the economic factor, namely gross national income per capita in purchasing power parity. The average number of years of schooling appears in our statistical survey as the element with the lowest priority of increase in the case of this country.

With regard to the informative value of the statistics used in our work, we evaluate the situation in Poland as similar to that in the case of Hungary. Poland has the highest dependency on variables - average life expectancy at birth and also the average number of years of schooling. Once again, we can recall the absence of an economic indicator, which is only in third place with its weight. As the last indicator on which Poland should focus from the indicators analyzed by us, we state the expected number of years of education, which fell to the lowest value.

In the case of the Slovak Republic, we interpret the obtained results as the most surprising. The statistics we carry out show the strongest dependence between gross national income per capita in purchasing power parity. This indicator is the most important for the Slovak Republic in its efforts to increase HDI. As is well known, the EU community evaluates the state of the economic situation and development forecasts annually for each country, so our recommendation is for the Slovak Republic to focus on these reports, predictions and recommendations that could be helpful in the future direction of the country. This ongoing economic policy cycle also provides various recommendations. The second equally important indicator is the average life expectancy at birth. The other two indicators relate to education. The third most important value turned out to be us in the case of the expected number of years of education. We see the lowest weight in the case of the average number of years of schooling.

The last country we analyzed from the V4 group is Hungary. In this case, we see the strongest relationship in the indicator of the expected number of years of education. The second indicator with the strongest interconnection is the economic factor gross national income per capita in purchasing power parity. We evaluate the area of education as the third strongest indicator in the case of the average number of years of schooling. We see the weakest dependence in the case of life expectancy at birth.

Among the identified positive influences that affect the value of the human development index in individual countries, we recommend a combination of an increase in average life expectancy at birth, average number of years of schooling, expected number of years of education, gross national income per capita in purchasing power parity.

In analyzing the definition of possible tools and measures that have a positive effect on the quality of life, we relied on available information on how individual states can legitimately proceed with this influence.

From the available sources, we evaluate that in the case of the Czech Republic, influencing the factor of the expected number of years of education can take place at several levels. Education as such can be understood as preschool, which usually takes place within five years. After completing the sixth year of life, a person in the Czech Republic enrolls in basic education, and it is in that period that it is necessary to influence the development of educational needs. It is important to prolong education as it does not end with compulsory schooling. The indicator of life expectancy at birth reflects the functioning of health care in a given country and the level of health of the citizens of a given country. As in the case of the Czech Republic this indicator had the second highest value in statistical monitoring, it is necessary to focus on the provision, access to health services and the provision of more professional care. The indicator of gross

national income per capita in purchasing power parity represents the monetary value of goods and services at a certain time, which were created through residents of the Czech Republic. Influencing this indicator can be applied through economic factors, but also a tool can be a change in legislation, which will ultimately have economic benefits. The average number of years of schooling in the case of the Czech Republic needs the least intervention and adjustment, as our statistics show that it has the least impact of the indicators. However, if we want to provide a recommendation in this area as well, the Czech Republic should focus on managing school attendance as in 2002-2005, when this country could be an example for all V4 countries.

Poland should focus on the average life expectancy at birth of its inhabitants when drawing up strategies to influence the human development index. In particular, healthcare could best contribute to the health of citizens and thus to a better quality of life. Not only is the provision of quality health care important for health, but access to this care should also be an object of concern. Another factor that needs to be addressed in our recommendations is the average number of years of schooling, as this factor is largely determined by EU standards. It is necessary to look at this indicator differently. With regard to school attendance in a country such as Poland, given the size of the country and the population, it is necessary to focus on making school facilities accessible to the population. Gross national income per capita in purchasing power parity is an economic factor that can be influenced most by legislation and legal regulations. The expected number of years of education in the case of Poland is not the most important for influencing the overall human development index, but even in this case there are possible recommendations that could strengthen its values. One of the key factors is to make available and support additional education of the population.

The evaluation of a country such as the Slovak Republic is the most accessible in our work in terms of obtaining additional information, on which we build recommendations and suggestions. Gross national income per capita in purchasing power parity should be an indicator for a country that needs to be given the highest priority. Influencing that indicator could bring about a positive course in terms of quality of life. Another important factor that needs to be adjusted is life expectancy at birth. Not just a healthy birth. But also the healthy development of citizens should be important for the Slovak Republic. When increasing the indicators, the expected number of years of education should not be forgotten. The value is the third lowest, when influencing the HDI. The last indicator is the average number of years of schooling, although with the lowest statistical value, this indicator is still significant for the overall value.

Hungary, as the last country we evaluated, should focus on the expected number of years of education in its further direction. As we have had the opportunity to find out when collecting data, Hungary has gradually understood the power of education and is currently strengthening the education of citizens. The second important factor that Hungary should pay attention to is the gross national income per capita in purchasing power parity. As with the recommendations in other countries, we consider the use of legislative and legal options to be the best tool here. We evaluate the average number of years of schooling as the third important indicator in the statistical phase implemented by us. This indicator needs to be increased, and the possible means to achieve this is to make school facilities available. As the last indicator with regard to the achieved values, we advise the average life expectancy at birth, which in our opinion could be targeted directly through health care.

CONCLUSION

Based on our goal to analyze the quality of life using the human development index on the example of the V4 countries in a given time, we can assess that the development of this index took place in a positive spirit. Since we think that the index of human life reflects the quality of life, it is necessary to increase this index.

The aim of the paper was a gradual analysis of the data obtained not only from several perspectives with regard to different specifics, but also to examine the various dimensions at what stage the countries we selected are. Today, with the volatile situation in many spheres of life, it is difficult to predict how the various factors influencing the quality of life will develop in the following, future periods in individual countries. A more appropriate and effective solution is not only long-term country strategies and visions in the long term, but also operational and action plans to achieve early results. Another finding is that just as a

country's economy is as important to the well-being of its citizens, there are many non-economic factors that are increasingly taken into account over time when assessing the overall situation of countries.

In spite of the countries we select have many characteristics in common, and in many spheres the direction of countries is influenced by EU directives and regulations, it is necessary to realize that each country must maintain its integrity in its direction. Based on the implemented statistical part, we can state that it is more important for each country to focus on other sectors to improve the overall index of human development, and thus the quality of life of people. An appropriate solution for improving individual indicators is to adopt the strategy of countries with better values. As the V4 countries have common features, it can be deduced from this assumption that the application of already established strategies of one country could contribute to the improvement of the situation in another country.

Although the quality of life is influenced by many factors, we have chosen the ones that act for us as the most influencing quality of people and human life. Understanding the importance and following developments is the initial stage. We will only achieve improvement when we take steps to make changes.

REFERENCES

- Bacova, V. et al. (2008), Life quality and social capital – psychological dimensions, Faculty of Arts, University of Presov (in Slovakia).
- Euroekonom* (2010), <http://www.euroekonom.sk/ekonomika/vseobecna-ekonomicka-teoria/gnp-a-nnp-cisty-ekonomicky-blahobyt-new>.
- Eurostat* (2018), <http://ec.europa.eu/eurostat/data/database>.
- Ferriss, A.L. (2006), "History of QOL studies from an economics perspective", M.J. Sirgy, A.C Michalos, A.L. Ferriss, R.A. Easterlin, D.Patrick, & W. Pavot, *The Quality-of-Life (QOL)*, Research Movement: Past, Present and Future. *Social Indicators Research*, Vol. 13, pp. 1445-1457.
- Hagerty, M.R. (2000), "Social comparisons of income in one's community: Evidence from national surveys of income and happiness", *Journal of Personality and Social Psychology*, Vol. 78, No. 4, pp. 764–771. <https://doi.org/10.1037/0022-3514.78.4.764>
- Hagerty, R.M., Cummins, R., Ferriss, L.A. (2001), "Quality of life indexes for national policy: Review and Agenda for Research", *Bulletin of Sociological Methodology*, Vol. 71, No.1, pp. 58-78. DOI: 10.1177/075910630107100104.
- Heckova, J., Stefko R., Frankovsky, M., Birknerova, Z., Chapcakova, A., Zbihlejova, L. (2019), "Cross-border mergers and acquisitions as a challenge for sustainable business", *Sustainability*, Vol. 11, No.1, pp. 3130. DOI: 10.3390/su11113130.
- Hopins, J. (1991), „Human development revisited: A new UNDP report”, *World Development*, Vol. 19, No. 10, pp. 1467–1474.
- Horvathova, J., Mokrisova, M. (2019), „Construction of Logit model applying selected financial indicators”, *Journal of Management and Business: Research and Practice*, Vol. 11, No. 2, pp. 1-12.
- Human Development Reports* (2018), <http://hdr.undp.org/en/statistics/indices/>.
- Chakravarty, S.A. (2003), "A generalized human development index", *Review of development economics*, Vol. 7 ,No. 1, pp.99-114. DOI: 10.1111/1467-9361.00178.
- Johnston, R. J., Gregory, D., Smith, D. M. (1994), "The Dictionary of Human Geography", Blackwell, Oxford.
- Kacmarova, M., Babincak, P., Mikulaskova, G. (2013), *Theory and tools for measurement of the subjective evaluated life quality*, Filozoficka fakulta Presovskej univerzity v Presove, Presov (in Slovakian).
- Koohi, F., Nedjat, S., Yaseri, M., Cherghi, Z. (2017), "Quality of life among general populations of different countries in the past 10 years, with a focus on human development index: A systematic review and meta-analysis", *Iranian Journal of Public Health*, Vol. 46, No. 1, pp. 12-22.
- McGillvray, M. (1991), "The human development index: Yet another redundant composite development indicator?", *World Development*, Vol. 19, No. 10, pp. 1461-1468. DOI: 10.1016/0305-750X(91)90088-Y.
- McGillvray, M., White, H. (1993), "Measuring development? The UNDP's human development index", *Journal of International Development*, Vol. 5, No. 2, pp. 183-192. DOI: 10.1002-jid.3380050210.

- Neumayer, E. (2001), "The human development index and sustainability – a constructive proposal", *Ecological Economics*, Vol. 39, No. 1, pp. 101-114. DOI: 10.1016/S0921-8009(01)00201-4.
- Noorbakhsh, F. (1998), "A Modified Human Development Index", *World Development*, Vol. 26, No. 3, pp. 517-528. DOI: 10.1016/S0305-750X(97)10063-8.
- Ranis, G., Stewart, F., Ramirez, A. (2000), "Economic growth and human development", *World Development*, Vol. 28, No. 2, pp. 197-219. DOI: 10.1016/S0305-750X(99)00131-X.
- Ranis, G., Stewart, F., Samman E. (2011), "Human Development: Beyond the human development index", *Journal of Human Development*, Vol. 7, No. 3, pp. 323-358. DOI: 10.1080/14649880600815917.
- Slovakian statistics and demography (2007), "Development of net monetary income structure in Slovakian households in 2000-2005", *Slovakian statistics and demography*, Vol. 17(1-2), pp. 73-74 (in Slovakian).
- Veenhoven, R. (2000), "The four qualities of life. Ordering Concepts and Measures of the Good Life", *Journal of Happiness studies*, Vol. 1, pp. 1-39. DOI 10.1023/A:1010072010360.
- UN development program (2018), <http://www.undp.org/>.