

# **The Future Oriented Thinking Index: A Case Study of the Czech Republic, Greece, Moldova and Switzerland**

*Jan Macháček // jan.machacek@upol.cz  
Palacký University Olomouc, Czech Republic*

*Jiří Teichmann // jiri.teichmann@upol.cz  
Palacký University Olomouc, Czech Republic*

*Pavel Nováček // pavel.novacek@upol.cz  
Palacký University Olomouc, Czech Republic*

*Pavel Kladivo // petr.kladivo@upol.cz  
Palacký University Olomouc, Czech Republic*

## **Abstract**

The aim of this paper is to discuss some key factors in sustainable development and prosperity. One of the most commonly used indicators is Gross Domestic Product (GDP), which measures the economic performance of a country. It is often misinterpreted as an indicator of well-being and the quality of life in a country. The concept of the Future Oriented Thinking Index (FOTI) was first discussed in the journal *Foresight* (Nováček, 2014). The following shows the calculations for the FOTI of four European countries with different histories and at various stages of economic development. The FOTI is also intended to be drawn up for selected non-European countries, in particular for developing countries. Computation of the Future Oriented Thinking Index can provide an improved insight into why some communities and nations are prosperous and some less so. FOTI might be the main key to prosperity and success.

If future-oriented thinking is an important factor in prosperity, we need an instrument to measure it. The FOTI is closely affiliated with the State of the Future Index (SOFI), developed by Theodore J. Gordon and the Millennium Project. Instead of assessing the “state of the future” – whether the future will improve or deteriorate, as the SOFI does – the FOTI focuses on identifying the ability to take into account future challenges and act accordingly. There are 28 indicators suggested for the FOTI computation.

**Key words:** Sustainable development, future, Czech Republic, Greece, Moldova, Switzerland

## **Introduction**

In recent years, economists, environmentalists and experts from other disciplines have been working together on a draft of alternative indicators and on the revision of complete abandonment of GDP, and replacing it with an index that would better express the quality of life and better capture the long-term development of a society. Since 1990 the United Nations Development Programme (UNDP) has been using an alternative indicator, which should provide a better reflection of the quality of life (Desai, 1991; UNDP, 2014);

The Human Development Index (HDI). The principal behind the index is based on the assumption that in addition to financial security, a high-quality and decent lifestyle must provide opportunities for people to live long and healthy lives and have access to knowledge, education and resources.

Another indicator which, to a large extent, has already become an alternative or a complement to the GDP, is the Ecological Footprint (EF). The Ecological Footprint measures the consumption of natural resources in “global hectares per capita,” which is the comparative unit of consumption of natural resources and the effective capacity of biologically productive land and water on Earth (WWF, 2010). One great advantage of the ecological footprint is that it can be evaluated on a global, national, local, and even individual level. Another alternative indicator which measures the success of a country and society is Gross National Happiness (GNH). This concept was introduced in 1972 by the Bhutanese King Jigme Singye Wangchuck in an attempt to define the quality of life as regards its non-material aspects (Zurick, 2006).

The State of the Future Index remains the only indicator that not only studies the present, but also tries to uncover trends in the selected variables (indicators). It was designed by Theodore J. Gordon (Glenn *et al.*, 2012). The global SOFI is a statistical combination of 28 key indicators relevant to the state of a society. Based on historical data, the global index has evaluated the past 20 years, and this allows us to forecast the next several years (Glenn *et al.*, 2011). Assuming that future-oriented thinking is one of the prerequisites for success and prosperity, a tool to assess it should be developed. One such tool could be the Future Oriented Thinking Index (FOTI). The FOTI is a methodological approach similar to TJ Gordon’s SOFI, but the FOTI focuses more on identifying people’s ability to take into account future challenges on a personal, community, national and global level, and then to act accordingly. In other words, the SOFI studies what the future might look like, while the FOTI measures how well-prepared people are to confront future challenges.

Future-oriented thinking could be the main key to prosperity and success. Max Weber (2010) drew attention to Protestant ethics and their influence on the development of capitalism in Western Europe and North America. In the past, all activities such as consumption, savings, investments and hard work were based on a vision of God’s salvation after death. This is a typical example of future-oriented thinking which determined current behaviour. The opposite may be found in the attitude of a person or a community living only for the moment without worrying about what is to come or the consequences of their behaviour. One example could be an extreme consumerist lifestyle, where the sense of security relies on a full refrigerator and there is no vision of the future. If the number of these people exceeds a critical limit, whether in a family, community or country, it is difficult to imagine the healthy and prosperous development of such a society. Therefore the FOTI could complement indexes such as the GDP and the HDI and help identify the societal attitudes which lead to sustainable prosperity.

### **The FOTI – variables, data sources, selection of territory**

The initial step in the research was to identify appropriate indicators with which to calculate the FOTI for the selected territories. Initially our research followed similar studies, especially the variables considered in the calculation of global SOFI (Glenn *et al.*, 2012) and SOFI at a national level (Kladivo *et al.*, 2014). However, the variables were then adapted to the main FOTI idea; emphasis was placed on societal trends. The selection of indicators was adapted to the development specifics of the regions (or countries) for which the case studies were drafted. In order to assess the dynamics of development in different areas, variables from five categories were selected (education, health, economy, society, environment), allowing for the subsequent calculation of partial indices. The calculation of the total FOTI included all the variables. Selected experts on sustainable development and regional development helped identify the key variables (indicators).

While it is clear that the variables (Table 1) are not of equal importance, all were given the same weight of 1 for the initial pilot calculation of the FOTI. This is in contrast to the SOFI studies (Kladivo *et al.*, 2014) and other authors, who decided to weigh the variables (usually weight 1-10) based on the results of a Real Time Delphi questionnaire (Glenn *et al.*, 2009).

**Table 1: Indicators included in the FOTI calculation**

ECONOMY		HEALTH	
1	Foreign direct investment, net inflows (% of GDP)	18	Immunization, DPT (% of children ages 12-23 months)
2	Adjusted savings: net national savings (% of GNI)	19	Immunization, measles (% of children aged 12-23 months)
3	GDP per capita, PPP (current international \$)	20	Physicians (per 1,000 people)
4	Energy use (kg of oil equivalent) per \$1,000 GDP (constant 2005 PPP)	21	Health expenditure, public (% of GDP)
5	Unemployment, total (% of total labour force)	22	Overweight (mean BMI (kg/m <sup>2</sup> ) (age-standardized estimate) (age group 20 + years male)
ENVIRONMENTAL		SOCIAL	
6	GDP per unit of energy use (constant 2005 PPP \$ per kg of oil equivalent)	23	Unemployment, youth total (% of total labour force aged 15-24)
7	Improved water source, rural (% of rural population with access)	24	Adolescent fertility rate (births per 1,000 women aged 15-19)
8	Improved sanitation facilities (% of population with access)	25	Birth rate, crude (per 1,000 people)
9	Improved sanitation facilities, rural (% of rural population with access)	26	Life expectancy at birth, total (years)
10	CO <sub>2</sub> emissions (kg per 2000 US\$ of GDP)	27	Recorded adult (15 + years) per capita consumption (in litres of pure alcohol)
11	Percentage of nationally protected areas	28	People voting in election %
EDUCATION			
12	School enrolment, primary (% gross)		
13	School enrolment, secondary (% gross)		
14	School enrolment, tertiary (% gross)		
15	Communications, computer, etc. (% of service imports)		
16	Internet users (per 100 people)		
17	Think tank organisations		

The study uses 28 variables. Five relate to economic characteristics and five characterize the health of the population; while the environmental, social, and educational components of the index each have six indicators (see Table 1). All the variables were generated from the publicly available sources of the World Bank (2016). In calculating the SOFI, statistical computations based on a 20-year time period were used.

This allows us to forecast the development of each variable over the following years, usually every ten years (Glenn *et al.*, 2012; Kladio *et al.*, 2014). As yet, our research has only assessed the past development of the FOTI (1995-2013).

The FOTI pilot study focuses on countries at various levels of development with different recent economic and political histories. Another requirement was that the data (variables) were easily accessible. For this reason we chose four European countries. Switzerland is a stable, developed and rich country with a high quality of life. The Czech Republic underwent significant political and economic changes in the 1990s which had a major impact on its development. Greece has been considerably affected by the economic recession of recent years. Moldova was formerly part of the Soviet Union and, since the demise of the totalitarian regime, it remains the poorest country in Europe.

We are aware that the selection of variables used in the FOTI calculation is highly subjective and is influenced by the availability of data. These should be from one source and the data collection should follow a uniform methodology. The main sources of statistical data were the World Bank and the World Development Indicators (2014).

### The FOTI calculation

The index calculation included the following steps:

#### a) Calculation of the relative FOTI

1. Calculation of average values for each variable over the period under review (1995-2013)
2. Establishment of the top positive and bottom negative limits
3. Data standardization
4. final calculation of the FOTI

If we denote each variable  $a_i$ , then the value of the variable in a given year is  $a_i^{\text{year}}$ . At the beginning we operate with matrix A consisting of 19 rows (indicating the years from 1995 to 2013) and 28 columns (each for one variable):

$$A: \begin{array}{cccc} a_1^{1995} & a_2^{1995} & \dots & a_k^{1995} \\ a_1^{1996} & a_2^{1996} & \dots & a_k^{1996} \\ \cdot & \cdot & \dots & \cdot \\ \cdot & \cdot & \dots & \cdot \\ \cdot & \cdot & \dots & \cdot \\ a_1^{2013} & a_2^{2013} & \dots & a_k^{2013} \end{array}$$

During the period under review, each variable takes its own minimum and maximum. Whether the maximum or the minimum is the most desired outcome always depends on the nature of the variable. For example, the higher the GDP, the better the outcome; while the opposite holds true in such variables as unemployment.

The average value for each variable is then calculated for the period 1995-2013 as

$$\bar{a}_i = \Sigma a_i^{\text{year}} / 19$$

We then identified maximum ( $a_i^{\text{max}}$ ) and minimum ( $a_i^{\text{min}}$ ) values for each variable in the period 1995-2013. Thus we created the upper good limit ( $U_{ai}$ ) and the lower bad limit ( $L_{ai}$ ). This is a simplification compared to the SOFI methodology, where the limits were selected not only based on the minimum and the maximum, but also on the theoretical positive and negative values in the future.

Data from the original matrix are standardized (producing a new matrix  $B = (b_i^{\text{year}})$ ), using the formula:  $b_i^{\text{year}} = (a_i^{\text{year}} - \bar{a}_i) / (U_{ai} - L_{ai})$

$$B: \begin{matrix} & b_1^{1995} & b_2^{1995} & \dots & b_k^{1995} \\ & b_1^{1996} & b_2^{1996} & \dots & b_k^{1996} \\ & \cdot & \cdot & \dots & \cdot \\ & \cdot & \cdot & \dots & \cdot \\ & \cdot & \cdot & \dots & \cdot \\ & b_1^{2013} & b_2^{2013} & \dots & b_k^{2013} \end{matrix}$$

Subsequently, the FOTI for each year is calculated:  $\text{FOTI}^{\text{year}} = \Sigma b_i^{\text{year}}$ . The annual index for a country equals the sum of the values in a respective row of matrix B. All the FOTI values are then qualified relative to the 2006 value. The calculation is one step easier than the SOFI computation as we have not yet weighed the variables. These methods of standardization used a methodological approach similar to TJ Gordon's SOFI. Standardization is based on the initial calculations of SOFI which are not simplified to theoretical positive and negative values in the future.

### **b) Calculation of the absolute FOTI**

1. Alignment of the data of all of the countries concerned
2. Data standardization
3. Calculation of partial FOTIs
4. Calculation of the total FOTI

The total index is computed for a number of reasons. The main reason is that, while the relative FOTI facilitates a comparison of the progress of countries over time, it does not assess their actual level of advancement.

In practice, this means that the curve of the relative FOTI can grow dynamically, which shows a positive trend, but the variables may be very far from reaching the values of countries whose curve of the relative FOTI is stagnant, or even in decline. In addition, with the above FOTI calculation, the absolute indices are incomparable because while making the calculation for individual countries, only the maximum and minimum values of countries' characteristics are used in the standardization. Therefore, we decided on a simple calculation for the absolute index. The calculation is based on the principle of data standardization, using the formula:

$$z_i' = (z_i - \tilde{x}_{50})/Q$$

where:

$z_i'$  is a standardized value

$z_i$  is the original value of the variable

$\tilde{x}_{50}$  is the median of all values across all countries for each variable between the years 1995 and 2013

$Q$  is the interquartile range

The final index for a country is the sum of standardized values in individual years. To compare the developments in the various categories of variables we also provide partial indices, i.e. the economic, social, environmental, health, and education index. The partial indices are the sum of the standardized values of the variables in each category.

## Principal findings, comments

### *The relative FOTI*

A simple analysis of the relative FOTI curves shows the following:

- Although Moldova is one of the poorest European countries, most of the indicators surveyed are improving. Moldova enjoys the most dynamic growth in the FOTI of all the four countries studied. While this may seem optimistic at first glance, the absolute values of the FOTI reveal the country's actual situation (see below). In recent years, development has taken a quite favourable direction.
- An altogether different trend is noted in the FOTI of Switzerland, whose curve oscillates around 0.8. Between 2000 and 2005 it even dropped, somehow triggered by slightly unfavourable developments in the economic indicators (unemployment, especially among the population aged 15 to 24 years; and a decline in foreign investment), as well as other indicators (e.g. low birth rates, an increase in obesity). This changed around 2005, when the relative FOTI began to grow.



It deteriorated again in 2007 and 2008, corresponding with the onset of the global economic recession. In these years, the index dropped with varying intensity and duration in all the countries studied.

- Greece has a relatively stable FOTI curve. The development can be divided into two basic stages. Until 2007, the relative index grew slightly, or sometimes stagnated, but from 2007 it fell into decline. The negative development in the index is not as significant as we might expect for Greece. This is due to the construction of the index, where a significant decline in economic characteristics was, to some extent, offset by favourable health and education values. The impact the various components of the index have on its total value will be demonstrated later in the text with the help of the absolute values of the index.
- A far more dynamic development of the FOTI is observed in the case of the Czech Republic. Here, the development is divided into two phases, with 2003 as the turning point. Until then, the curve was in decline, mainly due to the post-1989 social changes associated with a significant decrease in fertility (postponing the first child until a later age), rising unemployment (especially in young people), a drop in voter turnout, etc. Although most of the other characteristics do not show unfavourable development, that is not enough to offset the overall negative trend. In 2004, the situation started to change and, with the exception of the period 2007-2008, the curve rose. The rise was associated with the increase in the birth rate. Baby boomers entered a reproductive age and mothers who had postponed parenthood now had children. The positive trend was also observed in the economic variables.

### ***The absolute FOTI***

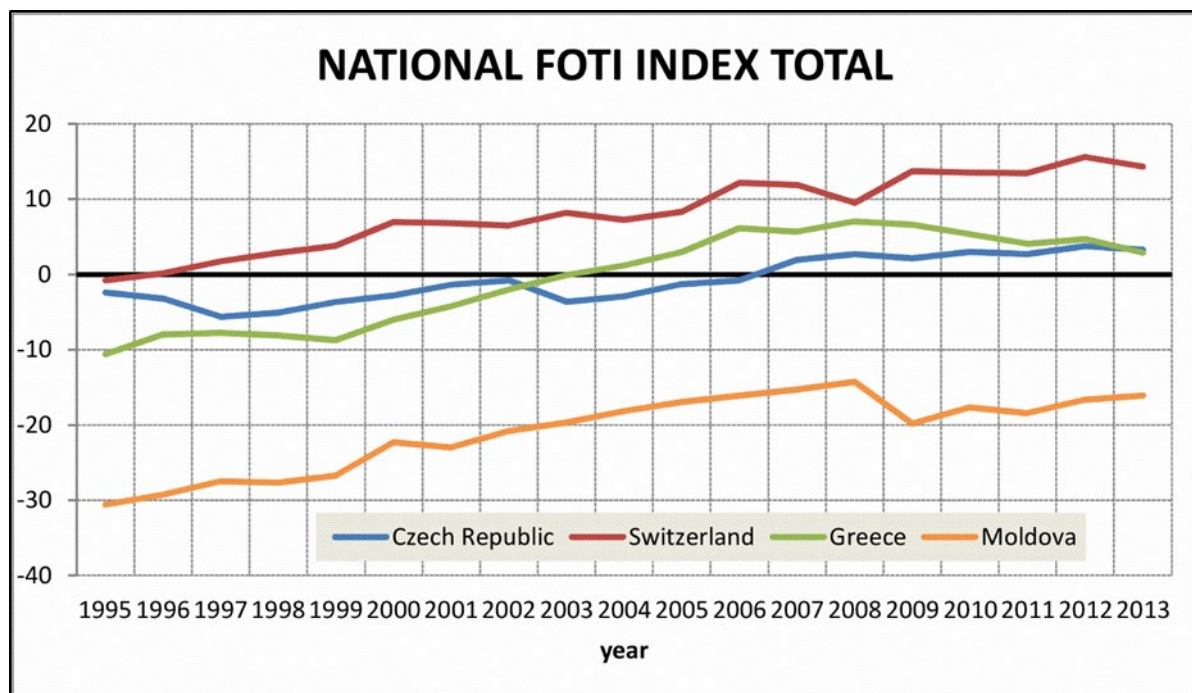
Figure 1 shows the development of the absolute FOTI values, including partial indices, calculated as the sum of standardized values in the individual years. The values of partial FOTIs can be compared as there are approximately the same numbers of variables (five and six) in all categories. The anticipated large differences between the countries are verified, both in the overall index and in its components. The greatest differences are between Switzerland, as one of the most developed countries, and Moldova at the opposite end of the European scale. A positive finding for both countries is that their index values grew through most of the monitored period (except for a downturn in 2008 due to the worldwide economic recession). In the mid-1990s Moldova was in a deep crisis caused by a period of uncertainty, the separatist Transnistria conflict, and an economic decline associated with the absence of a market economy following the collapse of the Soviet Union. The FOTI values are deep in the red, below -30 points, because the variables did not come close to the median of all the four countries in the years 1995-2013. Since 1999, the index has grown relatively dynamically and almost all the indicators monitored have enjoyed positive development. Although the trend is positive, with its level of individual characteris-



tics, Moldova still lags far behind the other countries surveyed. The FOTI of Switzerland remains positive with a slightly increasing trend seen through the entire period monitored. Only in the last four years has the curve stagnated. Of all the countries surveyed, Switzerland has the highest FOTI (13.5 points in 2011).

Greece recorded an interesting development. Following initial stagnation on the negative index values (-10), the curve began to rise in 2000 and three years later the Greek values were better than the Czech figures. The turning point, however, came in 2007-2008 with the first strong indications of the economic crisis. This negatively affected economic and social indicators. Although the Czech Republic escaped such a slump, their overall index stagnated and Greece's FOTI was higher than that of the Czech Republic. The Czech Republic was the only country whose FOTI was in decline at the beginning of the surveyed period and stagnated until the turn of the millennium. The trend only showed a significant change in 2003 due to positive rises in most variables.

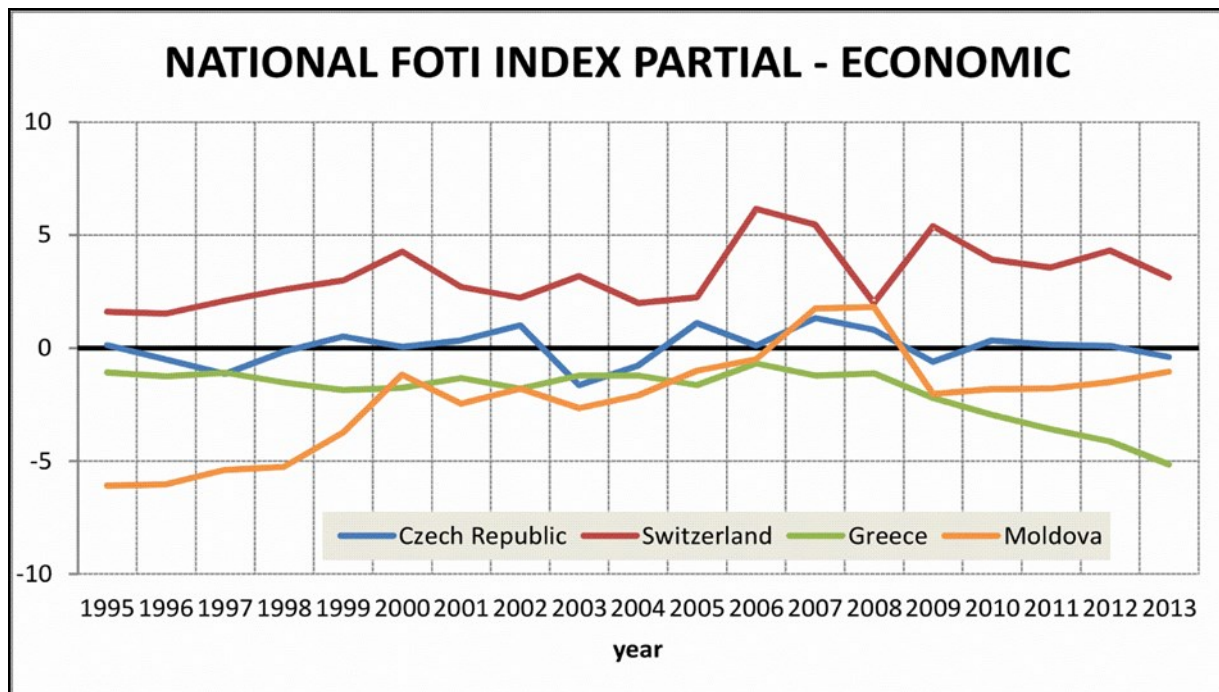
**Figure 1: National FOTI Index - Total**



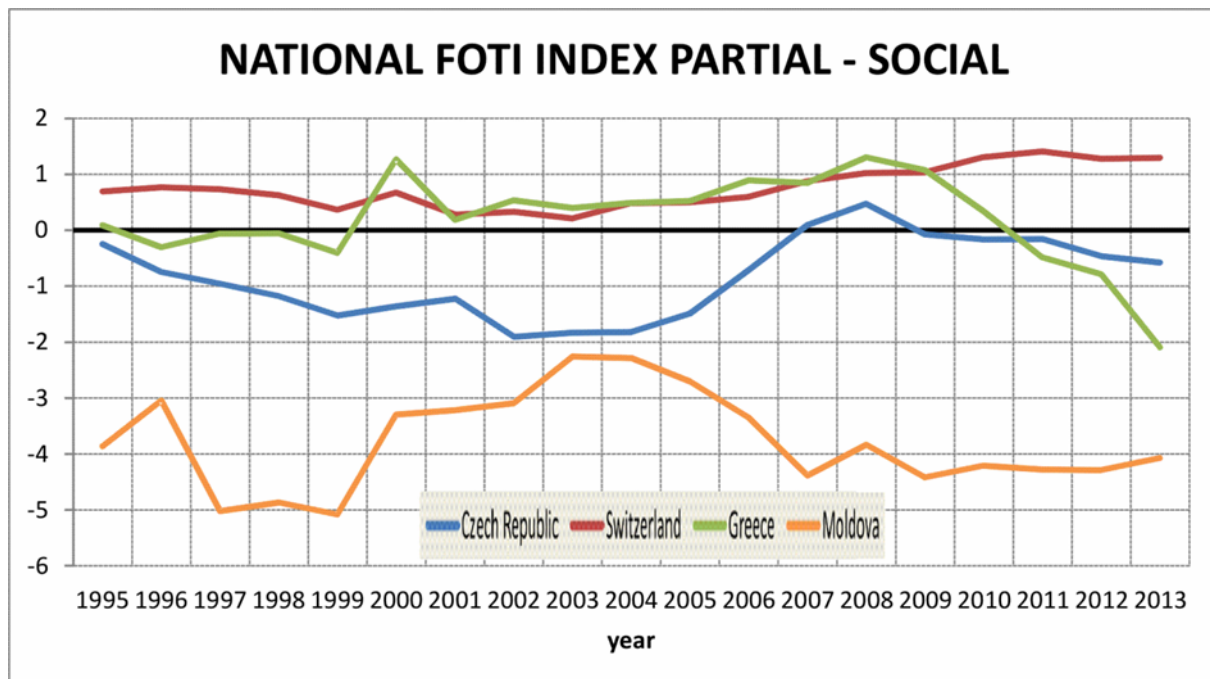
### ***The absolute FOTI partial***

An analysis of the partial indices leads to very interesting conclusions (we can see in Figures 2, 3, 4, 5, 6). Until 2008, in all four countries surveyed, the trend in the economic FOTI (Figure 2) was almost balanced or it oscillated around a single value, which was nevertheless different for each country. Interestingly, since 2000, Moldova's values are virtually no different from those of Greece, which has been increasingly falling behind since 2008. The 2007-2008 decline was discussed above. The dominant position of Switzerland is not surprising, nor are the economic indicators for the Czech Republic. However, what surprised us was the slump that Greece suffered, even falling below Moldova's figures.

Figure 2: National FOTI Index Partial – Economic



Along with economic indicators, the drop in the absolute value of Greece's total FOTI was also brought about by a significant drop in social variables (Figure 3). This category includes demographic indicators (e.g. birth rate) and socio-economic indicators (unemployment in the population aged 15-24 years). It is the negative development of these indicators that has recently driven the Greek values down, despite the fact that in the social area, the Greek FOTI used to be on a level comparable with Switzerland. Thanks to the baby boom between 2004 and 2008 (and the associated higher fertility), the index for the Czech Republic grew and overtook that of Greece. Moldova is considerably behind in the social area, largely due to a low life expectancy, which is 13 years shorter than in Switzerland.

**Figure 3: National FOTI Index Partial - Social**

Probably the least surprising result of the study FOTI curve is the partial FOTI focused on environmental indicators (Figure 4); the curves for individual countries show a linear development. This is due to the structure of the environmental FOTI, or rather, the composition of its indicators. For example, the proportion of protected areas in a country changes little over time. The same applies to the percentage of inhabitants with access to drinking water. Conversely, indicators which assessed the air quality (CO<sub>2</sub> emissions) and GDP per unit of energy used showed slight improvements virtually over the entire surveyed period and in all four countries. The environmental indices of the Czech Republic and Greece are comparable. Switzerland has the best environmental index, while Moravia has much the worst, mainly due to CO<sub>2</sub> emissions.

Figure 4: National FOTI Index Partial - Environmental

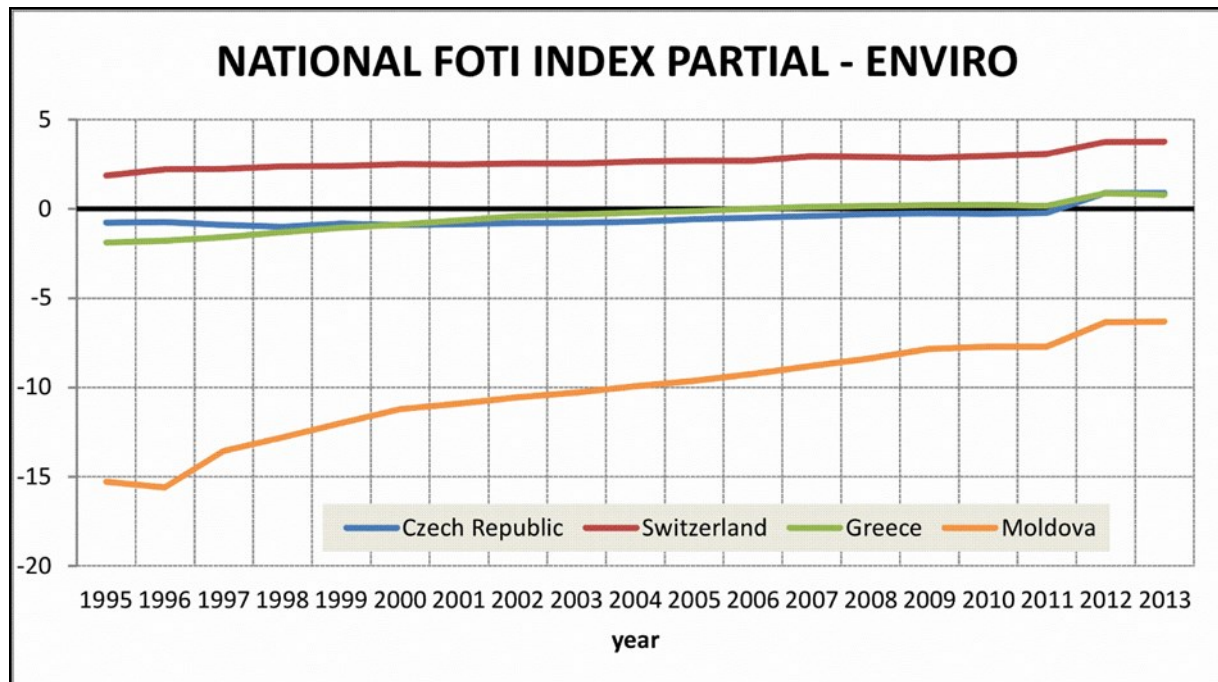
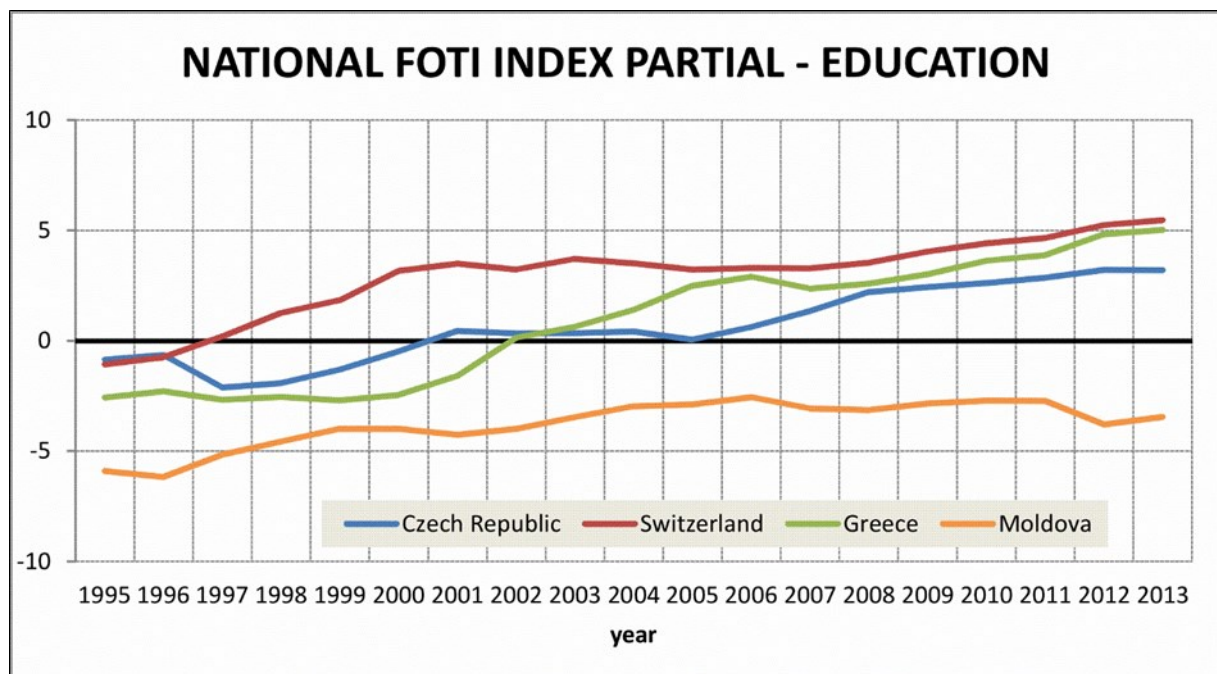


Figure 5: National FOTI Index Partial - Education

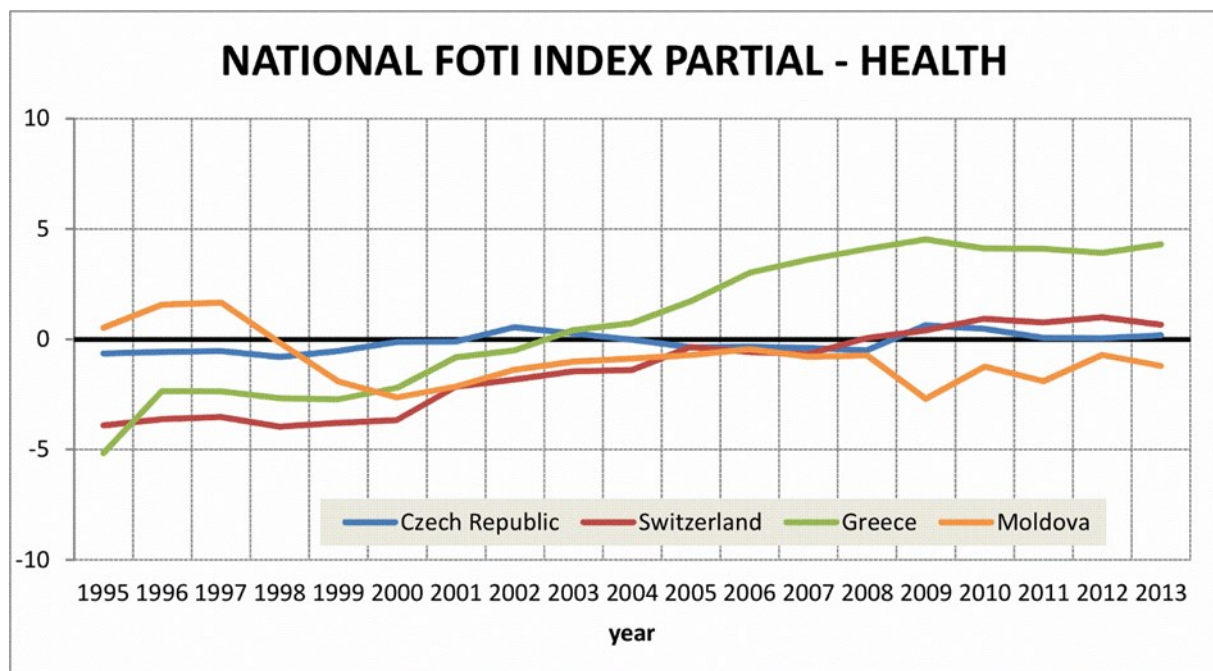


Findings based on the FOTI that monitored health indicators (Figure 6) were very interesting. This is the only category that is not dominated by Switzerland. Instead, Greece surpasses the other countries. It is likely that Greece owes its very good results in this category to the Mediterranean lifestyle, coupled with a healthy diet, lower stress levels and a favourable climate.



In addition, Greeks have very good access to healthcare and Greece is on a par with the other countries in investments in healthcare (measured by the proportion of GDP). However, it is obvious that for Greece the positive partial health index compensates for the negative trends in the economic and social categories, and this prevents a significant decline in the total FOTI index.

**Figure 6: National FOTI Index Partial – Health**



## Conclusion

The Future Oriented Thinking Index does not aim to compete with existing indices that are used in practice (GDP, HDI, Ecological Footprint, etc.), but to monitor and evaluate important factors that determine societal development. We believe that a hitherto neglected key prerequisite for sustainable development and quality of life is future-oriented thinking.

Max Weber (2010) drew attention to Protestant ethics and their influence over the development of capitalism in Western Europe and North America. Grounding all current activities - including consumption, savings, investments, and hard work – on the vision of God's salvation after death is a typical example of future-oriented thinking that determines one's present behaviour and actions.

In 1989, Lawrence Harrison formulated four fundamental factors that facilitate economic efficiency and prosperity in a society: the radius of social trust, the rigor of the ethical system, the way authority is exercised (today we would probably say "good governance"), and attitudes towards work, innovation, savings, and profit.

The opposite may be the attitude of a person or a community living only for the moment, without considering the future. If the number of these people exceeds a critical limit, whether in a family, community, ethnic group or country, it is very hard to imagine that there would be any healthy, prosperous development.

The FOTI not only evaluates education, health, and economic indicators (as does the Human Development Index), but in combination with social and environmental categories, it also aims to comprehensively evaluate the development of a society. In this pilot study, the methodology for calculating the FOTI is similar to the methodology used in the SOFI (State of the Future Index). However, up to now we have not allocated weights to individual indicators, nor do we predict the future evolution of the variables (in the SOFI methodology this is established using the Real Time Delphi method). In the future, we would also like to expand the case studies and apply the FOTI methodology to other, non-European territories and developing countries. Another option for improving the methodology is the calibration of the absolute FOTI calculation. Alternatives to data standardization that would use global averages instead of the median values of the surveyed countries are under consideration.

The relative FOTI was also complemented with the absolute numbers we obtained as the sum of the standardized, and thus dimensionless, values. This allowed us to supplement the data concerning the positive or negative developments in the 4 countries with information detailing the countries' actual levels. In our study, the best situation in terms of the absolute FOTI is in Switzerland. While the great difference between the absolute index values of Switzerland and Moldova was predictable, the relative FOTI suggests positive developments in Moldova. All four countries show a positive trend in the total FOTI. Partial index analyses, which assessed the surveyed countries in five areas (economic, environmental, social, education, and health), showed relatively great dynamics in the variables.

## References

- Desai, M. (1991) Human Development: Concepts and measurement, *European Economic Review* 35 (2/3): 350 - 357.
- Glenn, J. C., Gordon, T. J. and Florescu, E. (2011) *State of the Future 2011*. Washington DC: The Millennium Project.
- Glenn, J. C., Gordon, T. J. and Florescu, E. (2012), *State of the Future 2012*, Washington DC: The Millennium Project.
- Glenn, J. C. and Gordon, T. J. (2009), *Futures Research Methodology*, Washington DC: American Council for the UNU.
- Harrison, L. E. (1989) Underdevelopment is a State of Mind – The Latin American Case. *Canadian Journal of Latin American and Caribbean Studies* 14: 128-130.
- Kladivo, P., Nováček P., Teichmann, J., Macháček, J. (2014) The State of the Future Index for the Czech Republic. *Moravian Geographical Reports* 22 (3): 42-52.
- Malik, K. (2014) *Human Development Report 2014: Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience*. New York, NY: UNDP.

Nováček, P. (2014) Thinking Oriented Towards The Future – Key to Prosperity and Sustainable Development? *Foresight* 15: 354 - 362.

Pollard, D., (2010) *Living Planet Report 2010: Biodiversity, biocapacity and development*. Gland, Switzerland : World Wide Fund For Nature.

Weber, M. (2010) *The Protestant Ethic and the Spirit of Capitalism*. rev. ed., Oxford, UK: Oxford University Press.

World Bank. (2016). Indicators. <http://data.worldbank.org/indicator>.

Zurick, D. (2006) Gross National Happiness and Environmental Status in Bhutan. *Geographical Review* 96 (4): 657 - 681.