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Slovakia and the Czech Republic on the path towards Sustainable Development

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Abstract. The objective of this contribution is to identify, on the basis of an empirical content analysis of documents, the results of fulfilling the 2030 Agenda in the Czech Republic and Slovakia in terms of their global responsibility for fulfilling development goals, by identifying indicators for each of the 17 goals of the 2030 Agenda. This was based on selective research in terms of the selected pilot indicator for each goal of Agenda 2030. These selected indicators were chosen because they best represented the social, economic and territorial problems of the countries surveyed. Their fulfilment is therefore the most important part of fulfilling the complex Sustainable Development Goals. Then a selective and complex relational comparison of the analysed countries in terms of their performance in implementation will be performed on the basis of data obtained using the SDG index. The outcome of the paper is a specification of the surveyed countries' prospects for meeting all the examined aspects of the SDG by 2030 by an arithmetic expression of their potential to reach 100% in the surveyed indicators. This paper is part of the solution of Project VEGA no. 1/0302/18 "Smart Cities as a possibility for implementation of the concept of Sustainable Urban Development in the Slovak Republic".

Contents:

1. Introduction

The concepts of sustainability and sustainable development began to be used at the beginning of the 1970s, mainly in the context of recognising that any uncontrolled growth (of population, production, consumption, pollution, etc.) is unsustainable in an environment of limited resources. Economist Kenneth Boulding (1966) pointed out that the planet is no longer endless. He suggested the metaphor of a spacecraft. And like a spacecraft, all the waste remains on board (Boulding, 1966). Boulding was followed by Garrett Hardin (1985) with the assumption that the ship must have a captain – and that that is not what Earth has. It has no common order. It is argued over by selfish groups who attribute rights without responsibility and do not care about the ship. The planet's limited capabilities are not compatible with the unlimited demands of humans (Hardin, 1985). Economist Julian Simon (2006) takes the opposite view in the monograph "The Ultimate Resource", rejecting the risk of depletion of raw materials and energy, environmental pollution and other global problems. According to him, all our natural resources are unlimited in every way, because they are the product not only of nature itself, but above all of human labour, ingenuity and thinking (Simon 2006). The concept of sustainable development represents an alternative model of society development as contrasted with the industrial economy. It reflects the environmental limits of economic growth; policies based on this concept try to align economic and social development with the capacities of ecosystems, preserving natural values and biological diversity for current and future generations (Daly, 2006). The traditional definition from a report by the UN Commission on Environment and Development (the "Brundtland Report") from 1987 states as follows: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs, without this being at the expense of other nations" (Mebratu, 1998). Therefore, sustainable development originally only applied to environmental protection, although now it has been expanded to also cover other areas (ME CR, 2018). Sustainable development is also legally defined in Paragraph 6 of *Act no. 17/1992*

Coll. On the environment, where it is stated that it is the type of development that preserves the possibility for present and future generations to satisfy their vital needs without reducing nature's diversity, and preserves the natural functions of ecosystems. P. Pearce and R. Turner state that "Sustainable development should maximise the net benefits of economic development while protecting and ensuring the reproduction of the usefulness and quality of natural resources in the long run" (Pearce, Turner, 1990). Paula Bajdor understands this concept as a process of increasing the spectrum of alternatives enabling individuals and communities to realise their aspirations and potential in the long run, while maintaining the ability to regenerate economic, social and environmental systems (Bajdor 2017). The definition is meant to be brief, and thus it can never describe the idea of sustainable development in its entirety. Therefore, the main principles of sustainable development that specify this concept are often mentioned together with the definitions. These include improving the quality of human life, building national structures, protecting the environment, etc.

Sustainability is a European brand. Yet, in order to preserve the future for future generations, the right policy choices must be made. The EU has a strong starting point in the field of sustainable development and, together with the Member States, is fully committed to becoming a pioneer in the implementation of the 2030 Agenda. In November 2016, the European Commission outlined its strategic approach to the implementation of the 2030 Agenda, including the objectives of sustainable development in the document "Next steps for a sustainable European future" (Statistical Office of the Slovak Republic, 2019).

The first Communication on the next steps for a sustainable European future explains how the Commission's ten policy priorities contribute to the implementation of the UN Sustainable Development Programme and the 2030 Agenda for Sustainable Development, and how the EU will meet the SDGs in the future. The second Communication on a new European Consensus on Development proposes a common vision and framework for development cooperation between the EU and their Member States, which are in line with Agenda 2030. The third Communication on a renewed part-

nership with African, Caribbean and Pacific (ACP) countries proposes a sustainable phase in EU–ACP relations after the Cotton Partnership Agreement expires in 2020 (European Commission 2016). Sustainable development is an important concept for the European Union (EU), at least at the political and strategic level (Steuer 2008).

First Vice President Frans Timmermans said, "*Building the future for our children and our planet for the benefit of all, through the SDG, must be the main direction of our work. Implementing the UN 2030 Agenda is a shared commitment to the unavoidable cooperation needs of everyone.*"

High Representative/Vice-President Federica Mogherini said, "*Today we are increasingly connected than ever before, so investing in people outside our borders is also an investment for Europe. Today's proposals have the common goal of reinforcing the impact of our cooperation worldwide while promoting sustainability at home. At the heart of the EU's global strategy, the EU will continue to be a leading partner in external actions that promote peace, democracy and good governance, which strengthen resilience at all levels and promote shared and sustainable prosperity for all*" (European Commission 2016).

In the Czech Republic, the first Sustainable Development Strategy was approved in 2004 (Government of the Czech Republic, 2004), in Slovakia 2001 (Slov-Lex, 2016). The Strategic Framework Czech Republic 2030, approved by the government in 2017, is currently the key state administration document for sustainable development and for raising living standards, and is a response to the adoption of a global development agenda by the UN General Assembly in New York in September 2015, bringing to the domestic environment 17 Sustainable Development Goals (Colglazier, 2015). The 2030 Agenda for Sustainable Development is a summary of global commitments for the international community to respond to the most serious challenges of our time (United Nations, 2015). Climate change, poverty, increasing economic and social inequalities or the unsustainability of the dominant patterns of production and consumption are complex and interrelated problems (Biermann, Kanie, Kim, 2017). The SDGs set by the 2030 Agenda apply to all countries regardless of their level of economic and social development – they are relevant to Somalia and the

US, as well as to Slovakia and the Czech Republic (the Office of the Deputy Prime Minister of the Slovak Republic for Investments and Informatisation, 2017).

The first document related to the implementation of the 2030 Agenda in Slovakia was adopted by Resolution of the Government of the Slovak Republic no. 95 of 2 March 2016, entitled "Baselines of the Implementation of the 2030 Agenda for Sustainable Development" (Government of the Slovak Republic, 2016). It established the principle of shared responsibility for national and external implementation of the agenda. By Resolution of the Government of the Slovak Republic no. 5 of 11 January 2017, the Concept of the Implementation for the 2030 Agenda in the international environment was approved. It presents a vision of how Slovakia's foreign engagement can contribute to fulfilling sustainable development goals on the global level (Government of the Slovak Republic, 2016). Responsibility for the 2030 Agenda in Slovakia is shared between the Office of the Deputy Prime Minister of the Slovak Republic for Investments and Informatisation and the Ministry of Foreign and European Affairs of the Slovak Republic (the Office of the Deputy Prime Minister of the Slovak Republic for Investments and Informatisation and the Ministry, 2017). The main coordinating authority for implementing the 2030 Agenda in Slovakia is the Government Council of the Slovak Republic for the 2030 Agenda. This council coordinates policy-making and strategies related to sustainable development, both at the national and international level, and evaluates progress achieved in implementing the 2030 Agenda programme (the Office of the Deputy Prime Minister of the Slovak Republic for Investments and Informatisation and the Ministry, 2018).

In response to the adoption in 2015 of the new UN Strategy, "Transforming our World Agenda 2030 for Sustainable Development", as a response to the end of the Millennium Goals, the EU also had to revise current strategies to reflect as closely as possible current developments and global society needs. In the environment of the European Union, Agenda 2030 and its 17 Sustainable Development Goals build on the European Strategy Papers entitled "Next steps for a sustainable European future", (Ministry of Regional Development of the Czech Republic, 2019). For the first time, sustainable de-

velopment objectives are universally applicable in all countries and the EU is committed to being a leading initiator in their implementation (European Commission, 2016). The global and transnational dimension of these documents is not coincidental, given the global issues of sustainable environment, world community and economy (Maier, 2012).

Other EU strategic documents that meet the Agenda 2030 objectives are currently: The 7th Environment Action Programme (EAP), White Paper on the Future of Europe - Reflections and scenarios for the EU27 by 2025 (2017), Innovating for sustainable growth: A Bioeconomy for Europe 2012–2020, Strategic Framework for European Cooperation in Education and Training 2020, Territorial Agenda of the European Union 2020, EU Digital Education Action Plan 2018, Global Strategy for the European Union's Foreign and Security Policy (2016), and many others (Ministry for Regional Development of the Czech Republic, 2019).

The Czech Republic has developed a comprehensive portal of strategy databases in the section of individual ministries, where individual strategies are hierarchically sorted according to their binding nature, the territorial level to which they apply and the time period for their fulfilment. These strategies respond comprehensively to the individual goals of Agenda 2030, thus contributing to a unified and transparent mechanism for their achievement. The problem is that there is no such unified portal of strategies in the Slovak Republic. For example, in the area of Goal 11, a methodology for evaluating smart and sustainable cities was published in the Czech Republic in 2019. The Slovak Republic has no methodology for evaluating smart and sustainable cities, and is based on internationally available and harmonised ISO standards. However, it is questionable whether these universal standards suf-

ficiently reflect the specific conditions in the Slovak Republic. Therefore, we can assume that the Czech Republic should be better than the Slovak Republic at attaining the SDG by 2030, based on its institutional approach and internal policy-making mechanisms at individual levels that meet the requirements of the SDGs.

2. Methods of research and data

The SDG Index is a UN tool used for monitoring the fulfilment of the 2030 Agenda goals in individual UN member states (World Health Organisation, 2016). This index uses publicly available data published by official providers such as the World Bank, the WHO and other international organisations, including research centres (SDSN) and non-governmental organisations (Schmidt-Traub, Teksoz, Durand-Delacre, Sachs, 2017). An SDG Index score indicates whether a country is among the worst (0%) or the best, or has target (100%) results. In order to be able to compare countries in terms of performance in fulfilling individual goals, the SDG Index needs to express data according to population size or other suitable reference points, or data for the same number of identified selected indicators (SDSN, 2018) This means that in order to be able to identify shortcomings in fulfilling the 2030 Agenda goals in the analysed countries, we need to multiply an SDG Index score (0–100%) by population size, or divide it by the number of identically selected indicators. To calculate the fulfilment of the 17 goals of the 2030 Agenda in the Czech Republic and Slovakia, we chose the latter method of measuring shortcomings, which uses identically selected indicators. Therefore, we will calculate shortcomings in fulfilling the 2030 Agenda goals as follows:

$$n = \frac{\text{Sustainable Development Goals Index score}}{iA + iB + iC + iD + iE + iF + iG + iH + iCH + iI + iJ + iK + iL + iM + iN + iO + iP} \cdot 100\%$$

Where n is shortcomings in fulfilling the 2030 Agenda goals in the analysed countries, and i is identically determined indicators of the fulfilment of the 2030 Agenda in the Czech Republic and Slovakia. Seventeen indicators (A, B, C, D, E, F, G, H, CH, I, J, K, L, M, N, O, P) were selected, based on the availability of data for comparison, for the identification of shortcomings in fulfilling the 2030 Agenda goals. Each indicator covers a specified area contributing to the fulfilment of the 2030 Agenda goals.

For example, Goal 1 of the 2030 Agenda "End poverty in all its forms everywhere" is covered by Indicator A of the 2030 Agenda; while Goal 2 of the 2030 Agenda is covered by Indicator B, and so on. The following tables present the selected indicators. In reality, the number of indicators that may fulfil particular goals of sustainable development is higher than one; however, in light of the complexity of evaluating all 17 goals of Agenda 2030, for each goal only one indicator was selected – the ones best suited to the social, economic and territorial challenges of the countries surveyed. In determining the prospects of achieving the goals of the Agenda 2030 in the Slovak Republic and Czech Republic we aggregated indicators arithmetically within each goal and then averaged across goals, applying the same weight to every goal according to the equation:

$$I_i(N_i, N_{ij}, I_{ijk}) = \sum_{j=1}^{N_i} \frac{1}{N_i} \sum_{k=1}^{N_{ij}} \frac{1}{N_{ij}} I_{ijk}$$

where I_i is the index score for country i, N_i the number of SDGs for which the country has data, N_{ij} the number of indicators for SDG j for which data is available for country i, and I_{ijk} denotes the score of indicator k under SDG j for country i. This weighting for the SDG Index is subjective, as is the case with all composite indices. Our approach is consistent with the intention of UN member states who framed the SDGs as an "integrated and indivisible" 2030 agenda, whereby the goals have equal priority. This paper provides an overview of measurement and fulfilment of sustainable development goals of Agenda 2030 in the Czech Republic and Slovakia in order to contribute to creating national thematic research networks on statistics of sustainable development in the evaluated countries. For a more comprehensive approach to examining all indicators of individual SDGs of Agenda 2030, a study was used: Jeffrey Sachs, Guido Schmidt-Traub, Christian Kroll, Guillaume Lafortune and Grayson Fuller (2016–2019). Based on the outcomes of this study, a functional comparison of the analysed countries was carried out within the framework of the comprehensive fulfilment of SDGs for the years 2016–19. From the results, gaps in their fulfilment were subsequently identified.

3. Results

The existence of quantitative measures that reliably show and monitor particular stages of transition is one of essential conditions for the right way to conduct sustainable development (Maier, 2012). This function is provided by indicators of sustainable development of Agenda 2030 that contain exact information and important facts necessary for decision making on all levels (Moldan, 1996).

The number of people living in extreme poverty, i.e. on less than USD 1.90 (EUR 1.60) a day, decreased from 1.9 billion in 1990 by more than a half (Bhalla, 2002). However, the figure is still 836 million people. The highest number of extremely poor people lives in South Asia and Sub-Saharan Africa, whose countries are small, unstable and constantly conflict-afflicted (United Nations Information Centre Prague, 2018). The CR consistently ranks EU countries as having the lowest poverty and social exclusion rates. A Czech Statistical Office analysis shows that 960,000 Czech men and women (9.7%) lived below the income poverty line in 2017, which, according to the analysis, was 0.6% less than in the previous year. A person is below the income poverty line if his income is less than 60% of the median of the standard of living. However, labour unions and charities point out the problem of "working poverty". For many people, their low income does not cover their basic needs (Czech Statistical Office, 2017). In the SR, 650,000 people (12.4%) were at risk of income poverty in 2017. The figures are based on the EU SILC 2017 survey of the incomes and living conditions of households, representing a drop compared to 2016, when 670,000 people (12.7%) were at risk of income poverty. It is expected that countries such as the Czech Republic and Slovakia will reduce these poverty rates by at least 50% by 2030. (Statistical Office of the Slovak Republic, 2017). The Czech Republic's value of Indicator A of the SDG Index is 0.3% and Slovakia's value of Indicator A is 0.9% (ME CR, 2018). This means that 99.7% of people in the Czech Republic do not live in extreme poverty, i.e. they have more than USD 1.90 a day (EUR 1.60). The equivalent figure in Slovakia was 99.1%. So the number of people suffering from extreme poverty is higher in Slovakia than in the CR.

Obesity is a civilisational disease whose incidence and prevalence is growing globally. Obesity is an instance of metabolic syndrome and an independent risk factor of mortality in all population age groups (Björntorp, 1992). Prevalence is one of the basic indicators in epidemiology – it is the ratio of individuals suffering from a disease to the total number of individuals in a monitored population (Bonita, Beaglehole, Kjellström, 2006). Body Mass Index (BMI) shows how you are doing in terms of your weight in proportion to your height (Prentice, Jebb, 2001).

The Czech Republic's value of Indicator B of the SDG Index is 26% and Slovakia's value of Indicator B is 20.5% (ME CR, 2018). This means that 26% of people (adult population) in the Czech Republic suffer from obesity and 20.5% of the adult population in Slovakia are obesity sufferers. If we were to include data on those who are overweight, i.e. BMI of 25–30, we would find that many more people (adult population) in both countries have a weight problem.

This situation is the result of the fast-paced modern lifestyle, unhealthy food and growing physical passivity and comfort. For this reason, the Czech Republic approved the Long-term Programme for Improving the Health of the Population of the Czech Republic – Health for All in the 21st Century.

The Czech Republic's value of Indicator C of the SDG Index is 18.2% and Slovakia's is 22.9% (ME CR, 2018). This means that at least 18% of people over 15 in the Czech Republic smoke at least one cigarette a day and almost 23% in Slovakia. Most smokers (more than one third) smoke six to ten cigarettes a day. According to a survey by the National Institute of Public Health, the number of non-smokers in the Czech Republic grew by 3.5% between 2016 and 2017. This may be due to the Act on the Protection of Health against the Harmful Effects of Addictive Substances, which prohibits smoking in restaurants, or also due to a large number of smokers switching to other forms (replacement) of smoking, so-called "healthy smoking" with a lower content of harmful substances. Unfortunately, Slovakia shows the reverse trend compared to the CR. According to Eurostat, almost 30% of adults over 15 are smokers and as many as 29.2% of people are exposed to tobacco smoke daily (Eurostat, 2014). This ranks Slovakia among the worst EU countries in terms of the number of smokers. Only Austria, Greece and Bulgaria have more smokers. It is important to note that the CR does not even reach the EU average.

Tertiary education (age 19 and older) enables secondary school graduates to pursue a higher qualification in various specialisations by studying at conservatories, higher vocational schools (HVS) or universities. Education attained at universities

Table 1. Indicator (A) of the fulfilment of Goal 1 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Expected proportion of poor people on less than USD 1.90/day in 2030 (% population)	Estimated share of population below poverty line (USD 1.90/day) in 2030.

Source: World Data Lab 2017, own materials

Table 2. Indicator (B) of the fulfilment of Goal 2 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Obesity prevalence, BMI>30 (% adult population)	Percentage share of population with body mass index (BMI) of 30 or higher, based on measured height and weight.

Source: WHO 2018, own materials

Table 3. Indicator (C) of the fulfilment of Goal 3 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Daily smokers (% of population aged 15+)	Percentage of people aged 15 and older who smoke daily

Source: OECD 2018, own materials

Table 4. Indicator (D) of the fulfilment of Goal 4 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Population aged 25–64 with tertiary education (%)	Percentage share of people aged 25–64 who have completed tertiary education

Source: OECD 2018, own materials

can be classified into three basic levels: bachelor, master and doctoral (PhD) (Nováček, 2011). The Czech Republic's value of Indicator D of the SDG Index is 23% and Slovakia's is 22% (ME CR, 2018). This means that the number of people aged 25–64 with university education in the Czech Republic is identical to that in Slovakia. Higher education institutions are important partners in implementing the EU's strategy for advancing and maintaining growth: "Europe 2020: A strategy for smart, sustainable and inclusive growth" set the goal of increasing the number of persons in the EU aged 30–34 with university education to 40% by 2020 (European Commission, 2010). Improving the performance of education and vocational training systems of all levels and increasing participation in tertiary education is also one of the integrated main directions of the economic and employment policy, which were later developed into a component of the Europe 2020 strategy (Marlier, Natali, 2010).

The median is a statistical indicator which does not reflect extremes in the way that mean wage does. It is a value that divides a series of ascending results into two equal halves. The median wage of men is, according to the latest OECD statistics, 16.3% higher than that of women. The figure in Slovakia is 13.9%, so it is 2.4% closer to being equal than in the CR. Many experts believe that women earn less mainly because they usually stay at home with children. When they return to work, they typically fail to catch up to other colleagues. Another

factor contributing to the difference in wages between men and women is the differences between the preferences of men and women for certain sectors; women typically work in the education, healthcare and non-profit sectors. As Eurostat data show, the biggest wage gap between men and women is in the finance and insurance sector, the information and communication sector, as well as the car service sector. However, according to OECD statistics, it is apparent that the overall wage difference is gradually decreasing in both the CR and Slovakia. For example, as recently as in 2000, men in the CR earned 19.1% more than women (European Commission, 2018).

The Czech Republic's value of Indicator F of the SDG Index is 97.6% and Slovakia's is 93.4% (ME CR, 2018). This means that 97.6% of people in the Czech Republic use safely managed drinking water services, although in Slovakia the number is 4.2% lower.

Renewable energy sources include wind power, solar power, hydropower, tidal power, geothermal power, biofuel and renewable waste (Boyle, 2004). The use of energy from renewable sources has many potential benefits, including a reduction in greenhouse gas emissions, diversification of energy supplies and lower dependence on fossil fuel markets (especially oil and gas) (Ellabban, Abu-Rubb, Blaabjerg, 2014). The growth of renewable energy sources may also stimulate employment in the EU by creating jobs in the field of green technologies (Eurostat,

Table 5. Indicator (E) of the fulfilment of Goal 5 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Wage differences between men and women (total, % of men's median pay)	Difference between the median wages of male and female full-time and self-employed workers, divided by men's average wage.

Source: OECD 2018, own materials

Table 6. Indicator (F) of the fulfilment of Goal 6 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Population using safely managed water services (%)	Percentage of population using safely managed water supply services. A safely managed drinking water service meets three criteria: it is accessible indoors, water is available when required, supplied water is without contamination.

Source: The Statistical Office of the Slovak Republic 2017, own materials

Table 7. Indicator (G) of the fulfilment of Goal 7 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Share of renewable energy in total final energy consumption (%)	The share of renewable energy consumption in total final energy consumption

Source: World Bank 2018, own materials

2018). The Czech Republic's value of Indicator G of the SDG Index is 14.8% and Slovakia's is 13.4% (ME CR, 2018). This means that both examined countries fail to sufficiently use renewable energy sources in their individual sectors, while the EU wants to see the share of gross final consumption of energy from renewable source in the Czech Republic reach 20% by 2020. The European legislation requires Slovakia to reach a 20% share of renewable sources in gross final energy consumption. According to Eurostat data, this share was 12% in 2016. It was 12.9% in 2015. In 2017, unlike the Czech Republic, Slovakia did progress towards meeting its 2020 target by increasing its share of renewable energy to 13.4%. It is therefore a mere 0.6% away from the required 2020 target, compared to 5.2% in the case of the Czech Republic (Eurostat, 2016).

There are many people in the world who would not take banking services for granted. According to the latest available surveys, over 2.5 billion peo-

ple – roughly a half of the world's adult population – do not use them (The World Bank, 2018). The Czech Republic's value of Indicator H of the SDG Index is 84.2% and Slovakia's value of Indicator H is 81% (ME CR, 2018). This means that 19% of adults (aged 15 and older) in Slovakia do not report having an account in a bank or elsewhere, while 15.8% of adults (aged 15 and older) in the Czech Republic do not report having an account in a bank or other financial institution; these are mostly students, pensioners and young unemployed people.

Experts warn, however, that there is a growing number of people in the world who do not fit or do not want to fit into this model. In developing countries, it is not just poverty but also long distances to the nearest bank or difficult administration that are a problem. The European Commission has started to address this problem. According to a new directive, even a homeless person should have a basic bank account (EUR-Lex, 2015).

Table 8. Indicator (H) of the fulfilment of Goal 8 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Adults (aged 15 or older) with a bank account in a bank or other financial institution (%)	The percentage of adults aged 15 and older who report having an account (alone or with someone else) in a bank or other type of financial institution, or who personally used a mobile device as a financial service in the past 12 months

Source: Demirguc-Kunt et al., 2015, own materials

The Czech Statistical Office (CSO) published the results of its annual survey of research and development. The total expenditure on research and development in the Czech Republic reached a record CZK 90.4 billion in 2017. The private sector contributed the biggest share of this sharp increase. The expenditure of 1.79% of GDP on research and development in the Czech Republic is still lower than in the 2013–15 period, when we came close to the EU average (2%), spending 1.97% in 2014 and 1.93% in 2015. In Slovakia, expenditure on research and development last year was lower than the EU average, at 0.80% of GDP, so Slovak expenditure on research and development was 1.20% of GDP in 2017. Gross domestic expenditure on scientific research and development according to 2017 results was higher in the Czech Republic than in Slovakia.

The Palma Index ratio is an alternative to the Gini Index and focuses on the differences between the upper and lower limits of disposable incomes (Cobham, Schlögl, Sumner, 2016). The Czech Republic and Slovakia are among the countries with the highest degree of equality in the EU, taking into account distribution of incomes between the wealthiest and the poorest levels of society. Slovakia, together with Slovenia, even has the lowest value of this ratio in the EU. The value of this ratio is 0.8%. The Czech Republic's value is 0.9% and the country ranks third in the EU in terms of the Palma ratio. The greatest income inequalities in terms of the Palma ratio in the EU exist in Latvia, Great Britain, Lithuania, Spain and Greece. The values of the Palma ratio in these countries are nearly three times as high as in the Czech Republic and Slovakia.

Public transport and its role are becoming a very important topic in the cities and villages of the examined countries. The value reached by Indicator J of the SDG Index is 70% in the Czech Republic and 60% in Slovakia (ME CR, 2018). Slovakia therefore has worse results in terms of satisfaction with public transport, with 40% of people dissatisfied with public transport compared with 30% in the Czech Republic. The world is undergoing changes that also naturally affect mobility. With growing demand for transport in the Czech Republic and Slovakia, the number of passenger cars and commercial vehicles is increasing. Cities must respond to problems associated with this increasingly often. The main negative consequence of growing spatial mobility and suburbanisation is an increased transport burden (primarily due to individual road transport) in city hubs, and transport in cities themselves (Douša, Koreňová, 2018). Growth in personal mobility also has a significant impact at the local level, i.e. on the spatial distribution of service functions and workplaces. In addition, we can expect that growth in spatial mobility associated with different life cycle stages will also continue. It is also in this respect that the Czech and Slovak population is beginning to follow trends seen in Western European countries, as pensioners in particular are leaving metropolitan and urban areas in search of a more peaceful and natural environment in their home country or abroad, but with good access to necessary services.

The amount of discarded electronic products in the world has increased dramatically in the past few years, with 20–50 million tonnes of such waste being generated each year. Electronic waste now makes up five percent of the total communal waste produced in the whole world, which is almost the same as all plastic packaging, but far more dangerous (Robinson, 2009).

E-waste is now the fastest growing component of communal solid waste, as people replace their mobile phones, computers, televisions, audio devices and printers more often than ever before. Mobile

Table 9. Indicator (CH) of the fulfilment of Goal 9 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Research and development expenditure (% GDP)	Gross domestic expenditure on scientific research and experimental development expressed as a share of gross domestic product (GDP)

Source: The Czech Statistical Office 2017, own materials

Table 10. Indicator (I) of the fulfilment of Goal 10 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
The Palma Index (%)	The share of the wealthiest 10% of the population in gross domestic income (GNI) divided by the share of the poorest 40% of the population

Source: OECD 2017, own materials

Table 11. Indicator (J) of the fulfilment of Goal 11 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Satisfaction with public transport (%)	The percentage of respondents who answered "Yes" to the question "Are you satisfied with public transport in your town or area?"

Source: Gallup 2016, own materials

Table 12. Indicator (K) of the fulfilment of Goal 12 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Production of electronic waste (kg/person)	Waste generated from electrical or electronic equipment, expressed in kilograms per person. Estimated based on data on domestic production, import and export of electronic products and data on product lifetimes.

Source: WHO-IAS 2015, own materials

phones and computers cause the biggest problem, as they are replaced most frequently. In Europe, for example, e-waste has increased by three to five percent, more than three times faster than the total inflow of waste (Nnorom, Osibanjo, 2008).

There is 14.8 kg of electrical waste per person in the Czech Republic and 11.4 kg of electrical waste per person in Slovakia (ME CR, 2018). Slovakia uses an electronic waste portal designed to serve as a comprehensive register and a source of information about waste management at the municipal level, and for managing waste management systems. It is intended to assist city and village mayors and workers responsible for waste management in keeping records of any communal waste produced in their city or village. The CR operates the SEPNO system, managed by the Ministry of Environment, for record-keeping and reporting of hazardous material transport.

The Czech Republic produces 9.2 tonnes of CO_2 (emissions) per person, while Slovakia only produces 5.7 tonnes of CO_2 per person (ME CR, 2018).

This means that the Czech Republic produces 3.5 tonnes more CO_2 (emissions) per person than the Slovak Republic. Iceland produces the most carbon dioxide (CO_2) per person in the EU (16.9 tonnes), and its statistical office attributes this primarily to the growth of air transport and metal production. Other countries exceeding the limit of 11 tonnes of CO_2 per person are Luxembourg, Estonia, Denmark and the Netherlands. Despite this, total CO_2 emissions per person in the EU are decreasing, from 8.8 tonnes in 2008 to 7.3 in 2017 (Vrbová, 2018).

4. Indicator (M) of the fulfilment of Goal 14 of the 2030 Agenda in the Czech Republic and Slovakia

Goal 14 of the 2030 Agenda is "Conserve and sustainably use the oceans, seas and marine resources for sustainable development" (United Nations, 2015). This goal is primarily intended for countries that directly use or are surrounded by the ocean, sea or sea resources. Unfortunately, the Czech Republic and Slovakia do not meet this criterion, as they are both landlocked countries. Evaluation of indicators for this goal was therefore not relevant.

Forests contribute to the fight against climate change, as they absorb carbon dioxide from the atmosphere. Carbon dioxide is then stored in trees and other vegetation, as well as in soil. More than 40% of the area of the EU (1.77 million km²) is covered by forests. In contrast with other parts of the world, forestation in the EU is expanding by 0.4% a year. Every year, 13 million hectares of forest is cut down in the world (an area the size of Greece), mostly to make way for farms, mines or new infrastructure. The EU has called on the international community to reduce global deforestation by a half by 2020 and to stop it altogether by 2030. The EU proposes that the international community should agree on ways to encourage developing countries to stop deforestation (Wulf, 2003). The EU also cooperates with a number of wood-exporting countries to improve forest management and to ensure that wood from these countries comes from legal logging. The sale of illegally logged wood has been banned in the EU since March 2013 (Kauppi, 2016).

The change in forestation between 2000 and 2016 represents 7.1 % in the Czech Republic, and 7% in the case of Slovakia according to SDG Index values. The loss of forestation (trees) in Slovakia and the CR has slowed down in recent years thanks to numerous initiatives to plant new trees and to afforest new areas as part of creating new city parks in individual cities (European Commission, 2013).

The Czech Republic's value of Indicator O of the SDG Index is 73% and Slovakia's is 67% (ME CR, 2018). This means that people in both countries feel rather safe when walking at night in their town or in the area where they live. In the town of Pilsen in the CR, for example, people can contribute to safety in the town by highlighting problems that concern them and that have not been addressed by anyone. Citizens can also use an internet portal where they can find their district and street and, of course, people they can contact either in writing, electronically or by phone. The portal is www.bezpecnemesto.eu, providing information regarding crime prevention, advisory services, news and other matters of interest. The town of Prešov in Slovakia is currently working on the www.pocitovamapa.sk project, where people can express their opinions about the areas of the town where they feel safe or unsafe, areas with missing street lighting, dark corners, which public areas they like, dislike, why, etc.

The total expenditure of the government sector on healthcare and education combined in the Czech Republic makes up 11.6% of GDP, and 12.3% of GDP in Slovakia. The share of expenditure on healthcare in GDP does not, however, reach the EU average, which is 9.9% for healthcare and 11% for education. The Czech Republic outperforms its neighbouring states such as Slovakia, Poland or Hungary. The figure for healthcare in developed countries such as France, Germany or Sweden is 11%, while at the other end of the spectrum are the Baltic States and Romania, spending six percent and five percent, respectively (Czech Press Office, 2017). Although expenditure on education has increased in the Czech Republic in recent years, it is still one of the lowest among the member states of the Organisation for Economic Co-operation and Development (OECD). According to OECD rankings, Slovakia is even one place below the Czech Republic. However, the total government expenditure on healthcare and education in Slovakia is high-

Table 13. Indicator (L) of the fulfilment of Goal 13 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Energy-related CO2 emissions per person (tCO2/person)	Carbon dioxide emissions per person produced during energy consumption. This includes emissions produced by the combustion of oil, coal and gas.

Source: Oak Ridge National Laboratory 2018, own material

Table 14. Indicator (N) of the fulfilment of Goal 15 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
Annual forestation changes (%)	The total area of tree loss from 2000 to 2016 in areas with at least 30% forestation, to be compared with the basic forestation level in 2000

Source: Global Forest Watch (2014) & EPI (2018), own materials

Table 15. Indicator (O) of the fulfilment of Goal 16 of the 2030 Agenda in the Czech Republic and Slovakia

INDICATOR	DESCRIPTION
People who feel safe walking at night in their town or in the area where they live (%)	The percentage of respondents who answered "Yes" to the question "Do you feel safe walking at night in your town or in the area where you live?"

Source: Gallup 2018, own materials

Table 16. Indicator (P) of the fulfilment of Goal 17 of the 2030 Agenda in the Czech Republic and Slovakia

| INDICATOR	DESCRIPTION
Healthcare and education expenditure (% GDP)	Total general (local, regional and central) government expenditure on healthcare and education (standard expenditure, capital and transfers) expressed as a percentage of GDP

Source: UNESCO 2018, own material

er by 0.7% of GDP. But in both cases the analysed countries do not reach the OECD average even for healthcare or education.

Indicator I and Indicator A, which evaluate the fulfilment of Goal 10 and Goal 1 of the 2030 Agenda, have the best chance of achieving 100% fulfilment of the 2030 Agenda in the Slovak Republic. By contrast, the biggest shortcomings in the fulfilment of the 2030 Agenda exist in the case of Indicators D, CH and P, i.e. in the case of fulfilling Goals 4, 9 and 17 of the 2030 Agenda. We could also add other indicators to this group; those which are below the overall average of all examined indicators. As for the Czech Republic, Indicator A and Indicator I, as in the case of Slovakia, have the best chance

of achieving 100%, followed by Indicator F. By contrast, the biggest shortcomings in the fulfilment of the 2030 Agenda exist in the case of fulfilling Indicators D, P, L and CH. When compared with the Czech Republic, the Slovak Republic is just as successful in its effort to achieve the goals of the 2030 Agenda, achieving almost the same overall average of all examined indicators. This average is 68.9% for the Slovak Republic and 68.7% for the Czech Republic. The Slovak Republic has better values in 8 of the 17 examined indicators.

In terms of a comprehensive examination of the fulfilment of SDG in the countries surveyed, it is clear that the best period in the Czech Republic was 2017 with almost 81.9%, while in the Slovak Repub-
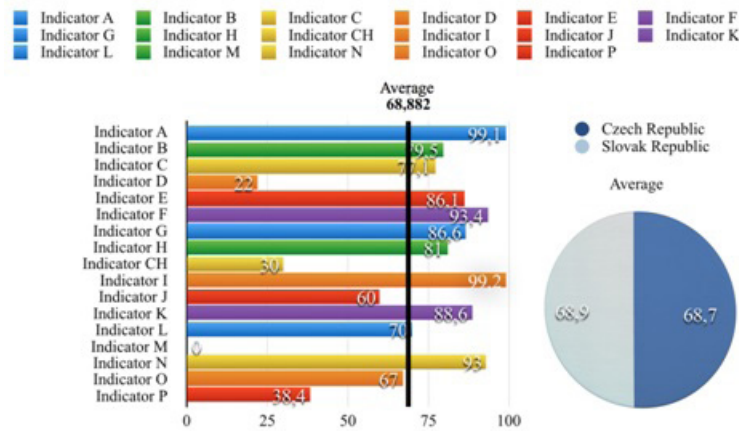
Fig. 1. Prospects of achieving the goals of the 2030 Agenda in the Slovak Republic expressed in (%)
Source: Authors research data derived through survey data
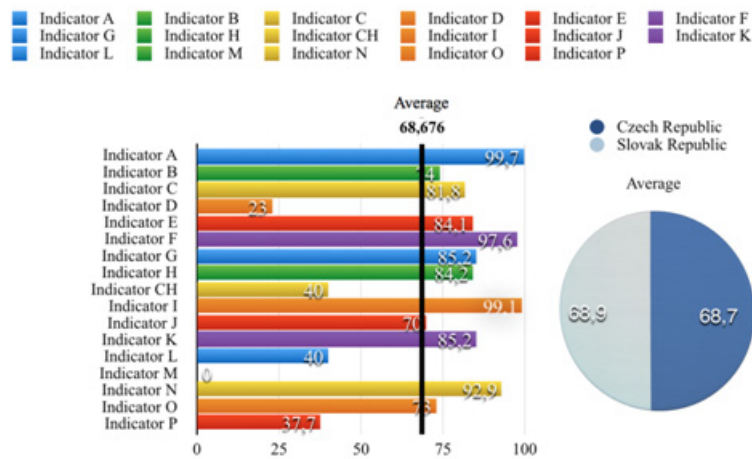
Fig. 2. Prospects of achieving the goals of the 2030 Agenda in the Czech Republic expressed in (%)
Source: Authors research data derived through survey data

lic the best period was 2017 with almost 76.9%. On the other hand, the worst year in terms of achieving the SDGs was 2016 in both countries surveyed. This is due to the introduction of new measures and strategies, the effects of which will only be reflected in the longer term. In terms of a comprehensive assessment of the intensity of progress in achieving the individual SDGs, we can state that both countries are moving towards sustainability by 2030 and thus meeting the 2030 Agenda commitment. In 2017, when the difference was 5% in favour of the Czech Republic. In all investigated periods 2016–19, the Czech Republic shows better values than the Slovak Republic in terms of SDG fulfilment. Results of the comparison of the analysed landscapes based on a comprehensive examination of all indicators in individual SDGs are shown in Table 17 and Fig. 4.

The variance of the values around the mean was measured by standard deviation. Based on its results, it is clear that the smallest deviation among the countries surveyed was in 2018. On the other hand, the largest deviation in terms of achieving sustainable development in the countries surveyed was reported in 2017. This deviation is also visible through the Global Index Score, where this difference is of 18 places.

Table 17. Global Index Score and Global Index Rank in the Slovak Republic and Czech Republic

	2016		2017		2018		2019	
	Global Index Score	Global Index Rank	Global Index Score	Global Index Rank	Global Index Score	Global Index Rank	Global Index Score	Global Index Rank
Slovak republic	72.70	26	76.9	23	75.6	24	76.2	27
Czech republic	76.73	15	81.9	5	78.7	13	80.7	7
Differential	4.03	11	5	18	3.1	11	4.5	20
Standard Deviation	2.84964		3.535534		2.192031		3.181981	

Source: own processing according to the study by Jeffrey Sachs, Guido Schmidt-Traub, Christian Kroll, Guillaume Lafortune and Grayson Fuller (2016–2019)
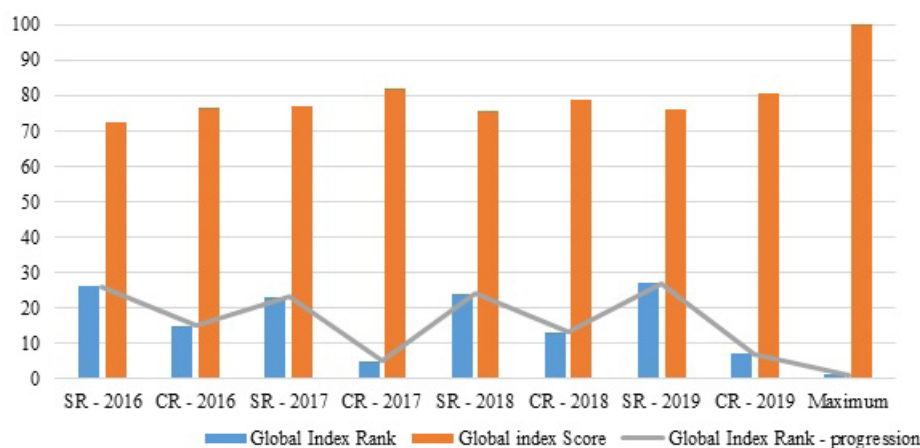
Fig. 3. Global Index Score and Global Index Rank in the Slovak Republic and Czech Republic
Source: own processing according to the study by Jeffrey Sachs, Guido Schmidt-Traub, Christian Kroll, Guillaume Lafortune and Grayson Fuller (2016–2019)

5. Summary and conclusion

The objective of this contribution was to identify, on the basis of a content analysis in empirical research and subsequent deduction, the results of fulfilling the 2030 Agenda in the Czech Republic and Slovakia in terms of their global responsibility for fulfilling development goals, by identifying indicators for each of the 17 goals of the 2030 Agenda. The Czech Republic performs better in the case of Indicator A, but even the Slovak Republic does not have negative results. Both examined countries reach almost 100% fulfilment of Indicator A and therefore of the target for Goal 1 of the 2030 Agenda. The Slovak Republic performs better in the case of Indicator B. The results of the research show that 26% of people (adult population) in the Czech Republic suffer from obesity and 20.5% in Slovakia.

If we were to include data on being overweight, i.e. BMI of 25–30, we would find that many more people (adult population) in both countries have a weight problem. As for Indicator C, our results show that at least 18% of people over 15 in the Czech Republic smoke at least one cigarette a day, and almost 23% in Slovakia. So again, the Czech Republic performs better in the case of the examined Indicator C – Goal 3 of the 2030 Agenda. In the case of Indicator D, where we examined the percentage of the population aged 25–64 with completed tertiary education, the Czech Republic had better results (23%) than the Slovak Republic (22%). But the number of people aged 25–64 with university education in the Czech Republic is identical to that in Slovakia. As for Indicator E, which expressed wage differences between men and women, the Slovak Republic has better results by 2.4%. In the case of Indicator F, which examined the percentage of pop-

ulation using safely managed water supply services, the Czech Republic achieves an SDG Index value of 97.6% and the Slovak Republic achieves 93.4%. This means that 97.6% of people in the Czech Republic use safely managed drinking water services, although in Slovakia the number is 4.2% lower. In the case of Indicator G of the share of renewable energy in total final energy consumption (%), the Czech Republic achieves an SDG Index value of 14.8% and the Slovak Republic achieves 13.4%. This means that both examined countries fail to sufficiently use renewable energy sources in their individual sectors, while the EU wants to see the share of gross final consumption of energy from renewable source in the Czech Republic reach 20% by 2020. The European legislation requires Slovakia to reach a 14% share of renewable sources in gross final energy consumption. As for indicator H, we found that 19% of adults (aged 15 and older) in Slovakia do not report having an account in a bank or elsewhere, whereas 15.8% of adults (aged 15 and older) in the Czech Republic do not report having an account in a bank or other financial institution, and these are mostly students, pensioners and young unemployed people. As for Indicator CH, the Czech Republic's expenditure on research and development was 1.79% of GDP, and the Slovak Republic's expenditure on research and development was 1.20% of GDP. Our examination of Indicator I showed that the Czech Republic and Slovakia are among the countries with the highest degree of equality in the EU, taking into account distribution of incomes between the wealthiest and the poorest levels of society. Slovakia, together with Slovenia, even has the lowest value of this ratio in the EU. The value of this ratio is 0.8%. The Czech Republic's value is 0.9% and the country ranks third in the EU in terms of the Palma ratio. Our examination of Indicator J for fulfilling Goal 11 of the 2030 Agenda showed that its value in the Czech Republic is 70% and its value in Slovakia is 60%. Slovakia therefore has worse results in terms of satisfaction with public transport, with 40% of people dissatisfied with public transport compared with 30% in the Czech Republic. Our examination of Indicator K "production of electronic waste (kg/person)" showed that the Czech Republic produces 14.8 kg of electronic waste per person, while Slovakia only produces 11.4 kg of electronic waste. As for Indicator L, we

found that the Czech Republic produces 9.2 tonnes of CO_2 (emissions) per person, while Slovakia only produces 5.7 tonnes of CO_2 per person. This means that the Czech Republic produces 3.5 tonnes more CO_2 (emissions) per person than the Slovak Republic. In Indicator M, we did not specify an indicator for measuring the fulfilment of Goal 14 of the 2030 Agenda, as this goal is primarily intended for countries which directly use or are surrounded by the ocean, sea or sea resources. Unfortunately, the Czech Republic and Slovakia do not meet this criterion, as they are both landlocked countries. It was therefore impossible to evaluate the indicators for this goal. In Indicator N, we examined the percentage of annual change in forestation in the examined countries. The change in forestation between 2000 and 2016 represents 7.1% in the Czech Republic, and 7% in Slovakia according the values of the SDG Index. The loss of forestation (trees) in Slovakia and the Czech Republic has slowed in recent years thanks to numerous initiatives to plant new trees and to afforest new areas as part of creating new city parks in individual cities. In Indicator O, we examined the percentage of respondents who answered "Yes" to the question "Do you feel safe walking at night in your town or in the area where you live?" The Czech Republic's value of Indicator O of the SDG Index is 73% and Slovakia's is 67%. This means that people in both countries feel rather safe when walking at night in their town or in the area where they live. Indicator P examined the total general (local, regional and central) government expenditure on healthcare and education (standard expenditure, capital and transfers) expressed as a percentage of GDP. The total expenditure of the government sector on healthcare and education in the Czech Republic makes up 11.6% of GDP, and 12.3% of GDP in Slovakia. It is important to point out that neither of the analysed countries reaches the OECD or EU averages in either area.

The chances of fulfilling all examined aspects of SD by 2030 and their potential 100% success in the examined indicators are almost the same in the Slovak Republic as in the Czech Republic. The overall average difference in its final form is just 0.206%, so it does not even reach 1%. Monitoring the SDGs will be a crucial element of the strategy for achieving them. The SDGs must become management tools for policymakers: we will only know if we are

on track to meet the ambitious aims if we have a sound system of indicators in place to guide our policies (Kroll, 2015).

Acknowledgements

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