

# Sustainable Development in the Russian Federation – Indicator-based Approach

## Zrównoważony rozwój w Federacji Rosyjskiej – podejście wskaźnikowe

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### Abstract

The presented study discusses problems referring to the concept of sustainable development in the Russian Federation in the period 2004-2013. The first part presents, e.g. the importance of creativity, good space governance, the significance and reasons for sustainable development in Russia. Next, sustainable development indicators, selected for the analysis, are characterized in accordance with the approach to sustainable development level measurement adopted by the European Union. The synthetic measure of development (SMD) was applied as the research method, the data for calculations were collected from The World Bank resources. The research results presenting values of particular indicators in the studied years and the values of SMD constitute the core of the study. Despite relatively unfavourable or moderate results a gradual improvement of the situation was observed in the context of sustainable development concept implementation in Russia over the studied years.

**Key words:** sustainable development, economy, society, environment, linear ordering, Russia

### Streszczenie

W niniejszym opracowaniu poruszone zostały zagadnienia odnoszące się do koncepcji zrównoważonego rozwoju w Federacji Rosyjskiej w latach 2004-2013. W pierwszej części poruszona została, m.in. problematyka znaczenia kreatywności, dobrego rządzenia przestrzenią, istotności i przesłanek zrównoważonego rozwoju w Rosji. W dalszej części scharakteryzowano wskaźniki zrównoważonego rozwoju wybrane do analizy, zgodne z przyjętym przez Unię Europejską podejściem do mierzenia poziomu zrównoważonego rozwoju. Zastosowaną metodą badawczą był syntetyczny miernik rozwoju (SMR), dane do obliczeń pozyskano ze źródeł Banku Światowego. Rdzeń opracowania stanowią wyniki badań, pokazujące wartości poszczególnych wskaźników w badanych latach oraz wartości samego SMR. Pomimo relatywnie niekorzystnych lub umiarkowanych wyników, zauważono sukcesywną poprawę sytuacji w kontekście implementacji koncepcji zrównoważonego rozwoju w Rosji na przestrzeni badanych lat.

**Słowa kluczowe:** zrównoważony rozwój, gospodarka, społeczeństwo, środowisko, porządkowanie liniowe, Rosja

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### 1. Introduction

The implementation of sustainable development concept at the country or regional level should, on the one hand, facilitate taking advantage of the emerging development opportunities and, on the other, support overcoming the occurring problems.

The concept itself is expressed by ensuring harmony between economic growth, in terms of economy, and the improvement of natural environment condition, taking into account the extensive social aspects and supporting good governance (Baker, 2006; Giorgetta, 2002). The aforementioned good governance

is gaining popularity as the subject of research carried out in recent years. It essentially depends, to a great extent, on the effectiveness of managers, with particular emphasis on public managers, who should be characterized by strong leadership and present the skill of e.g. inspiring others to implement the set goals, using both intellectual and organizational potential at their disposal (Gelder, 2005; Gibney, 2012). It is also crucial to have the features of a good manager, which usually represent the compilation of inborn qualities (charisma, intelligence, creativity) and the acquired ones (knowledge, experience), supplemented by the strong orientation towards the implementation of the set goals (Cohen et al., 2008; Green, 2010; Eden and Ackermann, 2013; Diamond, 2012). The focus on the role of human factor is important due to the fact that it is the particular people who are responsible for the implementation of sustainable development concept and thus should understand it well and also have adequate tools to put it into practice.

Beyond any doubt, Russia is the country holding an enormous social and economic potential, it is the largest country in the world with all the natural resources. The changes in the natural environment of Russia have impact on the entire global ecosystem. Russia, along with all its social and economic imperfections, represents a military and political superpower. It is in the interest of the global public opinion to implement the concept of sustainable development in this country.

The implementation of the discussed concept, in accordance with the standards known in the West, comes across numerous difficulties and obstacles. One of them is the Russian mentality and political culture, which did not fully develop the respect for environment in the society. It is rather referred to as the source of simple exploitation than the common good which should be taken care of in the context of future generations. In the Russian political culture the ideas related to sustainable development are frequently approached as a type of formation resulting from the strategies of the broadly understood West, i.e. in simple terms, as a foreign or unfavourable element for Russia. The hierarchy of country developmental priorities is also significant here. For the Russians strengthening the foundations of their Federation, the protection of borders, the construction of a strong army and state power are the most important factors. The concept of sustainable development seems unclear and sometimes even strange. The concerns of Russian society about foreign influence and imposing specific external solutions are deeply felt. While taking care of the population life quality or effective economy is well understood, the protection of environment is not observed in the categories of equal significance. In modern Russia the major assumptions of sustainable development concept are being gradually, although to a limited extent, taken into consideration, which is a moderately optimistic

symptom. Improvement is required in all areas, however, it is the natural environment which experienced the most extensive devastation and many failures (Szady, 2009).

On the other hand, having read the Russian reports on sustainable development problems it seems that all processes are heading in the right direction. The following sustainable development challenges are recognized in Russia as the key ones, both currently and in a long-term perspective: higher competitiveness on global markets by implementing innovative systems; population aging as a burden on the social system; migration processes; climate changes; air pollution; degradation of ecosystems; securing food resources on the global scale; increasing demand for electric power in Russia and worldwide; increasing amount of hazardous waste; the disposal of accumulated waste (Report on implementing..., 2012; Bobylev and Perelet, 2013). In the light of the above mentioned arguments the presented study offers yet another voice in the discussion and an attempt to provide an objective assessment of the situation regarding the sustainable development concept implementation in Russia.

The implementation of sustainable development concept should be supported by human creativity, predominantly in the social area and in the area of good governance. These elements are deficient in Russia, particularly in terms of civil liberties or the freedom of expression. At this point it is worth recalling the concept of 3T (Technology, Talent, Tolerance) as one of the more interesting ideas related to creativity in the context of socio-economic development of territorial units (towns, regions, countries). This concept is based on approaching human creativity as the main source of the aforementioned development. Territorial units which aspire to be creative and thus develop more dynamically, to be competitive and attractive on domestic and international markets should concentrate on modern technologies, innovations, education and community development in the spirit of respect for diversity and tolerance. In accordance with the discussed concept, creativity, unlike the classic factors of production, represents an inexhaustible, constantly improving and renewable resource (Florida, 2002; Florida, 2005; Florida, 2012; Mellander et al., 2012).

The purpose of this study is to present and analyse the position of the Russian Federation in terms of sustainable concept implementation in the period 2004-2013. The selection of indicators and the period under analysis were determined by the availability of reliable public statistics. The presented indicators are also consistent with the approach adopted by the European Union to measure the level of sustainability. Due to the complexity of this concept and diverse research approaches, the selected indicators should be referred to as one of measurement proposals. The synthetic measure of development (SMD) was applied as the research method in

order to assess the implementation of sustainable development standards in Russia and the data for calculations were collected from The World Bank resources. The measure itself is used in linear ordering of objects characterized by many diagnostic variables, later substituted by one diagnostic value.

## 2. Research methodology, sustainable development indicators of the Russian Federation

Indicators represent quantity specific tools which synthesize or simplify the data crucial for the assessment of certain phenomena. These tools are useful in communicating, assessing and making decisions (Geniaux et al., 2009). Indicators are the basic instruments used in sustainable development monitoring since they present such concept of development in a rational and measurable way (Borys, 2005). Sustainable development indicators can be defined as a statistical measure that gives an indication on the sustainability of social, environmental and economic development (Handbook of National Accounting..., 2003).

For the purposes of the conducted analyses these indicators were used which allow for the analysis of progress in the implementation of the discussed development concept in terms of the selected territorial units (country level in this case), in accordance with the approach to sustainable development level measurement adopted by the European Union<sup>1</sup>. The list of the selected indicators is presented in tab. 1.

The presented analysis and the framework of sustainable development concept implementation represent the general assessment of the selected aspects, meeting which has impact on an overall implementation of the concept. In the selection of variables for the study each of the presented sustainable development sphere was taken into account, i.e. social, economic and environmental sphere.

While assessing the level of sustainable development standards implementation it is crucial to define the set of indicators describing major aspects related to each sphere of sustainable development and to define the indicators from the perspective of their importance for sustainable development.

It is equally important to specify quantitative targets to be achieved in order to indicate to what extent the concept of sustainable development is being implemented. Specifying such quantity oriented targets requires identifying the nature of each variable i.e.: a stimulant, a destimulant or a nominant.

In order to assess the implementation of sustainable development standards in Russia the synthetic measure of development (SMD) method was applied (Jajuga et al., 2003). SMD is used in linear ordering of objects characterized by many diagnostic variables, which are later substituted by one diagnostic value.

The procedure of SMD construction is carried out in several stages:

- 1) the selection of diagnostic characteristics (indicators) and identifying the nature of variables in terms of sustainable development concept implementation: a stimulant, a destimulant or a nominant;
- 2) for indicator comparability the normalization of diagnostic characteristics was conducted using zero unitarization method in line with the following formula:

$$z_{ij} = \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}},$$

where:  $z_{ij}$  – value of the  $j$ -th diagnostic characteristics (indicator)  $j = 1, 2, \dots, k$  in the  $i$ -th object  $i = 1, 2, \dots, N$  after unitarization,  $x_{ij}$  – realization of the  $j$ -th diagnostic characteristics in the  $i$ -th object,  $\min_i x_{ij}$  ( $\max_i x_{ij}$ ) – the lowest (the highest) value of the  $j$ -th diagnostic characteristics  $x_{ij}$  (Dziechciarz et al., 2001). Normalization was carried out for the matrix covering data from the period 2004-2013. It allowed defining the joint development pattern. As a result of unitarization the values of characteristics were included in the interval  $\langle 0;1 \rangle$  with 0 value for the year in which the indicator took the lowest (minimal) value in the years 2004-2013 and 1 – the highest value. Having applied zero unitarization method the variable was measured on an interval scale with zero minimum;

- 3) defining the coordinates of the object-pattern. The top development pattern was adopted as the model, i.e. maximum values were considered the most favourable values of diagnostic characteristics in case of stimulants, whereas for destimulants – minimum values and for nominants – the lowest absolute value of the difference between the value of the characteristics and the optimal one. An object-pattern was made up of the most favourable indicator values obtained jointly in the period 2004-2013,
- 4) determine the distance of objects from the object-pattern using the Euclidean distance and the synthetic measure of development (SMD) for the  $i$ -th object according to the below formula:

$$SMR_i = 1 - \frac{d_{i0}}{d_0}$$

where:  $d_{i0}$  – Euclidean distance between the  $i$ -th object in the  $t$ -th period and 0 object-pattern,  $d_0$  – distance between the pattern and anti-pattern (Lausen et al., 2013).

<sup>1</sup> Sustainable development in the European Union, 2015 - monitoring report of the EU Sustainable Development Strategy, Eurostat Statistical Books, Luxembourg 2015.

Table 1. Sustainable development indicators selected for the analysis, source: authors' compilation based on: The World Bank data; *Indicators of Sustainable Development*, Central Statistical Office; *Indicators of Sustainable Development...*, 2007; *Defining a Sustainable Transport...*, 1996; Taniguchi et al., 2010; Raszkowski, 2014; Raszkowski, 2015; Kaufmann et al., 2010.

SDI theme	Indicator	The importance of an indicator for sustainable development
Socio-economic development	GDP per capita (current thousand US\$)	Gross domestic product (GDP) represents the basic measure of economic growth which, in a synthetic form, presents the most complete picture of national economy and changes in economic structure. It is the value against which the level of other phenomena is compared, e.g. public deficit and public debt. GDP per 1 resident is a very important indicator of economic growth level and its long-term growth remains the primary objective of the state economic policy.
	Research and development expenditure (% of GDP)	Socio-economic development depends, to a great extent, on the technological level of economy. Research and development activities represent its driving force. Increased R&D expenditure results in higher innovation and economy competitiveness. The investment in research and development (R&D) is a part of investment activities focused on knowledge accumulation, the creation and implementation of innovative solutions (products, services, organizational or marketing solutions) and subsequently higher capital productivity and also aimed at offering products meeting social/market needs much better. Such activities are focused on ensuring long-term economic growth along with developmental processes strengthening, including enhanced competitiveness of economies. They offer opportunities for changing the development directions through the implementation of innovative and socially desirable solutions, e.g. pro-ecological, less energy consuming or material absorptive, but also through the development of human friendly, health protecting technologies, resulting in the implementation of sustainable development idea. R&D expenditure against GDP show the scale of GDP redistribution into the activities aimed at economy transformation towards knowledge-based economy.
	Unemployment, total (% of total labour force)	Low unemployment rate, by principle, represents one of the conditions influencing dynamic economic growth in a long-term perspective. Unemployment has impact on the level of population life quality, increases the risk of poverty and remains one of the reasons of social exclusion. Employment policy aims at promoting full employment and higher employment rate in the groups facing the highest risk of unemployment. The goal of employment policy is to improve employees' and employers' adaptability, effectiveness of job market policies, job placement processes and vocational consultancy. Institutional solutions, within the framework of tax system and social security system aim at ensuring protection against poverty, as well as influencing the incentives for taking up occupational activity.
Sustainable production and consumption	Combustible renewables and waste (% of total energy)	Using energy from waste and energy from renewable sources contributes to saving non-renewable resources. Reducing the consumption of non-renewable resources represents one of the sustainable development goals. This concept is also successfully implemented in developmental processes of territorial units, e.g. in the area of urban logistics.
	Electric power consumption (kWh per capita)	The indicator is used to assess the effectiveness of sustainable electric power policy pursued with regard to energy conservation and environmental issues. The reduction of electric power consumption in economy means that less electric power is needed to produce the same GDP value and results in higher energy efficiency.
	Fertilizer consumption (kilograms per hectare of arable land)	Excessive use of fertilizers has negative impact on soil and the organisms living in it. Runoff water from the fields with fertilizer remains causes the contamination of surface waters. Therefore the volume of used fertilizers should be limited. In other words, both economy and agriculture should be characterized by adequate balance between the indispensable quantity of used fertilizers and the respect for natural environment and sustainable development principles.
Social inclusion	Poverty gap at national poverty lines (%)	This indicator describes the phenomenon of poverty and social exclusion, representing one of the major challenges for sustainable development. Fighting poverty and social exclusion should be based, in simplified terms, on economic growth and employment and also on effective social care. Owing to these activities those at risk of poverty and social exclusion will be able to live in dignity and participate actively in social life.
	Long-term unemployment (% of total unemployment)	The long-term unemployed, as a result of lasting exclusion from professional life, lose motivation to take up attempts aimed at their situation improvement and thus remain passive. Long-term absence on the job market results in social exclusion. The chances for returning to work by the long-term unemployed are relatively small, which means their and their families poverty advancement.
Demographic changes	Birth rate, crude (per 1,000 people)	It shows the number of live births per 1,000 population. It illustrates the quality of health care and the living conditions of a community. It is used to assess the population health situation.

Demographic changes	Population ages 65 and above (% of total)	Changes in population number of retirement age population have impact on e.g. the functioning of the national social security system. Incorrect proportion between the group of working population and elderly population is of significant importance for an effective socio-economic functioning of the state. Changing the proportions consisting in an increased retirement age population number (along with the decreasing working population number) shall result in the reduction of labour resources and a burden for the state budget with expenditure on retirement and disability pensions, it generates additional costs to support the unemployed population, related e.g. to increased medical care costs and other expenditure on health care.
	Age dependency ratio (% of working-age population)	This indicator is one of the measures illustrating the capacity of social security system and the productivity of society, especially in the current conditions of advancing reduction in the number of working-age population. High percentage of non-productive age population leads to imbalance in the number of working and producing population and those living at the expense of the working population (children, students, pensioners).
Public health	Life expectancy at birth, total	It is one of the key indicators to assess population health, it shows the quality of life of the entire population, the quality of health care and living conditions of the community. It is used to assess health situation of the population.
	Mortality rate, infant (per 1,000 live births)	This indicator allows the synthetic assessment of the population health condition and (indirectly) health care situation. It can also be referred to as a kind of civilisation development measure of societies, in the least developed countries it presents high values.
	Health expenditure, total (% of GDP)	One more indicator showing, to an extent, the situation of health care. Basically, it is expected that the values of this indicator will be increasing. Another issue is the efficiency of expenditure on health care.
Climate change and Energy	CO <sub>2</sub> emissions (kt)	The reduction of carbon dioxide and other greenhouse gasses emissions to the atmosphere is crucial for preventing excessive climate warming. Counteracting climate changes remains one of the objectives of sustainable development.
	Renewable energy consumption (% of total final energy consumption)	This indicator characterizes the level of obtaining energy from renewable sources. The increasing demand for energy resulting from civilization progress, along with the depleting traditional resources – mainly fossil fuels (coal, crude oil, natural gas) and the advancing natural environment pollution, resulting from their consumption, causes an increased interest in energy from renewable sources.
	Total greenhouse gas emissions (% change from 1990)	This indicator informs about the relationship between domestic energy consumption and greenhouse gas emissions (i.e. environmental impacts of energy industry). The consumption of fossil fuels is the primary source of carbon dioxide (CO <sub>2</sub> ) emissions. Due to the demand for energy this source is the driving force of greenhouse gas emissions. The transition to low-carbon fuels is an important means towards achieving the objectives of sustainable development.
Sustainable transport	CO <sub>2</sub> emissions from transport (% of total fuel combustion)	Transport sector is largely responsible for CO <sub>2</sub> emissions. In order to achieve the projected CO <sub>2</sub> reduction it is imperative to decrease the emissions from transport sector. The reduction of carbon dioxide and other greenhouse gasses emissions to the atmosphere is extremely important to prevent an excessive climate warming. Counteracting climatic changes remains one of the sustainable development goals.
	Railways, passengers carried (million passenger-km)	The concept of sustainable transport refers, among others, to the increased importance of public transport, including higher share of railroad carriage in transporting passengers. Moreover, one of the main solutions in the context of fighting pollution caused by vehicles is the promotion of the increased usage of public transport.
	Railways, goods transported (million ton-km)	The concept of sustainable transport predominantly refers to the reduction of goods transportation by vehicles and taking advantage of railroads, waterways and sea transportation.
Natural resources	Forest area (% of land area)	Forests represent an integral part of natural environment, they have positive influence on climate, water balance, maintain the biological potential of species and prevent soil erosion processes. They also play important production and social functions. There are extensive needs and possibilities to increase the volume of domestic forest cover through the afforestation of productively inefficient or undeveloped arable land.
Good governance	Voice and Accountability	This indicator reflects the extent to which a given country population is capable of participating in the election of their authorities. Additionally, freedom of speech and expression level, the functioning of free media or the freedom of association are taken into account. The particular elements of good governance are extremely important in an overall perception of sustainable development concept implementation.
	Rule of Law	Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
	Control of Corruption	Control of corruption capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as <i>capture</i> of the state by elites and private interests.

The values of the synthetic measure of development were normalized in the interval  $<0;1>$  and the pattern value equals 1. The higher the discussed phenomenon level the higher the value of the measure of development. The values of synthetic measures of development (SMD), specified based on the Euclidean distance, allowed identifying the positions regarding the implementation of sustainable development in the particular years. Lower than 1 SMD values, in terms of sustainable development, refer to the following situations in particular years:

- $<0,0 - 0,2>$  very unfavourable,
- $<0,2 - 0,4>$  unfavourable,
- $<0,4 - 0,6>$  moderate,
- $<0,6 - 0,8>$  favourable,
- $<0,8 - 1,0>$  very favourable.

### 3. Sustainable development in Russia in the period 2004-2013

The values of synthetic measure of development (SMD) in the years 2004-2013 were determined based on the set of indicators listed in tab. 2. The table also presents the nature (interpretation) of indicators and the coordinates (values) of an object-pattern in the years 2004-2013.

The values of individual indicators in the years 2004-2013 and the average annual change rate are presented in tab. 3. The dynamics measures represent an important type of indicators applied in assessing progress in achieving the specific goals. They allow measurement and evaluation of changes occurring over time. Therefore the average annual change rate was calculated for each of the indicators.

The analysis of individual indicator values and the dynamic analysis allow drawing the following conclusions regarding the situation of Russia characterised using the indicators of sustainable development in the period 2004-2013:

- the value of GDP per 1 resident presented an ongoing increase in each consecutive year (except for 2009), the average annual change rate was 15%,
- the indicator of expenditure on research and development was characterized by slight changes,
- the share of unemployed population in labour force resources presented the most unfavourable changes in 2009 against 2008, when the indicator value went up by 2,1 percentage point,
- the decline in the share of energy from renewable sources and waste in the total annual average energy by 1,15 was an unfavourable phenomenon,
- the electric power consumption was growing year by year, the annual average increase was 1,7%,

- the consumption of fertilizers in kg per hectare of arable land went up by 3,2%,
- the share of population living below poverty level declined by almost 8%,
- the share of long-term unemployment rate in total unemployment ranged from 28,7% in 2009 up to 42,3% in 2006,
- the annual average increase by 2,7% of birth rate was a positive factor,
- the share of population aged 65 and over presented the same level,
- slight differences can be observed in the value of age dependency ratio,
- life expectancy at birth was systematically increasing in the years 2004-2011 and remained at this level in subsequent years,
- the annual average decrease in infant mortality rate by 5,9% was a positive phenomenon,
- the share of expenditure on health care was from 5,2% up to 7,4%,
- the annual average increase in CO<sub>2</sub> emission by 1,9% was a negative occurrence,
- the indicator of energy consumption from renewable sources was characterized by slight changes,
- the indicator of greenhouse gas emissions presented an overall improvement,
- CO<sub>2</sub> emissions from transport sector did not show any significant changes,
- the annual average decrease of railway passengers by 1,4% was a negative phenomenon,
- the annual average increase by 2,4% of goods transported by railways was a positive change,
- the share of forest area against the total country area did not change significantly,
- the annual average increase of Voice and Accountability indicator by 6,2% was a positive fact,
- the annual average decrease of the Rule of law indicator value by 1,9% was a negative phenomenon,
- the annual average increase in the value of Control of Corruption indicator proved a positive change.

SMD values in the years 2004-2013 are presented on fig. 1.

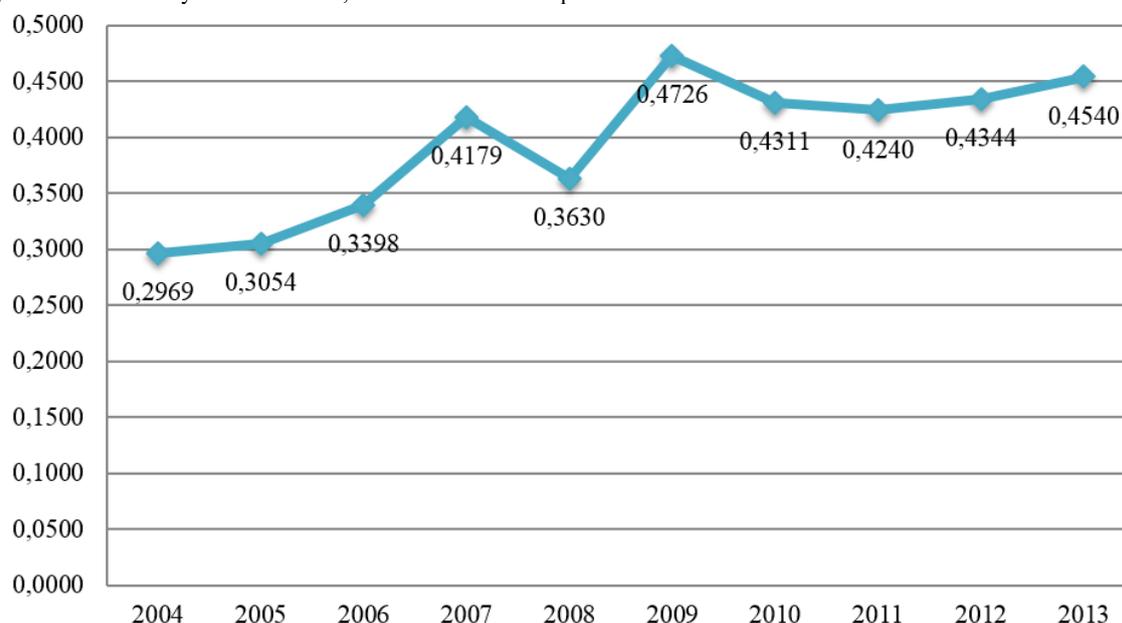
The situation in Russia in terms of sustainable development implementation in particular years can be defined as unfavourable or moderate. An unfavourable situation occurred in four analysed years, whereas in six of them it can be referred to as moderate. In the first three analysed years it was unfavourable, next moderate in 2007, in 2008 unfavourable and again moderate in the period 2009-2013.

The assessment of the situation in Russia, regarding the implementation of sustainable development standards, can be considered as positive having taken

Table 2. The set of indicators included in the analysis covering the situation in Russia from the perspective of sustainable development concept implementation, source: authors' compilation based on The World Bank data

SDI theme	Indicator	Indicator nature	Reference value
Socioeconomic development	GDP per capita (current thousand US\$)	stimulant	14487,3
	Research and development expenditure (% of GDP)	stimulant	1,25
	Unemployment, total (% of total labour force)	destimulant	5,5
Sustainable production and consumption	Combustible renewables and waste (% of total energy)	stimulant	1,12
	Electric power consumption (kWh per capita)	destimulant	5633,9
	Fertilizer consumption (kilograms per hectare of arable land)	destimulant	11,4
Social inclusion	Poverty gap at national poverty lines (%)	destimulant	0,9
	Long-term unemployment (% of total unemployment)	destimulant	28,7
Demographic changes	Birth rate, crude (per 1,000 people)	stimulant	13,3
	Population ages 65 and above (% of total)	destimulant	13,1
	Age dependency ratio (% of working-age population)	destimulant	38,8
Public health	Life expectancy at birth, total	stimulant	70,4
	Mortality rate, infant (per 1,000 live births)	destimulant	8,9
	Health expenditure, total (% of GDP)	stimulant	7,4
Climate change and Energy	CO <sub>2</sub> emissions (kt)	destimulant	1574367,78
	Renewable energy consumption (% of total final energy consumption)	stimulant	3,7
	Total greenhouse gas emissions (% change from 1990)	destimulant	-32,8
Sustainable transport	CO <sub>2</sub> emissions from transport (% of total fuel combustion)	destimulant	14,9
	Railways, passengers carried (million passenger-km)	stimulant	175800
	Railways, goods transported (million ton-km)	stimulant	2400000
Natural resources	Forest area (% of land area)	stimulant	49,8
Good governance	Voice and Accountability	stimulant	-0,59
	Rule of Law	stimulant	-0,74
	Control of Corruption	stimulant	-0,74

Figure 1. SMD in the years 2004-2013, Source: authors' compilation



into account the occurring trend. The conducted analysis showed that the situation changed from an unfavourable in the initial analysed years (2004-2007) into a moderate one (2007-2013 except for 2008). Therefore it can be concluded that Russia is in the process of ongoing progress regarding the implementation of the discussed development concept.

#### 4. Conclusions

The final remarks and conclusions should refer to the impact of the global crisis (2008) on the discussed concept implementation, however, this situation did reflect the global tendencies occurring at that time. As it has already been mentioned, the general trend

Table 3. The values of indicators in the years 2004-2013 and the average annual change rate, source: authors' compilation based on The World Bank data

SDI theme	Indicator	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average annual change rate
Socio-economic development	GDP per capita (current thousand US\$)	4102,4	5323,5	6920,2	9101,3	11635,3	8562,8	10675	13323,9	14078,8	14487,3	115
	Research and development expenditure (% of GDP)	1,15	1,07	1,07	1,12	1,04	1,25	1,13	1,09	1,13	1,13	99,8
	Unemployment, total (% of total labour force)	7,8	7,1	7,1	6	6,2	8,3	8,3	7,3	6,5	5,5	5,5
Sustainable production and consumption	Combustible renewables and waste (% of total energy)	1,09	1,06	1,12	0,99	0,91	0,98	1,01	0,98	1	0,99	98,9
	Electric power consumption (kWh per capita)	5633,9	5770,1	6098,5	6286,1	6399,7	6095,4	6409,9	6485,8	6617,1	6539,2	101,7
	Fertilizer consumption (kilograms per hectare of arable land)	11,4	11,8	12,5	14,3	15,9	15,6	16,1	16,1	16,4	15,7	15,2
Social inclusion	Poverty gap at national poverty lines (%)	2,1	2,1	1,6	1,3	1,3	1,2	1,2	1,2	0,9	1	92,1
	Long-term unemployment (% of total unemployment)	39,2	39	42,3	40,6	35,2	28,7	30	32,9	30,9	31	97,4
	Birth rate, crude (per 1,000 people)	10,4	10,2	10,4	11,3	12	12,3	12,5	12,5	12,6	13,3	13,2
Demographic changes	Population aged 65 and above (% of total)	13,8	13,8	13,8	13,6	13,4	13,2	13,1	13,1	13,1	13,2	99,5
	Age dependency ratio (% of working-age population)	41,7	40,8	40,3	39,7	39,1	38,8	38,8	39,2	40	41	99,8
	Life expectancy at birth, total	65,4	65,5	66,6	67,5	67,8	68,6	68,9	68,9	69,7	70,4	100,8
Public health	Mortality rate, infant (per 1,000 live births)	15,4	14,4	13,3	12,4	11,6	10,9	10,3	9,8	9,3	8,9	94,1
	Health expenditure, total (% of GDP)	5,2	5,2	5,3	5,4	6,2	7,4	6,8	6,6	6,6	7,1	103,5
	CO <sub>2</sub> emissions (kt)	1602955,7	1615687,5	1669618,1	1667597,6	1715639	1574367,8	1742540,1	1808073	1900844,3	1896122,6	101,9
Climate change and Energy	Renewable energy consumption (% of total final energy consumption)	3,6	3,6	3,5	3,7	3,3	3,6	3,3	3,2	3,2	3,3	99,0
	Total greenhouse gas emissions (% change from 1990)	-32,8	-29,7	-23,5	-27,5	-16,6	-28,7	-27,6	-22,7	-22	-26,4	97,6
	CO <sub>2</sub> emissions from transport (% of total fuel combustion)	14,9	14,9	14,9	15	15,8	15,8	16	15,6	15,3	15,4	100,4
Sustainable transport	Railways, passengers carried (million passenger-km)	164272	164262	173699	173411	175800	153500	139028	139842	144612	144612	98,6
	Railways, goods transported (million ton-km)	1801600	1801601	1950000	2090337	2400000	1865305	2011308	2127212	2222388	2222388	102,4
	Forest area (% of land area)	49,4	49,4	49,5	49,5	49,6	49,7	49,8	49,8	49,8	49,8	100,1
Good governance	Voice and Accountability	-0,59	-0,68	-0,9	-0,9	-0,85	-0,9	-0,88	-0,87	-0,98	-1,01	106,2
	Rule of Law	-0,86	-0,91	-0,93	-0,95	-0,93	-0,77	-0,77	-0,74	-0,82	-0,78	98,9
	Control of Corruption	-0,74	-0,78	-0,85	-0,95	-1,05	-1,09	-1,06	-1,04	-1,02	-1	103,4

remained positive, but having analysed the individual indicators in detail it is visible that in many cases the results were far from satisfying. All indicators referring to good governance adopted unfavourable values and in this respect urgent remedial actions are necessary. The area of forests against the total country area did not improve within the discussed decade, however, the absence of further degradation is a positive factor in this regard. The indicator of infant mortality rate was still quite high, if compared against the Western European countries. R&D expenditure (% of GDP) was definitely lower (1,13% in 2013) against e.g. China (2,01%). The indicator of renewable energy consumption (% of total final energy consumption) was low (3,3% in 2013) comparing to the European Union average (above 14%). Practically, in each of the studied respects the particular indicators can or should be improved.

It is crucial that the idea of sustainable development is extensively and effectively popularized in the Russian Federation. Beyond any doubt, this largest country in the world constitutes a very important component of the global ecosystem. It is in the interest of the Russian society, the international community, as well as the future generations to cooperate at an international scale for the benefit of solving environmental, social or economic problems faced by Russia and to promote the idea of sustainable development.

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