Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics (FEM)

Bachelor Thesis

Economic performance of the Czech Republic in the light of the World Economic Forum goals

Daria Merkusheva

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

BACHELOR THESIS ASSIGNMENT

Daria Merkusheva

Business Administration

Thesis title
Economic performance of the Czech Republic in the light of the World Economic Forum goals

---

Objectives of thesis

The main aim of the present Bachelor thesis is to identify the developmental trends in economic performance of a selected country (the Czech Republic) in the light of the World Economic Forum goals.

To achieve the formulated main goal the following partial reserach questions are supposed to be answered:

1. When and by whom the WEF was founded? Who are the Forum members?

2. What is the purpose of WEF foundation and their main Mission?

3. What is the Fourth Industrial Revolution according to WEF?

4. How does WEF help nations in achieving sustainable development goals (financial aid, investments, R&D grants etc.)?

5. Which agreements/laws were signed and eventually ratified (if any) by the Czech Republic to achieve sustainable development goals?

6. Were any noticeable changes observed in the development of main macroeconomic indicators (unemployment rate, GDP per capita, etc.) and indicators related to climate change (e.g. GHG emissions) of the Czech Republic over the period from 1995 to 2019?

Methodology

The theoretical part of the Bachelor thesis will be mainly based on a relevant literature review (represented by printed literature, scientific articles, surveys, web sources) and the research of similar studies, using methods such as abstraction, inductive reasoning, analysis, synthesis, and deduction.

The practical part will contain descriptive statistical analysis and qualitative thematic synthesis of the main economic indicators and selected for the analysis variables. Own research work will be mainly based on selected economic indices analysis along with comparative techniques and statistical inference.

The results of the conducted analysis will be discussed and complemented with the author's corresponding recommendations.

The proposed extent of the thesis

40-60

Keywords

WEF; Economic performance; GDP per capita

Recommended information sources

DALGAARD, P. *Introductory statistics with R.* New York: Springer, 2008. ISBN 978-0-387-79053-4.
FISCHER, S. – SCHMALENSEE, R. – DORNBUSCH, R. *Introduction to macroeconomics.*.
MONTIEL, P. *International macroeconomics.* Chichester: Wiley-Blackwell, 2009. ISBN 978-1-4051-8386-4.SACHS, L. *Applied statistics : a handbook of techniques.*.
WEF. 2030Vision. Available online: https://weforum.ent.box.com/s/xrrlbis95l7ut1ud88ybqks91ggu8amd

Expected date of thesis defence

2022/23 SS – FEM

The Bachelor Thesis Supervisor

Mgr. Elena Kuzmenko, Ph.D.

Supervising department

Department of Economics

Electronic approval: 15.6.2022

prof. Ing. Miroslav Svatoš, CSc.
Head of department

Electronic approval: 27.10.2022

doc. Ing. Tom**áš Š**ubrt, Ph.D.
Dean

Prague on 04. 03. 2022

Declaration

I declare that I have worked on my bachelor thesis titled **" Economic performance of the Czech Republic in the light of the World Economic Forum goals"** by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 2023   _____

Economic performance of the Czech Republic in the light of the World Economic Forum goals

Abstract

The purpose of this thesis was to determine what the World Economic Forum is, what its purpose, mission, participants, and main goals are. And also to analyze the economic performance of a country that participates in the WEF activities and shares its goals. Since at present time the main goals of the Forum are the goals of sustainable development established by the United Nations, it was interesting to analyze the economic performance of a country that recognizes the importance of the SDGs. The Czech Republic was chosen as such a country. The theoretical part gathered detailed information about the WEF and the SDGs. The practical part focused on the analysis of indicators. Economic, environmental and social indicators were selected and analyzed using methods such as descriptive statistics and correlation analysis. The analysis assessed whether the Czech Republic is making progress toward each of the goals, and how well this progress meets the requirements set by the WEF and the UN. The goals whose indicators have a negative trend or have not changed at all were singled out, as well as It has been revealed how changes in macroeconomic indicators are linked to changes in social and environmental indicators.

Keywords: WEF; Economic performance; GDP per capita; United Nations; Czech Republic; Sustainable development goals; Unemployment; Inflation; Correlation analysis; GNI; Economic growth; European Union

Ekonomická výkonnost České republiky ve světle cílů Světového ekonomického fóra

Abstrakt

Cílem této práce bylo zjistit, co je Světové ekonomické fórum, jaký je jeho účel, poslání, účastníci a hlavní cíle. A také analyzovat ekonomickou výkonnost země, která se účastní aktivit WEF a sdílí jeho cíle. Vzhledem k tomu, že v současné době jsou hlavními cíli fóra cíle udržitelného rozvoje stanovené Organizací spojených národů, bylo zajímavé analyzovat ekonomickou výkonnost země, která uznává význam cílů udržitelného rozvoje. Jako taková země byla vybrána Česká republika. V teoretické části byly shromážděny podrobné informace o WEF a cílech udržitelného rozvoje. Praktická část se zaměřila na analýzu ukazatelů. Byly vybrány ekonomické, environmentální a sociální ukazatele a analyzovány pomocí metod, jako je popisná statistika a korelační analýza. Analýza hodnotila, zda Česká republika dosahuje pokroku při plnění jednotlivých cílů a nakolik tento pokrok odpovídá požadavkům stanoveným WEF a OSN. Byly vyčleněny cíle, jejichž ukazatele mají negativní trend nebo se vůbec nezměnily, a také Bylo zjištěno, jak změny makroekonomických ukazatelů souvisejí se změnami sociálních a environmentálních ukazatelů.

Klíčová slova: SEF; ekonomická výkonnost; HDP na obyvatele; OSN; Česká republika; cíle udržitelného rozvoje; nezaměstnanost; inflace; korelační analýza; HND; hospodářský růst; Evropská unie

Table of content

1 Introduction

Nowadays, humanity is increasingly uniting and creating international organizations and alliances to solve global problems and conflicts that hinder and threaten the existence of humanity. One such organization is the World Economic Forum.

The World Economic Forum is a non-governmental organization founded in 1971 in Switzerland by Klaus Schwab, whose main mission is to bring together countries, businesses, politicians, and other influential people to achieve goals (agendas) that contribute to humanity's successful development. Currently on the agenda are the goals of sustainable development, as defined by the forum participants as the main (Vision 2030), as their achievement is the key to humanity's prosperous and successful existence.

Many countries and organizations around the world, including the United Nations and the European Union, actively support SDGs. As a member of the European Union, the Czech Republic is also committed to implementing the SDGs agenda as one of the primary issues that must be addressed in decision-making. Thus, in 2017, the Czech Republic's government adopted a strategic framework that enabled the agenda to be implemented in the context of the country's realities. The strategic framework defines the most important sustainable development goals for the country and the system by which they will be achieved.

And now, five years after the implementation of the program, it is justified to analyze the performance of the Czech Republic to understand how indicators are changing and whether their changes meet the declared objectives or on the contrary distant from the achievement of them. The bias will be directed to the analysis of economic, social and environmental indicators, as their change is more measurable and noticeable from a statistical and analytical point of view.

2 Objectives and Methodology

2.1 Objectives

The main aim of the present Bachelor thesis is to understand how the main economic performance's indicators of the Czech Republic change in the period of 1995-2021 in terms of the sustainable development goals. To achieve the formulated main goals, the following partial research questions are supposed to be answered:

1. When and by whom the WEF was founded? Who are the Forum members? What is the purpose of WEF foundation and their main Mission?
2. What is the main goals of the WEF at the present time?
3. What is the Fourth Industrial Revolution according to WEF? How is it connected with sustainable development goals?
4. How does WEF help nations in achieving sustainable development goals (financial aid, investments, R&D grants etc.)? Which agreements were signed and eventually ratified (if any) between the Czech Republic and WEF?
5. Were any noticeable changes observed in the development of main macroeconomic indicators (unemployment rate, GDP per capita, etc.) and indicators related to climate change (e.g. CO_2 emissions) and social indicators of theCzech Republic over the period from 1995 to 2021?

2.2 Methodology

This thesis will analyse the economic performance of the Czech Republic in terms of how close the country is to achieving sustainable development goals.

First of all, descriptive statistics will be used to construct graphs to determine increasing or decreasing tendencies in economic, social and environmental indicators. Then correlation analysis will be used to determine is there relationship between indicators.

Linear correlation analysis

Linear correlation analysis is used to determine if a relationship exists between two variables, and how strong the relationship is. To determine the relationship and its direction and strength, Pearson's coefficient will be used (Turney, 2022).

For the Pearson correlation coefficient (r) can be calculated by following formula:

$$r = \frac{\Sigma(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{(\Sigma(X_i - \bar{X})^2 \Sigma(Y - \bar{Y})^2)}} \quad (1)$$

Where:

X_i – first variance

Y_i – second variance

$\bar{X}$ – mean of the first variance

$\bar{Y}$ – mean of the second variance

The Pearson coefficient (r) can take a value from -1 to 1:

- [-1;0) - negative correlation (if one variable changes, the other variable changes in the opposite direction)
  - [-1; -0.5) - strong negative correlation
  - [0.5;0) – medium and weak negative correlation
- (0;1] - positive correlation (if one variable changes, the other changes in the same direction)
  - (0;0.5] – medium and weak positive correlation
  - (0.5;1] – strong positive correlation
- r = 0 - no relation between the variables

Significance of correlation coefficient

A statistical t test (p value) is used to determine if r is statistically significant or not. This is done to determine if the result obtained from the correlation analysis using a sample is applicable to the entire population (Turney, 2022).

Null hypothesis (H_0): $\rho = 0$

Alternative hypothesis (H_1): $\rho \neq 0$

Significance level $\alpha = 0.05$

If $p > \alpha$ it means that H_0 is not rejected so r is not statistically significant

If $p < \alpha$ it means that H_0 is rejected so r is statistically significant

The collected data is taken from online sources; it is quantitative data covering the period from 1995 to 2021. It was gathered from databases from official websites, in particular, official the World Bank website, Eurostat website and the European Commission website. During data collection, limitations in data availability were identified. Some data are not fully reported for the period 1995 to 2021, so some indicators represented a shorter period for analysis.

All calculations are provided using Excel.

3 Literature Review

In this part, firstly, the World Economic Forum's general characteristics and activities will be discussed: its main mission, purpose, WFF's history, members. The second part will cover sustainable development goals definition and their connection with WEF. The third part will determine the fourth industrial revolution, and how it is connected with the WEF's goals. On the fourth part key macroeconomic, social and environmental indicators related to economic performance will be defined according to the SDG list.

3.1 World Economic Forum characteristics

The World Economic forum was founded as non-for-profit foundation in 1971 by Professor Klaus Schwab in Geneva, Switzerland. And firstly, it was called the European Management Forum and only in 1987 the present name was given. The Forum involves leaders in politics, business, culture and society in setting global, regional and sectoral agendas. Initiatives are usually adopted and validated during the annual meetings each January in Davos. Approximately 450 executives from leading European companies attended the first symposium. Political leaders were not invited to the forum for the first time until 1974 (WEF, no date).

The Forum is supported by contributions from private sector (its members and partner enterprises). The forum partners-participants are divided into several groups. The first group forms the core, which consists of around 100 large international companies such as ABB, Nestlé, Barclays, Credit Suisse, Deloitte, Deutsche Bank, Google, Apple, Amazon, etc. In the second group the mid-sized global enterprises are included. They are usually selected on the basis of how much impact their business has on the environment, the market, the people, the regional economics. The main indicators are innovation of their business models or ideas, corporate citizenship and visionary leadership. The third group is political leaders of different countries. The number of partners changes every year (WEF, no date).

3.1.1 WEF mission and purpose

The main mission of the WEF is to bring together influential people from business, politics, culture and other areas of society to shape the global, regional and industrial agenda.

The WEF's work is defined as a distinct institutional culture founded on stakeholder theory, which contends that the organization is responsible to all segments of society. It means that companies should provide value to all stakeholders: customers, suppliers, employees, investors, communities and others relevant to the enterprise. Based on the theory of stakeholders or "Stakeholders Capitalism", the WEF assumes that people, business and governments will work together to achieve better results in a global perspective (WEF, no date).

The value of the forum is that it brings people and companies together and involves them in global issues. It also publishes an annual comprehensive report describing the current situation regarding global issues and the actions taken to address them.

3.1.2 WEF activities

The World Economic Forum's main event is an invitation-only annual meeting, which is held in Davos, Switzerland, at the end of January. It brings together the CEOs of 1,000 member companies, as well as politicians, academics, civil society organizations, religious leaders, and media representatives. They discuss key global issues such as globalization, international conflicts, and other (Corral, et al, 2022).

The meetings attract over 2,000 people from over 100 countries on average. And the meeting is divided into separate sessions, with an average of 400 attendees.

Journalists have access to all sessions as well (from print media, Internet sources, and others). However, they do not all have equal access to all areas. The forum uses a badge system, the color of which determines which sessions a journalist can attend and which cannot (Corral, et al, 2022).

Also, regional meetings are held each year in Africa, East Asia, Latin America, and the Middle East. They help establish and maintain links between corporate business representatives, local governments, and regional scientific organizations. The host countries vary each year, but China and India are the most frequent hosts since 2000 (WEF, no date).

3.2 Sustainable development goals (SDGs)

Sustainable development is an economic planning strategy that aims to promote economic growth while preserving environmental quality for future generations. In essence, an approach that seeks stability and sustainability in the social, political, and spiritual spheres of society, as well as in the climate and environment, through a correct economic development plan (Cheever and Campbell-Mohn, no date).

Figure 1 The Sustainable Developmeent Goals: 17 goals to Transform Our World

Source: (United Nation, 2020)

Sustainable development goals are the set of aims defined in 2015 as a part of the United Nation 2030 Agenda Sustainable development. They solve the global challenges facing the world and take in all aspects of sustainable development in a balanced and integrated manner. It consists of 17 goals with associated 169 targets. They are all related between each other, and some of them are a consequence of the achievement of other. But in spite of that it is possible conventionally divide them into main 3 groups (United Nations, 2020).

The first one is economic goals. This group includes goals which are connected directly with economic indicators. In particular, decent work and economic growth. The second group affects the social sphere. It may include objectives such as the extermination of hunger and poverty, eradicating inequality and achieving gender equality, good health and well-being, accessible quality education, cities and communities that are sustainable, peace, justice and

strong institutions, responsible consumption, innovation and infrastructure. The third one is related to environmental issues. For instance, affordable and clean energy, climate action, life below water and on land, clean water (United Nations, 2020).

According to the UN, as well as the WEF, these goals can only be achieved through the cooperation of all the countries of the world, as all the issues raised are global and the success of humanity as a whole depends on their solution (United Nations, 2020).

3.2.1 SDGs and WEF

The WEF acts as a kind of bridge between companies and people. This enables large companies to invest in projects submitted by forum members (which could be medium-sized companies, for example). As the World Economic Forum was created to solve global problems and achieve global goals through cooperation, it also supports the achievement of sustainability. The United Nations Sustainable Development Goals are taken by the WEF as the main agenda nowadays. And it promotes initiatives related to them. In particular, the 2030 vision, which is a strategic direction aimed at maximizing the impact of digital technologies on the Sustainable Development Goals (WEF. 2030Vision, no date).

According to this strategy the world may not meet all the goals by 2030 so it is justified to use supporting tools, in particular, digital technologies. 2030 Vision proposes that the goals should not be seen as individual elements but as a system divided into sub-themes. And climate adaptation has been chosen as the first theme. The initiative intends to influence issues in three ways: agenda-setting - discussing climate adaptation using the media to stimulate a global conversation. Innovation Sprints - engaging groups of experts and practitioners to develop innovative solutions to digital challenges and identify flagship projects to be supported by the forum. And system leadership - building decision makers at the highest level in the technology-climate interface (WEF: 2030 Vision, no date).
This approach will enable companies from different countries to implement projects they have conceived, e.g. to present it at one of the forum workshops, or to invest in analytical research.
As a result, the speed of joint training will be increased and cooperation will be facilitated, and the necessary companies will be brought on board more quickly.

3.2.2 Cooperation WEF with UN and EU to achieve SDGs

Since the World Economic Forum is not a governmental organization, it cannot enter into any legal agreements with countries. On this basis, the forum actively cooperates with the UN and the European Union (the European Commission, and the European Parliament), which are also interested in achieving sustainable development goals, and promotes their initiatives through them.

For example, the European Parliament decided to ban the sale of new petrol and diesel cars from 2035, as a measure to reduce carbon CO_2 emissions into the atmosphere (European Parliament, 2022).

Another example of cooperation is the fact that WEF has a long history of working with the United Nations (UN) through its Special Consultative Status with the UN Economic and Social Council (ECOSOC), and was accepted as a Partner with UN-Water under 6th SDG: Clean Water and Sanitation achievement (Water Environment Federation, no date).

Thanks to this, WEF's work process to promote the SDGs will be more noticeable and accepted by other UN-Water Partners and Members, increasing WEF's global impact. (Water Environment Federation, no date).

3.3 The fourth industrial revolution

WEF founder Klaus Schwab believes humanity is on the cusp of a fourth industrial revolution. It originates at the beginning of the 21st century and is a kind of consequence of the third revolution (also called the computer revolution or digital revolution). And it is based on the mobile internet, miniature manufacturing devices, artificial intelligence and learning machines.

In spite of the fact that the Fourth industrial revolution is also connected with digital technologies as third, it is radically different from the previous ones. It is much broader and more comprehensive and has a much higher speed. Every year there are new breakthroughs in a variety of fields, such as the complete deciphering of the human genetic code or the

development of equipment to synthesize plasma and harness thermonuclear energy with it. It is the synthesis of these technologies and their interaction in the physical, digital and biological spheres that make the main difference (Schwab, 2016).

3.3.1 Opportunities and challenges

Like any technological advance, the Fourth Revolution has its consequences, positive and negative.

Table 1. Positive and negative phenomena of the 4th Industrial Revolution

Opportunities (positive phenomena)	Threats and challenges (negative phenomena)
- economic growth - increasing of global income levels - quality of life improvement - increased significance of the artificial intelligence and other technologies - increasing of demand for knowledge-intensive professions	- significant job displacement - cybersecurity and hacking - inequality between people - business disruption - transhumanism

(Min Xu, et al, 2018)

Positive phenomena, also referred to as "opportunities," include economic growth, increase global income levels and improve the quality of life and other. The use of new technologies such as artificial intelligence is automating many processes and solving complex problems. This will help companies save millions of dollars and enable them to use it to create new products and services, which will lead to new professions and new jobs The use of technology in logistics will help reduce the cost of transportation services over the long term while increasing efficiency and speed of delivery (Min Xu, et al, 2018).

Also, through the introduction of technology, robots in production will contribute to the fact that highly skilled labour will be more in demand. Intelligent machines will do simple work more efficiently that humans used to do. While the need for knowledge-intensive professionals will increase on the grounds that machines need to be maintained (Min Xu, et al, 2018).

Speaking of the challenges that humanity may face, the main one is the increase in inequality between people, both within a country and between populations of different countries. Since countries have different levels of economic development, the fourth industrial revolution may widen the rift between developed and developing countries. Because people in some developing countries, especially in Africa, do not have access to the technologies brought by the third revolution, the new round of digital technology will not be available to them either. Even though humanity is developing faster and faster over time, the Internet, for example, has spread around the world in just ten years.

As for inequality within countries, despite the overall increase in wealth, studies show that, in particular, between 1983 and 2009, the U.S. population became richer overall, but only the top 20 percent received a 100 percent or more surcharge on assets. While the remaining 80 percent experienced a decline (Brynjolfsson and McAfee, 2018).

The coming global changes that the new round of progress will bring may increase these differences, since the latest technologies will be available only to those who can afford them, meaning that, as a consequence, only these people will have access to the benefits of progress.

Especially inequality is connected with the gap between returns to capital and returns to labour. „Automation substitutes for labour across the entire economy, the net displacement of workers by machines might exacerbate the gap" (Schwab, 2016). The breaking between high-paid and low-paid jobs will increase, which can lead to increased tensions within society.

There is also the threat of mass unemployment due to the fact that workers simply will not have time to adapt their skills to the needs of companies. This threat affects not only employees but also businesses themselves, which may be seriously understaffed.

A similar situation can happen to businesses. Some businesses may not have the time to adjust to the rapidly changing needs of consumers. This is especially true for small and medium-sized enterprises, which cannot adjust to the rapid change in stakeholder demands

as quickly as large companies due to limited resources, which will lead to intense competition that is impossible to cope with (Min Xu, et al, 2018).

Transhumanism is also one of the possible threats of the fourth industrial revolution since this ideology is directly related to the use of technology in relation to the human body. Transhumanism believes that modern advanced technology can be applied to humans (the human body and mind) because it will allow humanity to shed unwanted qualities and greatly expand physical and mental capabilities to increase productivity and impart new, supernatural abilities. The consequences of applying the ideology of transhumanism are unknown, on the grounds that humanity has not had precedents for the mass use of technology to change the human body (none of the previous revolutions suggested this). Therefore, the likely fact is. That humanity may not be prepared for the negative consequences that transhumanism will entail (Giesen, 2018).

3.3.2   4th Industrial Revolution and WEF

Based on the above possible challenges and opportunities, humanity must prepare an action plan that will minimize negative consequences and maximize new opportunities. The role of the forum in this matter is that through annual meetings representatives of different companies and different countries together develop an action plan affecting the near future, including future changes. Klaus Schwab wrote that "we do not yet know just how it (4th industrial revolution) will unfold, but one thing is clear: the response to it must be integrated and comprehensive, involving all stakeholders of the global polity, from the public and private sectors to academic and civil society" (Schwab, 2016).

3.3.3 4th Industrial revolution and SDGs

The World Economic Forum collaborates with the consulting firm PwC on the issue of accelerating the implementation of 2030 Vision initiatives via the use of innovation, which focuses on how and where technological advances can approach some of the world's most critical environmental, economic, and social challenges. This contains plans for boosting and scaling 4IR for these goals as were entered the action decade. The World Economic Forum's Annual Meeting in Davos saw the release of PwC's insight report with WEF, which examines in detail the new technologies that may assist meet the SDGs (Scott, no date).

3.4 Economic, social and environmental indicators and SDG

The economic performance of a country is represented not only by economic indicators, but also by some social and environmental indicators, due to their close interrelation.

1. **No poverty**

The first goal of sustainable development is the absence of poverty and all its varieties. Poverty is one of humanity's most serious problems since it is often accompanied by a lack of access to basic amenities such as electricity for those below it (Hasell, et al, 2022).

Poverty does not have one clear definition. Essentially, however, it can be understood as a lack of resources to access the necessities of life, such as water, food, and shelter. The concept has now been expanded to include those who do not have access to medicine, education, or transportation as poor people. For each country, the measurement of the proportion of poor people is unique, since it depends on many factors, such as price levels, inflation, and others (Okalow, 2022).

Poverty is strongly influenced by changes in the economy and society, as well as global events and disasters. For example, the working poverty rate rose in 2020 from 6.8 to 7.2 compared to 2019 due to the coronavirus pandemic, which led to the global economic crisis. In 2022, due to international conflicts and the effects of the pandemic, the number of people living in extreme poverty increased by more than 100 million, from 581 million in pre-pandemic situation to 657-676 million in 2022 (United Nations, 2022).

Poverty leads to other global problems, such as poor sanitation and lack of access to clean water, hunger, poor quality of education (in particular problems of higher education due to lack of financial means), increased crime, increased mortality, and lack of access to medicine. Most of these consequences of poverty have been identified by the UN as those that threaten the sustainable development of humanity and are goals that are critically important to achieving.

Due to the fact that poverty is vast issue, five targets have been developed with the aim to clarify and facilitate the goal. All of them are shown an the picture below.

Figure 2. 5 targets to achieve "No poverty" goal

(Source: United Nations, 2022)

Poverty can be measured as absolute and relative (Okalow, 2022).

Absolute poverty is measured by the proportion of the population whose income is below the line set by a particular state. A population earning below this line cannot maintain a minimum standard of living (Okalow, 2022).

People in **relative poverty** have overall earnings that are lower than a certain portion of the country's median income (commonly 50%). Median income changes over time due to economic events such as the crisis (Okalow, 2022).

Indirect indicators related to the measurement of the population's income or unemployment can also be used to measure the level of poverty. Such indicators may include, for example, gross national income and unemployment rate.

GNI and GNI per capita

Gross national income (GNI) is the overall income received by the country from its residents and businesses, whether they are domestic or foreign. GNI can be determined as a sum of gross domestic products and income from foreign sources. Unlike GDP, GNI is focused on income, not on output (The Investopedia Team, 2023).

It can be written in different ways.

For instance:

$$GNI = GDP + (EX_{FS} - IM_{FS}) \ (2)$$

Where:

GDP = gross domestic product

IM$_{FS}$ = money flowing to foreign countries

EX$_{FS}$ = money flowing from foreign countries

Or it can be also written as:

$$GNI = GDP + (C - D) \ (3)$$

Where:

 C = inward remittances by businesses and individuals

 D = outward remittances by the foreigners residing in the country

Many countries have a little gap between GDP and Gross national income on the ground that distinction among income obtained and payments made to the rest of the world is not noticeable. However, there is some cases when the difference between GNI and GDP is significant. It can happen if, for example, the amount of international support acquired from abroad is high. In this case GNI is larger than GDP. In particular, in 2020 the GNI of East Timor was 2,4 billion US dollars and the GDP was 1,8 billion US dollars (The Investopedia Team, 2023).

There is a measurement which is related to GNI it is GNI per capita. It can be calculated by dividing a country's GNI by its total population.

The GNP per capita is the best indicator of a country's quality of life. Higher GNP per capita, in particular, means greater rates of education, lower infant mortality rates, and access to basic sanitary goods, for example, pure water for the people inside the country (Team, 2023). Exports are measured by the value of goods and services sold by a particular country to the rest of the world

Unemployment rate

   The unemployment rate is most often used to measure labor market conditions. Unemployment occurs when there are people who are able and willing to work, but do not yet have a job. It is important to note that this indicator only includes those who are included in the labor force. The labor force includes those who are employed and those who are unemployed but are actively seeking work. Those who do not have paid work but are not looking for work are not included in the labor force. This group may include, full-time students, volunteers, people who permanently unable to work and retired (Maitah, 2015).

The formula for calculating the unemployment rate is shown below:

$$\text{Unemployment rate} = \text{Unemployed}/(\text{Labor force}) \times 100\% \quad (4)$$

Where:
Labor force = employed + unemployed

2. Zero hunger

The second goal is to eliminate hunger, achieve food security and sustainable agriculture. Hunger is the distress caused by a lack of food. Food undernourishment is defined as consuming lesser than 1,800 calories a day.

The **rate of hunger** can be calculated as a percentage of population (in a certain country or around the world) which amount of available and consuming food is lower than defined level. It depends largely on global events and phenomena, such as international conflicts, natural disasters, weather conditions, and others. In 2022, the rate of hunger is higher than in 2019 because of the global economic crisis caused by the Covid-19 pandemic as well as military conflicts and climate changes (United Nations, 2022).

According to statistics cited by the World Bank, one in 10 of the world's inhabitants suffers from food insecurity, and about 1 in 3 does not regularly have access to adequate food. Because of hunger, children have developmental problems, in particular, 149.2 million children under the age of 5 are stunted (United Nations, 2022).

Figure 3. 5 targets of "zero hunger" goal achievement

(Source: United Nations, 2022)

5 targets for the second sustainable development goal achievement are shown above. They

aim to improve human nutrition, especially for vulnerable groups, as well as to maintain the biological diversity of agricultural plants and animals and the development of sustainable agricultural production.

3.   Good health and well-being

The third sustainable development goal is "good health and well-being. It includes nine goals, which aim to reduce mortality rates (especially among children and mothers) and increase life expectance rate; end epidemics of AIDS, tuberculosis, and others; improve treatment and prevention of addictions (alcoholism, drug addiction, substance abuse); ensure access to health services for all people; and improve sexual and productive health care (United Nations, 2020).

The image below illustrates the main areas that are being developed to achieve the goal.

Figure 4. Third goals' main aspects

(United Nations, 2020)

The coronavirus pandemic, and the ensuing crisis, have negatively impacted progress toward the third goal. By the end of 2021, 92% of countries faced a healthcare crisis. More than 500 million people were sickened by the coronavirus, resulting in 15 million deaths. Infections from particularly contagious and dangerous diseases (malaria) and the percentage of people suffering from depression have also increased (United Nations, 2022).

The infant mortality rate and the life expectancy rate are available indicators of advances in health care.

The infant mortality rate is calculated as the number of children dying before their first birthday per 1,000 births (World Bank, 2022).

The life expectancy rate at birth is the amount of years that a newborn infant would live if death trends at the moment it was born remained constant throughout its life. (World Bank, 2022).

4. Quality education

Quality education is the fourth goal of sustainable development. The level of education affects many indicators, in particular helping to reduce poverty and enabling economic mobility.

Figure 5. Targets for SDG 4 achievement
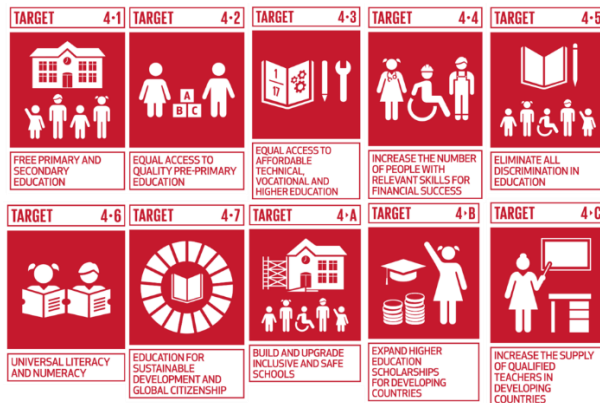
(United Nations, 2020)

The picture above illustrates the main aspects to focus on. In particular, there must be equal access to basic education for all boys and girls, as well as equal access to higher and technical education for men and women. The main thing is the elimination of illiteracy, which means that the population must have basic mathematical and linguistic skills.

The quality of education is influenced by **the percentage of expenses from the total state expenses, which is spent on development of education.**

5. Gender equality

The fifth Sustainable Development Goal aims to eliminate legal inequalities between men and women. This means that women as well as men should have access to education; equal pay; the opportunity to participate in political activities and others (United Nations, 2020). Also, this goal includes such aspects as the protection of women from violence and recognition of domestic unpaid work as well as paid work.

A gender equality index was created to measure equality. It is calculated using aspects such as money, knowledge, time, health, and power (European Institute for Gender Equality, 2022).

The main targets to achieve gender equality are shown on the image below.

*Figure 6. Gender equality targets*
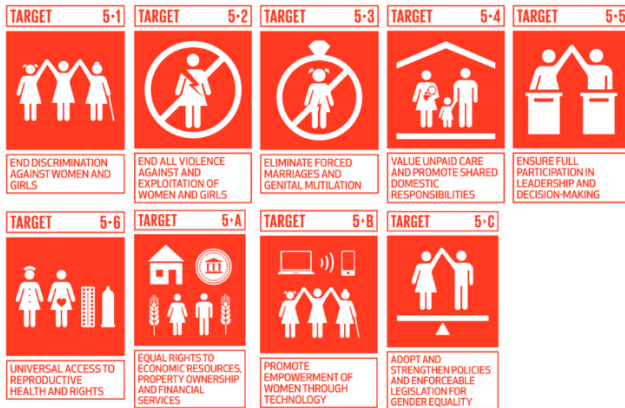
(United Nations, 2020)

6. Clean water and sanitation

The sixth goal includes access to clean drinking water and sanitation (hand-washing facilities, sanitary rooms, etc.). This especially applies to the population living in rural areas. Sanitation and clean water are especially important for maintaining public health, prevention of infectious diseases.

Below are the goals associated with the goal. The main aspects are protection of water-related ecosystems, optimization of water resources use, improvement of water quality and ensuring access to fresh water for all population.

Figure 7. Targets of the 6th SDG
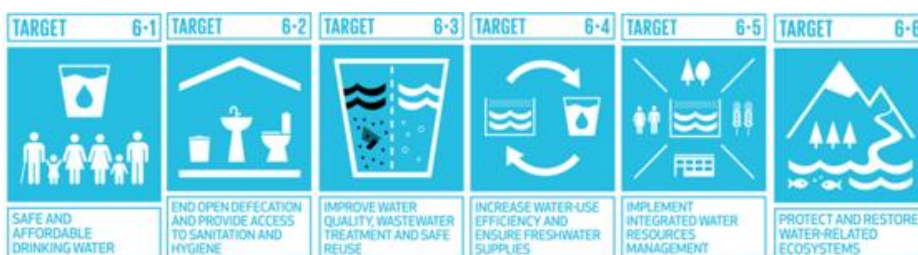
(United Nations, 2020)

Clean water access rate shows what proportion of the population has access to clean water for drinking, sanitary and hygienic needs.

7. Affordable and clean energy

The 7th SDG is affordable and clean energy. The targets represented in the picture are improved energy efficiency, increased share of energy generated from renewable sources, international cooperation for energy research (energy generation and infrastructure) (United Nations, 2020).

*Figure 8. Affordable and clean energy goals' targets*
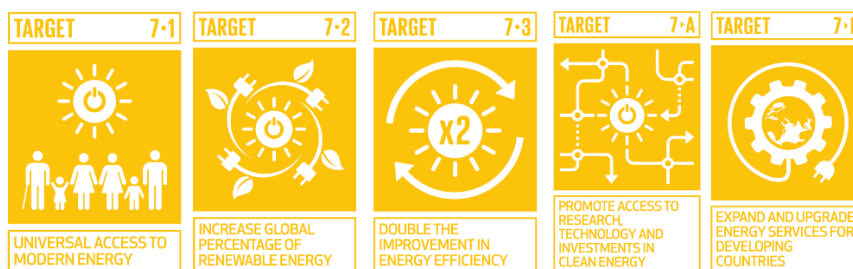
(United Nations, no date)

Renewable energy production rate is defined as the percentage of energy that is generated using renewable energy sources (hydropower, solar, wind, biomass and waste, geothermal, and tidal) of the total amount of energy produced by a particular country in a given period. Not only electricity is considered in the calculation of this indicator. Despite the fact that transportation and heating are more difficult to decarbonize, as they are more dependent on the use of oil and gas, they are also included in the rate (World Bank, 2022).

8. Decent work and economic growth

The eighth goal includes stable economic growth, decent-paying jobs, and the fight against unemployment. This goal is the most important in terms of economic performance because it is directly linked to economic indicators such as GDP growth, unemployment rate, minimum wages, and inflation rate.

Targets include increasing GDP by at least 7% per year, improving economic efficiency through the use of modern technology and innovation, improving resource efficiency, employing the entire working population, and (United Nations, 2020).

Figure 9. Targets for decent work and economic growth achievement
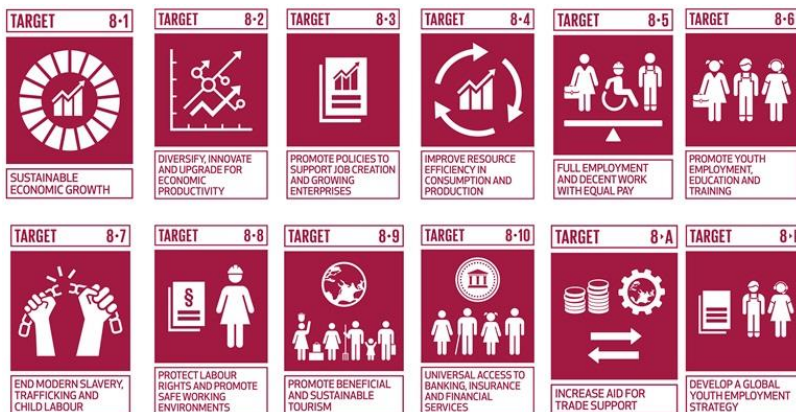
(United Nations, 2020)

GDP, GDP per capita, and GDP growth

Gross domestic product (GDP) is defined as "the total market value of all goods and services produced within a nation's border in the economy in the given period of time, usually one year" (Maitah, 2015). GDP is the main measure of economic performance.

GDP can be calculated as:

$$GDP=C+I+G+NX \quad (5)$$

Where:

C = Consumption

I = Investments

G = Government purchases

NX = Net export (export minus import)

Gross domestic product per capita approximates the value of goods produced per person in the country. It is counted as the GDP divided by the number of the population of the country.

Another measure related to the GDP is the GDP growth. It shows how economic performance grows in percentage. It is measured as comparison of the GDP between basis year and current year.

GDP Growth Rate can be calculated as:

$$GDP\ Growth\ Rate\ =\ \frac{GDP_1 - GDP_0}{GDP_0} \times 100\% \quad (6)$$

Where:

GDP$_1$ = GDP at the current year

GDP$_0$ = GDP at the basis year

National minimum wage

National minimum wage (NMW) is a lowest amount of money per hour, day or month (smallest salary), which is allowed to pay to employees legally in certain country. It is used to determine the standard of living in the country (NMW, 2022).

Inflation rate

Inflation is the rate of increase in price over a given period of time" (Oner, 2010). It is important to notice that "increase in price" means raising the average level of price. Changing in any specific price is not counted as inflation on the ground that it can increase or decrease continuously without changes in the average price level.

The current rate of inflation depends of aggregate supply or demand. Shift of the curve of one them leads to changes in inflation (Dornbusch and Fisher, 1993).

Inflation can be measured using either the Consumer Price Index (CPI) or the GDP Price Deflator. The first method is measured as average price if consumed goods and services. The second one refers to goods and services calculated in GDP.

In the data used, inflation has been calculated using CPI approach.

The formula of inflation rate is shown below:

$$Inflation\ rate = \frac{CPI_1 - CPI_0}{CPI_0} \quad (7)$$

Where:

CPI$_1$ = Consumer Price Index at the base year

CPI$_0$ = Consumer Price Index at the current year

9. **Industry innovation and infrastructure**

The 9th goal is industry innovation and infrastructure. It is included introduction of new technologies with the aim to increase competitiveness and efficiency what can lead to increasing of income and employment (United Nations, 2020).

Figure 10. Targets for 9th SDG
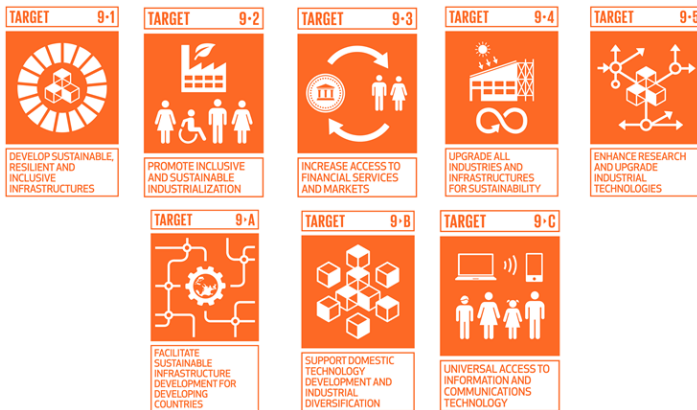
 (United Nations, 2020)

Technological advancement and innovation improvement, like rising energy and resources efficiency, are critical to finding long-term solutions to the both ecological and economic issues (United Nations, 2020).

Energy intensity rate indicates energy consumption per unit of GDP (Ritchie, et al, 2020).

10. Reduced inequality

Inequality reducing is the 10th SDG. To decrease inequality between countries it is important to imply the application of fiscal policy, to develop the financial markets and the expansion of opportunities for social, political, and economic integration.

It also emphasizes the need for measures in the economic, political, and social spheres of society, as well as measures to equalize the voice of developed and developing countries in decision-making.

Figure 11. Main aspects of inequality reduction

(United Nations, 2020)

To determine progress toward this goal, it is justified to assess the percentage growth of income in developing countries and to compare it with that of developed countries in order to determine whether there is a momentum for narrowing the gap. It is also possible to assess the level of involvement and participation of countries (especially developing countries) in world issues and participation in international summits and meetings.

In the same way, reducing inequality concerns the country's population, because it involves the support and protection of minorities (religious, ethnic, and others). The goal has a connection with the fifth SDG so it is justified to use **the gender equality index** for this goal as well.

11. Sustainable cities and communities

The goal number 11 is sustainable cities and communities. Cities are the main sources of development. Cities account for about 60% of GDP. So it is important to support the percentage of urban population in the country.

Nowadays, more and more people live in urban settlements. Therefore, it is critical to ensure the stable and innovative development of cities able to meet the increasing demand of the population (United Nations, 2022).

Aspects such as providing access to housing and utilities and transportation at adequate prices, protecting the world's cultural and natural heritage, increasing the urban population and more were highlighted.

*Figure 12. Targets of the 11th goal*
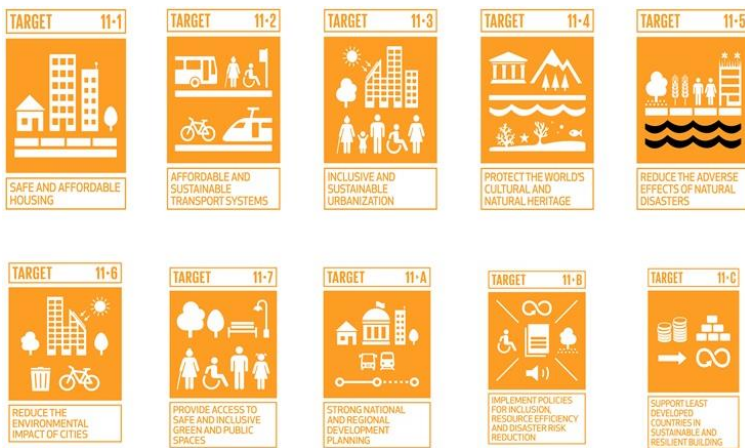
(United Nations, 2020)

The World Bank established urban population rate as one of the most important rates. **Urban population rate** is calculated as a percentage of the total population which lives in cities (World Bank, 2022).

12. Responsible consumption and production

The next SDG is responsible consumption and production. With the ever-increasing demand for goods and services due to population growth, it is critical to engage in responsible consumption and production to avoid resource depletion. The basics of responsible consumption can be described as doing better and more with less (both financially and in terms of resources).

Figure 13. Responsible consumption and production targets
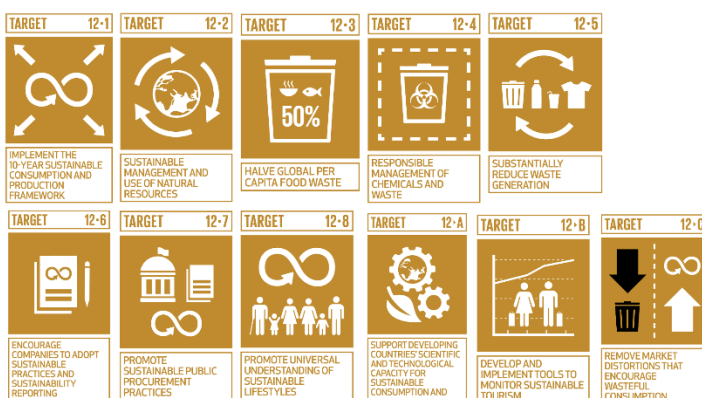
(United Nations, 2020)

Objectives identified by the UN include the responsible and safe handling of chemicals, the promotion of sustainable practices in large industries and international transport companies, the reduction of food waste, reduction of using fossil fuel and more (United Nations, 2020).

Fossil fuel consumption rate

Fossil fuel consumption rate defined as a sum of energy from coal, oil and gas and measured in terawatt-hours. This indicator shows how much energy from fossil nonrenewable resources was consumed by the country during a certain period.

13. Climate action, 14. Life below water and 15. Life on land

Goals number 13 (climate action), 14 (life below water), and 15 (life on land) are related to climate and nature protection.

Figure 14. Climate action, life below water, life on land goals illustration
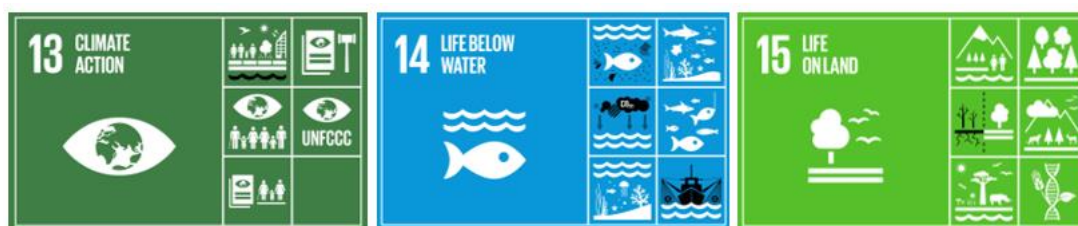
(United Nations, 2020)

One of the moast important and relevant rates is **CO2 emissions rate**.
Carbon dioxide emissions are those caused by the combustion of fossil fuels and the production of concrete. They involve carbon dioxide emitted during the combustion of solid, liquid, and gas fuels, as well as gas flaring. This is one of the most important environmental rates (World Bank, 2022).

In 2021, Carbon dioxide resulting from energy combustion and industrial processes represented nearly 89% of total energy sector greenhouse gas emissions (World Bank, 2022)**.**

16. Peace, justice and strong institutions

Achievement of peace, justice and strong institutions is the 16th sustainable development goal.

Figure 15. 16th SDGs' targets
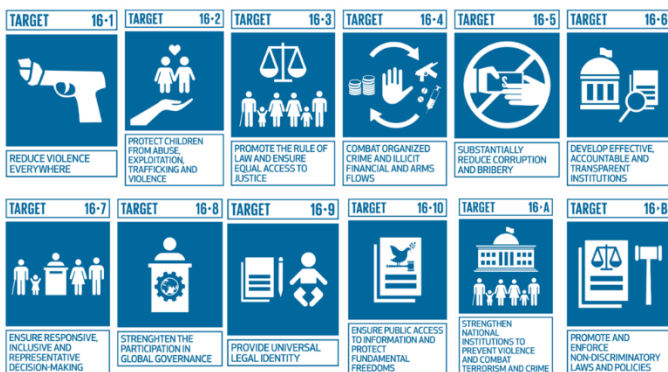
(United Nations, 2020)

This goal seeks to reduce wars, military conflicts and persecution and to build a society that is safe for all, with independent judicial systems and the rule of law that respects human rights.

The indicate which is related with this goal is crime rate.

Crime rate is calculated as the number of deliberately committed crimes per 100,000 of population.

17. Relationships for the goals

The last but not the least goal is partnerships for the goals.

Figure 16. Main aspects of partnerships for the goals

(United Nations, 2020)

This goal implies that in order to achieve all of the above, humanity must work together. It is critical to unite by creating international organizations and establishing communication between people, companies, and governments. This will help solve global problems more effectively and provide the necessary assistance in the event of accidents and natural disasters.

4 Practical Part

The practical part will focus primarily on the analysis of the economic performance of the Czech Republic. In the first part, it is justified to briefly describe the Czech economy, its relations with other countries, and its participation in international organizations and unions. Also, the country's attitude to the initiatives of the world economic forum and directly to the goals of sustainable development. The second part will analyze the Czech Republic's economic, social and environmental indicators to see how they have changed over time and whether they meet the selected goals of sustainable development.

4.1 Characteristic of the Czech Republic

The Czech Republic is a Central European country with Prague as a capital city. It borders Austria to the south, Germany to the east, Slovakia to the southeast, and Poland to the northeast. The country has an area of 78870 km^2 and a population of 10.51 million people. The Czech Republic is a unitary state; the form of government is a parliamentary republic. The state is divided into eight regions. The official language is Czech. The official currency is the Czech crown (CZK).

Figure 17. Czech Republic on the map

(Wikivoyage, 2019)

4.1.1 Czech Republic's economy

Czechia gained independence on January 1, 1993, as a result of the Velvet Revolution and the division of Czechoslovakia into two separate states. Before partition, Czechoslovakia had a command economy, after that it switched to a market economy. New economic measures were taken: private enterprise was allowed, the end of state price regulation,

privatization, and the end of state monopoly in the international market. The borders were opened for foreign investments and foreign capital. Thanks to such measures Czech economy recovered in a short period, and the industrial sector of the economy and infrastructure were restored and modernized (Britannica, no date).

In 2009, the Czech Republic faced a severe economic crisis caused by the global financial crisis. By the first half of 2010, the economy began to gradually recover.

It was also not without crisis during the coronavirus pandemic, which affected many economic indicators.

Currently, the Czech Republic is a developed country with an export-oriented market economy based on the production of goods and services and innovation. The main industries are mechanical engineering, metalworking, and electronics.

4.1.2   Czech Republic and international organizations and unions

After gaining independence, the Czech Republic began to actively join international associations. In particular, on March 12, 1999, the country became a member of the NATO military bloc. It also joined the OECD in 1995 and joined the European Union on 1 May 2004.

The Czech Republic is also a member of the Council of Europe and the UN, and actively supports their initiatives.

4.1.3   WEF and Czech Republic

"The Czech Republic has neither responsibilities nor rights towards WEF due to its specific nature" (Permanent mission of the CR in Geneva). However, the Czech Republic is trying to increase its involvement in the WEF at various levels. From taking part in the annual summits to involving as many Czech companies as possible in the agenda-setting and goal-setting process.

For example, The Czech company MIWA has joined the Technology Pioneers 2022. Technology Pioneers 2022 is a community of 100 fast-growing companies actively

implementing modern technologies and innovations in their operations. By joining the initiative, companies will participate in all events and summits held by the World Economic Forum for 2 years and bring their advanced ideas and knowledge to the global discussions. (WEF. Technology Pioneers, 2022).

MIWA is "complete circular business ecosystem for smart-powered reusable packaging". It connects producers, retailers and consumers, which helps to trace packaging through all stages of the supply chain and minimize waste. Tracking packaging greatly simplifies recycling and reuse.

This is a great solution for businesses and shop chains, as it helps reduce the material footprint by 90% on average and the carbon footprint by 62%. Which is directly linked to the Vision 2030 initiative and the achievement of one group of sustainable development goals.

Also, the initiatives of the WEF are actively supported by such organizations as the European Union, and as a consequence the European Commission, which actively develops laws and decrees binding on the member states of the European Union. Thus, the Czech Republic concludes agreements and adopts relevant laws to achieve the goals of the WEF not directly with the World Economic Forum, but through the European Commission.

4.2 Czech Republic and sustainable development goals' indicators

In 2017, the government of the Czech Republic supported the Sustainable Development Goals initiative and developed a strategic framework program. This program made it possible to adapt the goals to the realities of the Czech Republic. Within this framework, the most relevant goals were selected and a plan for their achievement was developed, and the responsible authorities and organizations were identified.

The obligatory item that appears in the list of measures for each goal is cooperation with other countries, preparation of reporting documents, and assistance to developing countries in achieving the goals. This item is directly related to Sustainable Development Goal 17: Partnership for the goals.

## 1. "No poverty" goal – GNI per capita, poverty rate, unemployment rate

According to the government program, the main measures should be focused on supporting those groups of the population who are most at risk of income poverty (for example, single people without relatives with low income, people with disabilities, the elderly, and others) (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

GNI per capita and Export

The program for achieving the Sustainable Development Goals defines GNI per capita as basic. Its increase can be seen as progress against poverty (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

The 18th figure shows changes in GNI per capita and Export from 1995 to 2021. It is noticeable that changes in one indicator lead to changes in the other. In particular, from 1995 to 2003 there was no noticeable change in either indicator. However, in 2004, exports began to grow rapidly due to new trade opportunities opened up by access to the European market.

Figure 18. GNI per capita and Export rates of the Czech Republic 1995-2021 (US$)
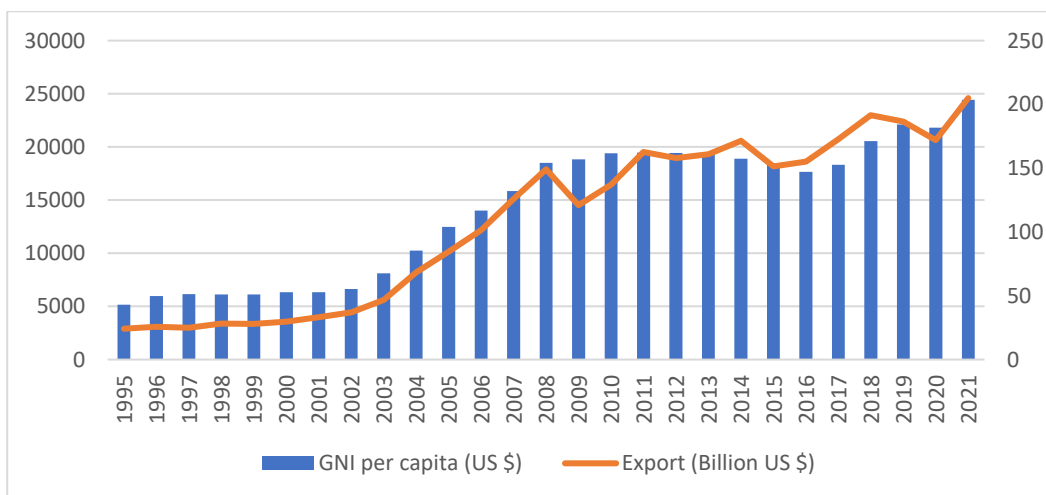
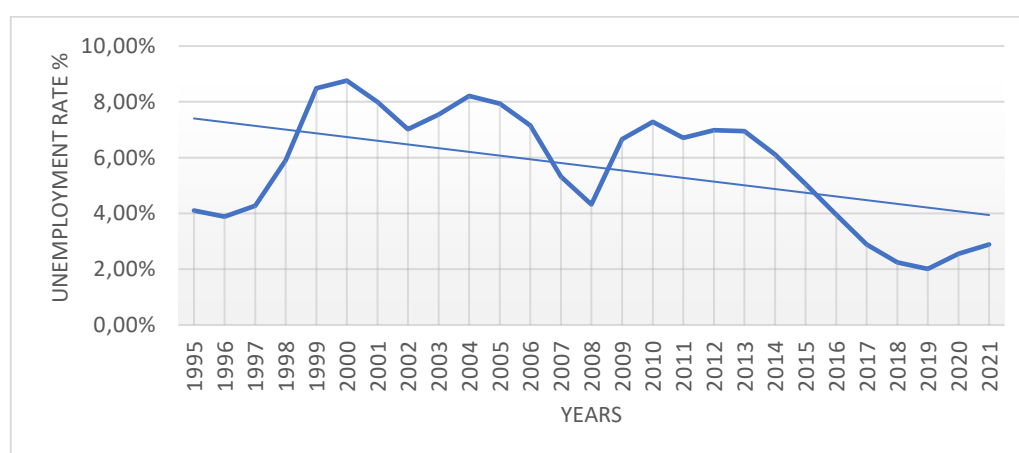Own work based on data from World Bank

In general, GNI per capita tends to increase gradually without sharp declines. In the period from 2017 to 2019 the GNI was increasing. But in 2020 there is a decline, influenced by the coronavirus pandemic and the imposed lockdown, which affected the efficiency of the economy's production capabilities.

The highest result of the analyzed indicator was reached in 2021 compared to all previous years shown in the graph. This indicates that the economy has begun to recover after crisis in 2020.

Unemployment rate

In figure 19 it can be noticed that, according to the trend line, the unemployment rate in the Czech Republic is decreasing. However, the decline is not stable and there are spikes.

Figure 19. Unemployment rate of the Czech Republic 1995-2021 (% of labor force)

Own work based on data from World Bank

In particular, dramatic increases in the indicator are observed in the periods from 1997 to 1999 and from 2008 to 2010. This is mainly due to the economic crises that the Czech Republic faced in those years.

There have also been reductions in the unemployment rate. For example, the decrease from 2000 to 2001 is connected with economic measures, which were introduced by the government in order to fight the crisis (the creation of the Securities Commission). There is also a decline in the period from 2004 to 2008. This happened because in 2004 the Czech Republic joined the European markets and subsidies.

The minimum unemployment rate (as a result of 6 years of recession) is observed in 2019 – 2% of labor force. This is due to the fact that in 2013 (the beginning of the contraction) the Czech Republic held its first direct elections and the parliament was reformed. As a result of these events, the country's economy normalized and developed until the crisis in 2020. Then

the country, like the rest of Europe, experienced a strong economic and social disruption due to the coronavirus pandemic, which leaded to mass layoffs, the effects of which are still observed 2021.

Poverty rate

The absolute poverty rate of the Czech Republic is calculated as the percentage of the country's population that earns less than 5.50 U.S. dollars per day. According to the data shown in figure 20, this rate is low, 0.3 percent in 2019, which is lower than in the Netherlands, Denmark, and Norway (World bank, 2022).

Figure 20. Poverty rate of the Czech Republic 2004-2019 (% of total population)
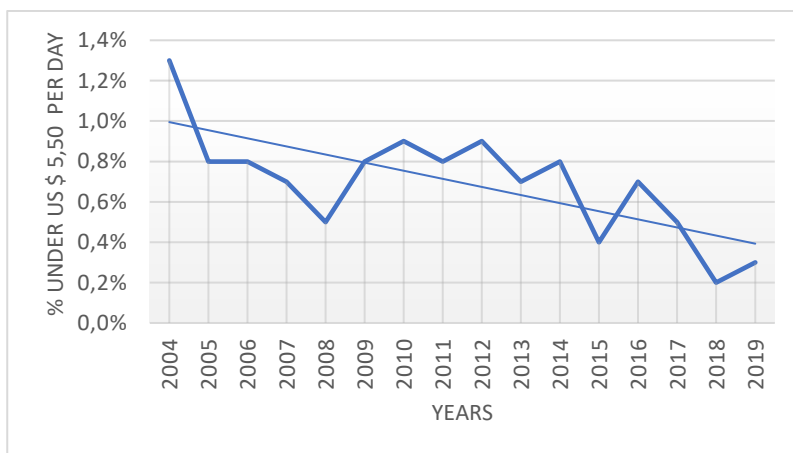
Own work based on data from World Bank

The graph shows that there is a downward trend, but not a smooth one. From 2004 to 2008 the index fell sharply from 1.3% to 0.8%, due to the strong economic and social development of the country related to its accession to the European Union. However, the downward trend was reversed in 2008 due to the worst crisis since 1997.

The continuous decline resumed in 2016 -2017, which resulted in the lowest percentage of poor people, at 0.2% in 2018. This is due to the application of policies to support the economically vulnerable population. Since 2019, the rate has risen again by one-tenth of one percent, that is, by about 10 500 people (World bank, 2022).

2. **"Zero hunger" goal - hunger rate**

Regarding the second goal, actions to support agricultural research (to ensure the necessary amount of quality products), to subsidize food in schools, and to participate in the creation of a fair and balanced global trade environment in agricultural markets were identified as important measures (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

Hunger rate

According to data cited by the World Bank, the Czech Republic's hunger rate has remained unchanged from 2001 to 2021. It amounts to 2.5% of the total population of the country, i.e. approximately 262,500 people. This figure is less than, for example, in Japan (3.2%) and Slovakia (3.8%). And this is on a par with Austria, Germany, Belgium and South Korea, but the population of all these countries is larger than in the Czech Republic, so in quantitative terms, the Czech Republic is better than these countries (World Bank, 2022).

Figure 21. Hunder rate of the Czech Republic 2001-2021 (% of population)
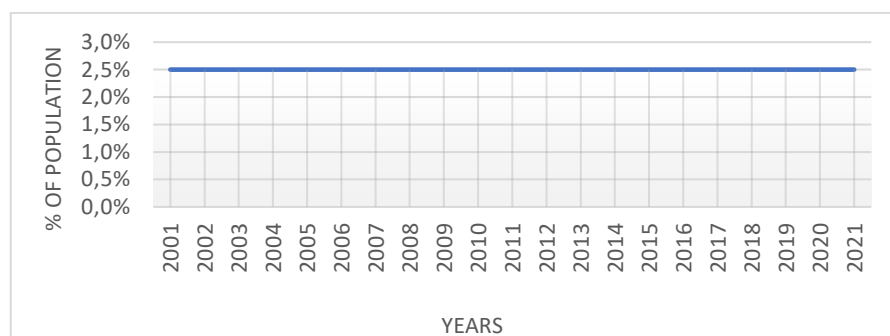
Own work based on data from World Bank

The graph is difficult to analyze because there is no change. The hunger indicator is stable and does not change under the influence of world events and changes in the economic, social and political spheres of society.

3. **"Good health and well-being" goal - infant mortality rate and life expectancy rate at birth**

In this paragraph, the indicators related to health and well-being will be analyzed. The government of the Czech Republic as well as the UN and the WEF have identified mortality rates as well as life expectancy rate as the main indices by which we can judge the progress of Sustainable Development Goal 3. Infant mortality rate and life expectancy rate at birth

were identified as priority indicators, on the grounds that they are the most dependent on the quality and development of the health care system (United Nations, 2020).

In 2017, the government of the Czech Republic prepared a program with basic measures aimed at the development of medicine and inclusion. In particular, the emphasis was not only on health care itself (reducing geographical fragmentation) but also on supporting the population with physical and mental disabilities (employment assistance, comprehensive care, and other) (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

Infant mortality rate

Figure 22 shows the changes in the infant mortality rate from 1995 to 2021. It can be seen that there is a downward trend, smoothly, without sharp fluctuations.

Figure 22. Infant mortality rate of the Czech Republic 1995-2021 (per 100 live births)
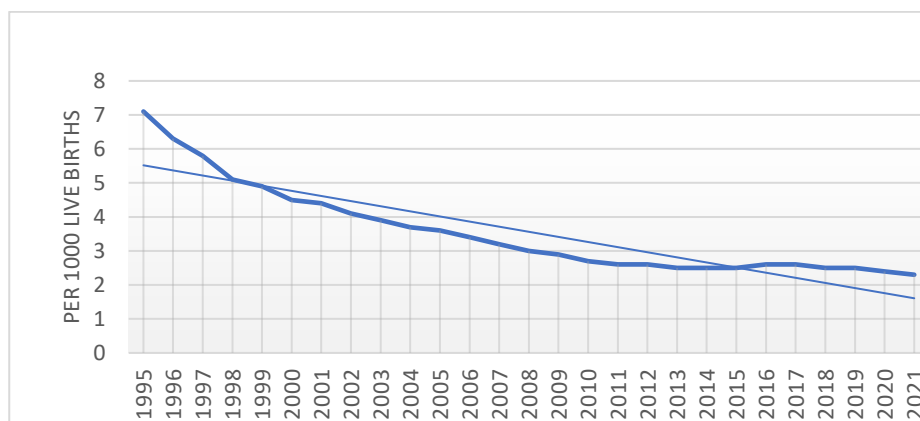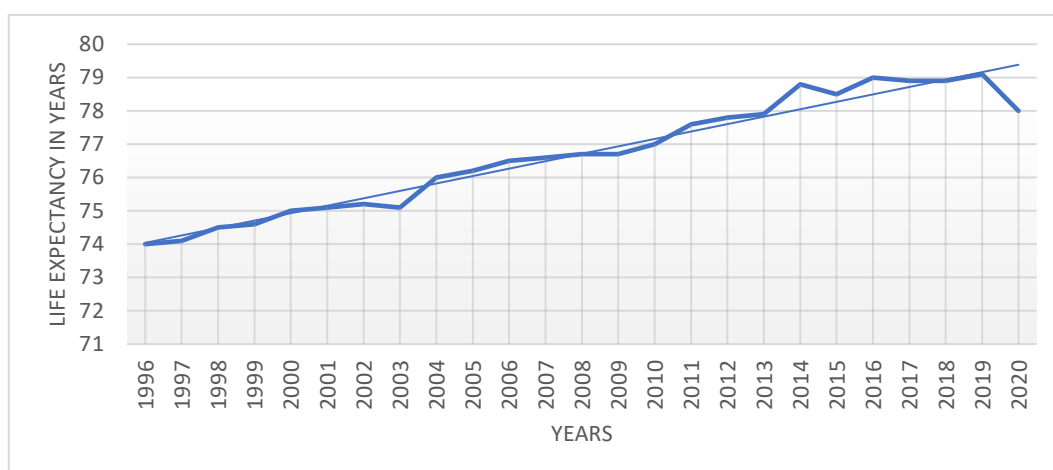

Own work based on data from World Bank

The highest value is observed in 1995 – 7.1. This is since many systems and social institutions of the country did not have time to recover and adjust their work after the collapse of Czechoslovakia and the transition from a command economy to a market economy. After 1995 and by 2013, the indicator had almost halved to 2.5 deaths per 1000 births. However, from 2014 to 2017 there is an increase to 2.6, probably as a result of a stabilization reform in which the budgets of large medical institutions were reduced to reduce the overall health insurance debt.

Between 2018 and 2021, the figure decreased again, even though in 2013 there was a major stabilizing reform of the health system. But the lowest value was reached in 2021, 2.3, which is lower than in developed European countries such as Austria and Belgium.

Life expectancy rate at birth

Speaking of the life expectancy rate at birth, it is justified to say that according to the data cited by the World Bank, the indicator generally tends to increase. However, there are periods when the indicator decreased, but the decrease was not more than 0.1 year, in particular in 2002-2003, 2008-2009, and 2014-2015. This was due to economic crises and an uncertain political environment, which had a negative effect on the indicator.

Figure 23. Life expectancy rate at birth of the Czech Republic in 1996-2020

Own work based on data from World Bank

The largest decrease in the indicator is observed in 2020 due to the coronavirus pandemic, with a drop of about one year.

4. **"Quality education" goal - education spending of the government**

The main aspects of achieving quality education identified by the Czech government include: ensuring equal and inclusive education, improving the quality of all levels of education, flexibility in additional education, support for non-formal education, the program of state scholarships and more (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

Education spending of the government

The data shown in Figure 24 shows how the share of the state budget that is allocated for the development and support of the education system is changing.

Figure 24. Education spending as a share of the total government expenditure of the Czech Republic 1996-2018 (% of total expenditures)
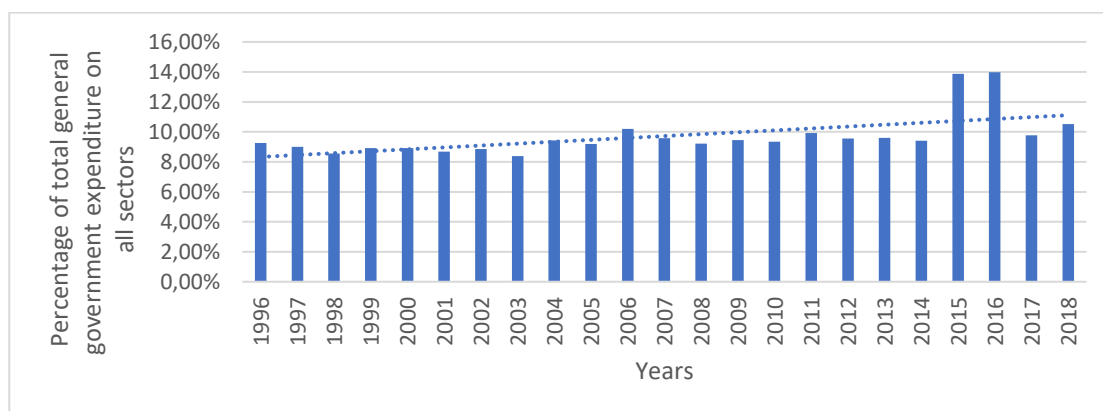
Own work based on data from World Bank

According to the trend line, there is an increasing trend in the share of expenditure allocated to education from 8% to 10%. The highest figures were achieved in 2015, 2016, at which time the Czech Republic adopted a package of measures for the development of the education system until 2020.

From 2017 (when the Sustainable Development Goals program was adopted) to 2018, the cost percentage increased from 9.76% to 10.51%, the third highest after the 2015 - 2016 boom. No data after 2018 is presented, so it is not possible to estimate how the cost percentage changed in subsequent years.

5. **"Gender equality" goal and 11. "Reduced inequality" goal – gender equality rate**

The government program for Goal 5 notes important aspects such as the adoption of measures to prevent domestic violence and human trafficking, the representation of women in leadership positions, measures to help women find employment, and the projection of equality between women and men in official documents (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

The government's program for achieving the 11 goal highlights the main aspects of reducing inequality: taking effective measures to support and combat discrimination against ethnic, religious, and other minorities, investing in Africa and small island countries, supporting the participation of developing countries in decision-making in international financial institutions, and more (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

Gender equality rate

The gender equality indicator shows how equal men and women are based on data in six dimensions. The assessment is from 0 to 100, where 0 is absolute inequality and 100 is absolute equality.

Figure 25. Gender equality rate of the Czech Republic and the European Union
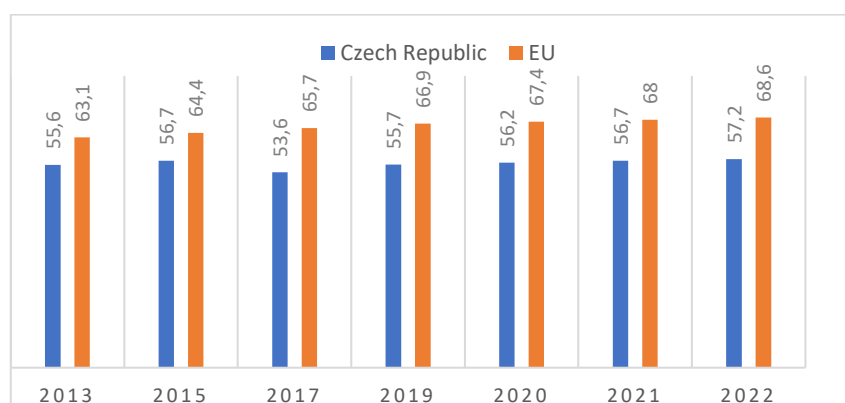
Own work based on data from European Institute of Gender Equality

Figure 25 shows the Czech Republic compared to the average of the European Union countries presented as the EU index for the last 7 years. We can notice that the Czech Republic lags behind the average of the EU countries by an average of 10 units.

In 2013, the Czech index was 55.6 compared to the European Union's 63.1, and in 2022 it was 57.2 in the Czech Republic and 68.6 in the EU, indicating that the crack between the Czech indicator and the EU average is widening.

The Czech index tends to rise, but not as fast as the European average. Also, while the European indicator is steadily increasing, the Czech indicator has a sharp decline in 2017 and 2019.

Czech gender equality rate in 2022: detailed representation

Speaking in more detail about the equality index of the Czech Republic in 2022, it can be noted, firstly, that there is no data regarding violence.

Secondly, the greatest progress in the power dimension (for instance, women's representation in leadership positions, parliament and other political institutions) is an increase of 2.2.

Figure 26. Czech gender equality rate in 2022: detailed representation
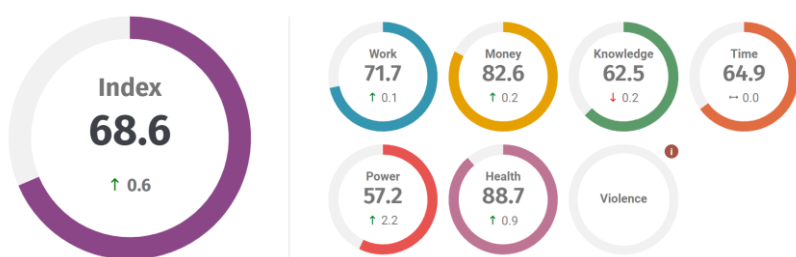
Source: European Institute of Gender Equality

However, there is a lack of dynamics in the time dimension, that is, in the way time is distributed between domestic work and the care and social activity of the individual.

There is also a decrease inequality in the aspect of knowledge. This means that in 2022, fewer women are in higher education and participate in formal and informal education.

This dimension is also relevant to Sustainable Development Goal 4 (quality education), as it shows that women and men had more unequal access to education in 2022.

6. "Clean water and sanitation" goal - clean water access rate

The government of the Czech Republic has emphasized as targets such aspects as the involvement of the population and local communities in solving issues related to the distribution of water resources, the provision of hygiene and sanitation facilities for the homeless, as well as assistance in the development of water supply and water protection systems in developing countries (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

Clean water access rate

Analyzing figure 27, it is justified to say that the rate of access to clean water in the Czech Republic tends to increase in the period from 2001 to 2014 from 96.4% to 97.4%. That is, approximately 1 million people gained access to clean water in 14 years.

Figure 27. Clean water access rate of the Czech republic 2000-2020 (% of the total population)
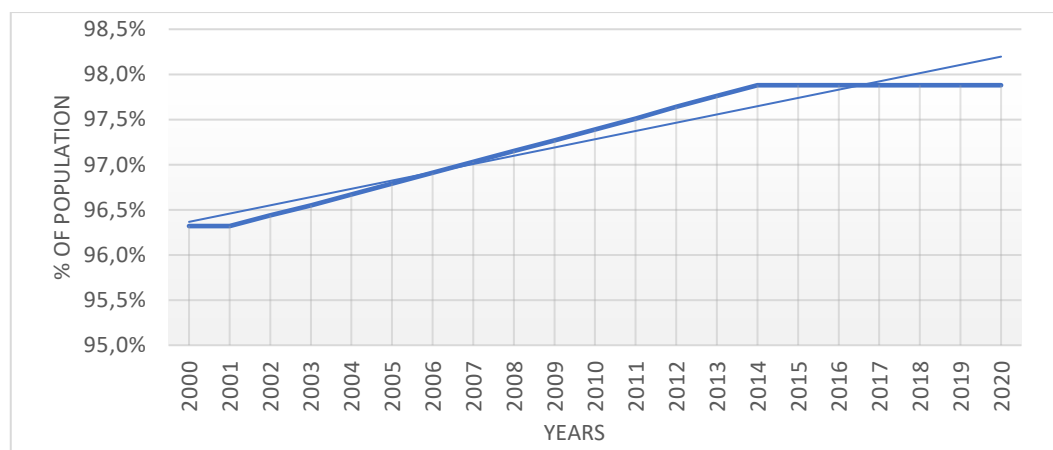
Own work based on data from World Bank

However, after 2014 and through 2020, the rate has not changed, remaining at 97.4%. This is a high rate relative to the world, but low compared to some European countries, particularly in Greece, Norway, the Netherlands, and several other countries, where 100% of the population has access to clean water. Since data for 2021 and 2022 are not available, it is impossible to determine whether stagnation has continued.

7. "Affordable and clean energy" goal - renewable energy rate

According to the adopted program to achieve the seventh goal, the Czech Republic must support the use of environmentally friendly energy sources with low emissions, consider the potential introduction of a carbon tax system, and develop systems of efficient energy use and storage (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

Renewable energy production rate

Analyzing the data shown in Figure 28 highlights that the strongest jump is between 2003 and 2013, from 2.27% (the lowest percentage) to 10.82% (the highest percentage). This is due to the active development of the energy industry in the alternative energy sector.

Figure 28. Renewable energy production rate of the Czech Republic 1995-2021 (% of total energy produced)
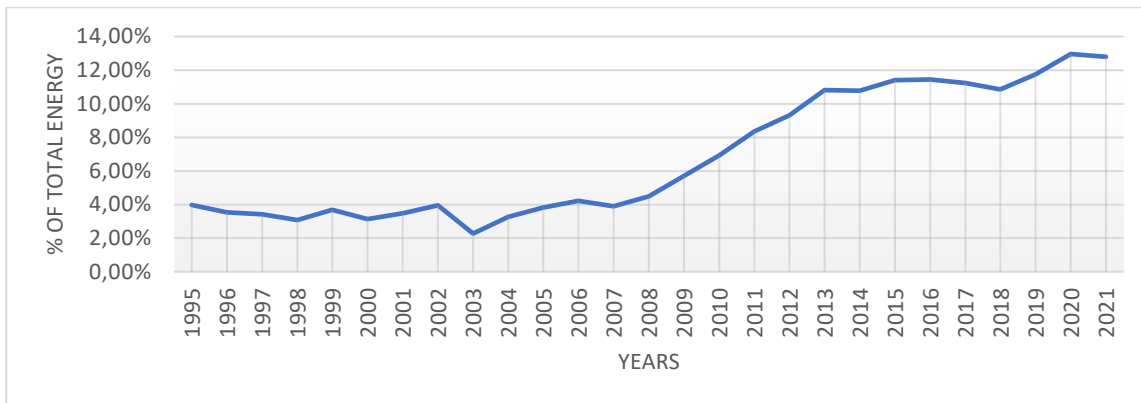
Own work based on data from World Bank

The growth of the share of renewable energy slowed down between 2014 and 2018, and even started to decrease by 0.4%. However, already in 2019 an increase began and in 2021 the renewable energy share was 12.79%.

8. "Decent work and economic growth" goal – GDP growth rate, inflation rate, minimum wage

To achieve Goal 8, the government highlighted important aspects such as strengthening the endogenous companies sector, supporting employment, increasing private investment, implementing the National Action Plan 2017-2022 and strengthening the understanding among the population that work brings not only financial benefits but also promotes socialization and strengthens one's position in society (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

GDP growth rate

The WEF as well as the United Nations has determined that GDP growth should not be less than 7% per year.

The data given in the table are based on the Czech GDP change calculated in current US dollar terms.

Figure 29. GDP growth rate of the Czech republic 2001-2021 (% change)
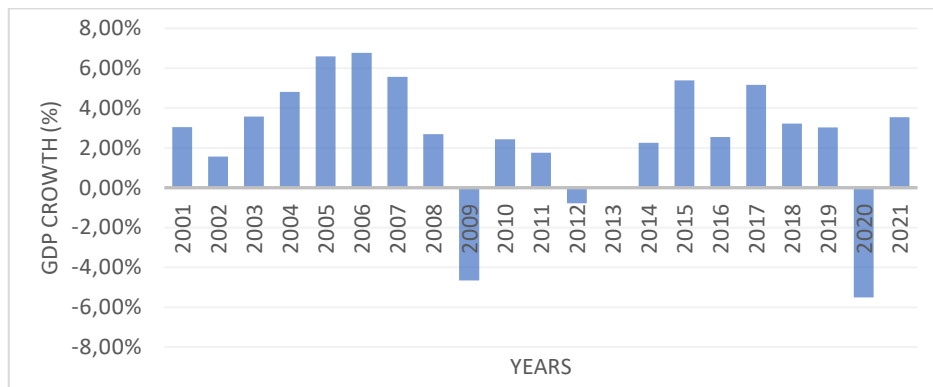
Own work based on data from World Bank

By analyzing the chart below, it can be seen that the Czech Republic has never achieved a GDP growth of 7% in 21 years. The closest economic growth was in 2005 and 2006 at 6.60% and 6.77% respectively. This is due to the fact that in 2004 the Czech Republic joined the European Union and gained access to European markets, which contributed to GDP growth. GDP growth was negative in 2009, 2012, and 2020. This is due to economic crises.

In general, it can be seen that there is no trend toward stable economic growth of 7%. On average, the Czech GDP increases by 4.82% per year.

Inflation rate

Analyzing figure 30 it can be seen that the rate of inflation is decreasing. The highest rates were observed in 1995 - 1998. This is due to the fact that at this time the Czech economy was making the transition from a command to a market economy and was weakened by the separation (from the general economy of Czechoslovakia to two separate - the Czech and Slovakian). Also, the figure of more than 6% was observed in 2008 due to the severe economic crisis.

Evaluating the inflation rate since 2017, it can be emphasized that this tends to increase, since 2020 this is largely due to the economic and social crises that have arisen in the aftermath of the Coronavirus pandemic. As of 2021, inflation was 3.84%.

Figure 30. Inflation rate of the Czech Republic 1995-2021 (in %)
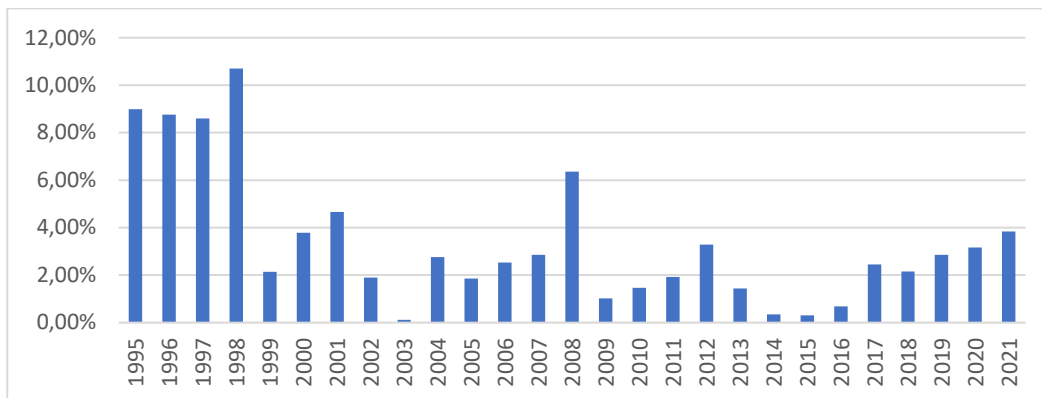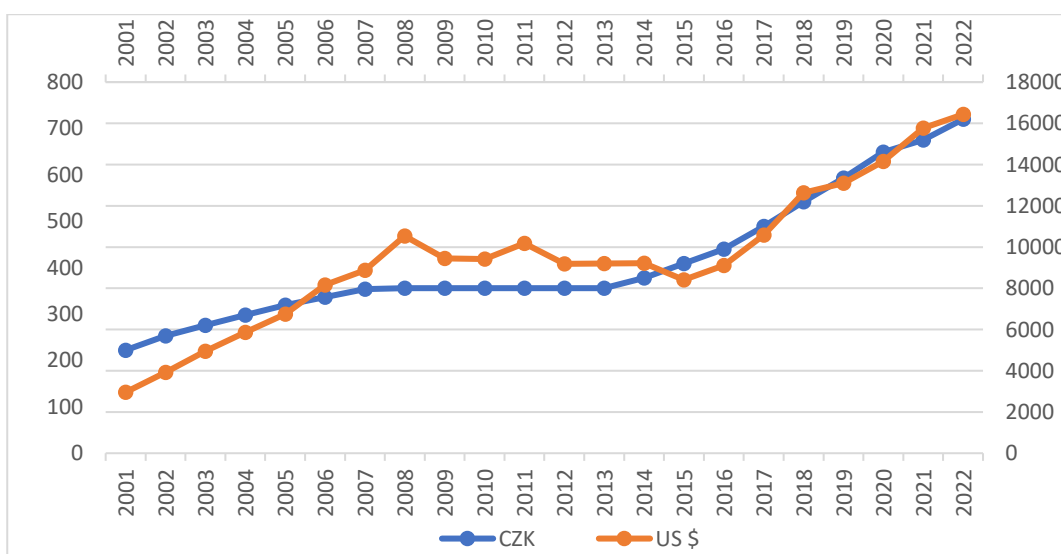

Own work based on data from World Bank

Minimum wage

Figure 31 represents changes in the minimum wage in the Czech Republic. It can be seen that the minimum salary in the Czech Republic is increasing.

Analyzing the figures in the national currency (Czech crown) we can see that the minimum wage has either remained unchanged (2007-2013) or increased (2001-2007, 2013-2022), and has never decreased. In 2022, the wage has more than doubled since 2001.

It is also important to analyze wages in U.S. dollars, on the grounds that due to local currency inflation, wage increases may not always indicate an increase in purchasing power and real income.

Figure 31. Minimum wage of the Czech Republic in 2001-2022 (in CZK and US dolllars)

Own work based on data from World Bank

From the line of change of the minimum wage in foreign currency, it can be seen that periods of wage reduction are present. Particularly in 2008-2009, when there was an economic crisis and a sharp rise in inflation, and a decline in GDP growth.

As of 2022, wage growth in both local currency and U.S. dollars is stable, with no declines since 2015. From this, it can be concluded that the coronavirus pandemic did not have a negative impact on the indicator.

9. Industry, innovation and infrastructure – energy intensity rate

Regarding Goal 9, the program involves actions to develop and expand international cooperation in research and innovation, creating a system of exchange of knowledge and experience between countries, and the development of scientific research policy in the field of trade policy (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

Energy intensity rate

Energy intensity rate shows how efficiently energy is used in the production of goods. The less energy it takes to produce one unit, the more efficiently energy is consumed.

Figure 32. Energy intensity rate of the Czech Republic 1995-2018 (KWH per one unit produced)
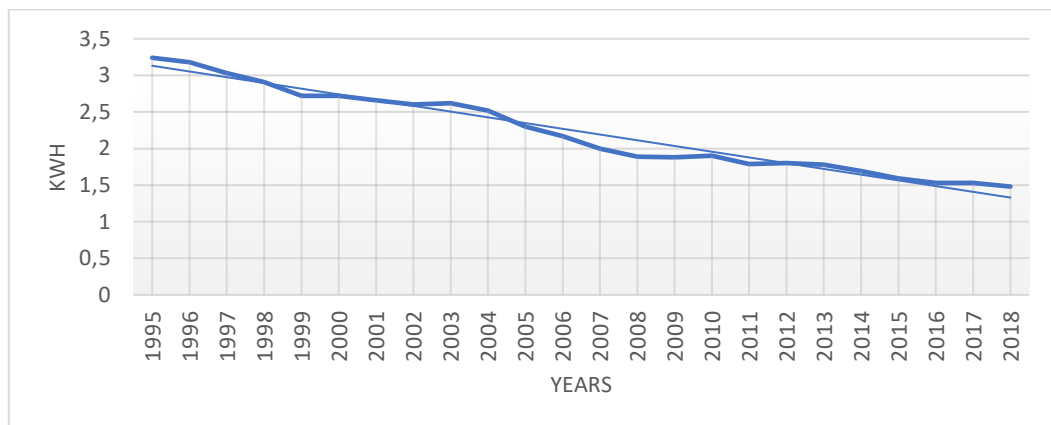
Own work based on data from World Bank

The graph below clearly shows a downward trend in the amount of energy consumed, that is, it is used more and more efficiently over time. Overall, the graph is smooth, with no sharp increases or decreases. The lowest value was reached in 2018 at 1.48 KWH. Compared to 1995, when consumption was 3.24 KWH, the line is down by 54%.

11. "Sustainable cities and communities" goal – urban population rate

The adopted program includes the following measures to achieve Sustainable Development Goal 11: introduction of a social housing system, support for housing affordability especially for vulnerable groups, regional and municipal decisions with public participation, a restoration program for natural and cultural heritage monuments, and control of household waste disposal (not more than 10%) (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

Urban population rate

By analyzing figure 33 it can be seen that this indicator has no clear upward or downward trend. Between 1996 and 2011, the share of the urban population decreased from 74.5% to 73.19%. However, already in 2012, the indicator started to increase, reaching 74.06% by 2020.

Figure 33. *Urban population of the Czech Republic 1996-2020* (as % of the total population)
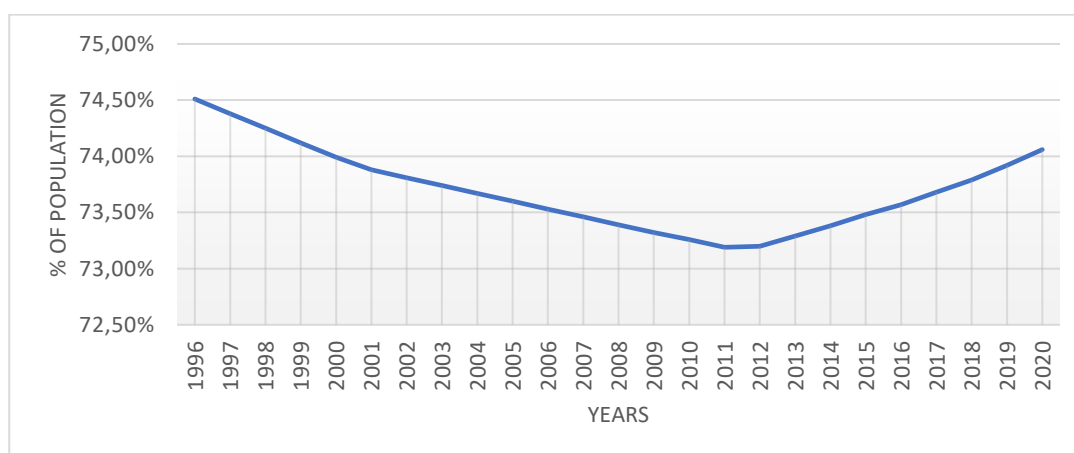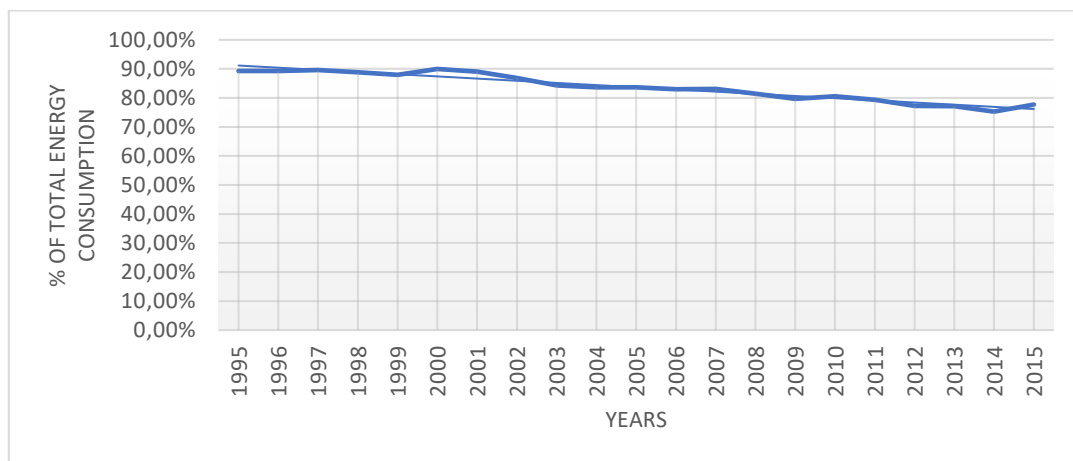

Own work based on data from World Bank

12. "Responsible consumption and production" goal - fossil fuel consumption rate

Regarding Goal 12, the program describes such aspects as the widespread use of the circular economy, maintaining education in this area, reducing the consumption of fossil resources, reducing food waste (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

Fossil fuel consumption rate

Analyzing Figure 34, we can emphasize that the share of energy generated by fossil sources tends to decrease. The graph is smooth, without sharp drops. The lowest figure was reached in 2014 and amounted to 75.28%, which is markedly different from the figure of 2000, when the share was equal to 89.96%.

Figure 34. Fossil fuel consumption rate of the Czech Republic 1995-2015 (% of the total energy consumption)

Own work based on data from World Bank

Despite the downward trend, the Czech Republic's fossil fuel consumption rates are still high compared to some other European countries. In particular, France's rate is 46.49% and Sweden's is 25.12% (World Bank, 2015).

13. "Climate action", 14. "life below water", 15. "life on land" goals – CO2 emission rate

Sustainable development goals 13, 14, and 15 are related to environmental protection. According to the program developed by the government of the Czech Republic, the following actions must be taken in order to achieve Goal 13 "climate action": obligatory achievement of 14 SDGs, implementation of existing strategies and plans related to climate change, increased funding allocated for the development of new climate projects and initiatives (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

Concerning Goal 14 (life underwater), the program proposes the following actions: to analyze the proportion of the pollution of the oceans and seas that the Czech Republic is responsible for, to reduce CO2 emissions, to subsidize fisheries, and to support international efforts in the rational use of the oceans and seas (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

Actions to achieve Goal 15 (life on earth): reduce the pressure from tourism activities, develop new measures for soil protection, achieve international goals (described in the UN convention), and work to comply with the strategies developed (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

CO2 emission rate

Figure 35. CO2 emission rate of the Czech Republic 1995-2021 (kilotons)
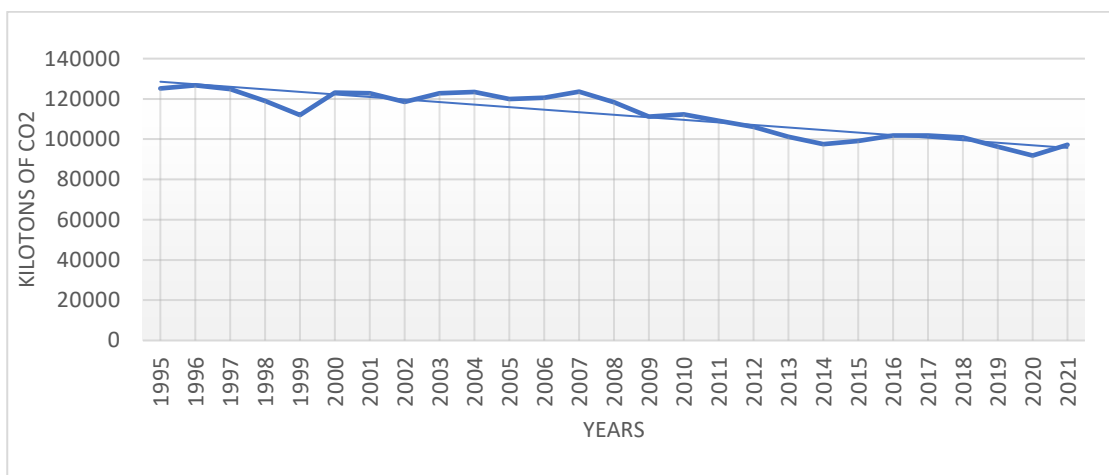
Own work based on data from World Bank

Figure 35 highlights the downward trend in CO2 emissions from 1995 to 2021. By 2020, carbon dioxide emissions were 91850 kilotons, the lowest result in the 26 years described. However, the rate increased by 2021 and equaled 97140. So it can be concluded that decreasing in 2020 was connected with reducing of the level of production activity due to pandemic restrictions.

Despite the downward trend, this figure is still high compared to, for example, Finland, whose emissions were 40710 kilotons, which is more than twice as low (World Bank, 2022).

### 16. "Peace, justice and strong institutions" goal – crime rate

The Czech government has identified the following aspects as key to achieving Goal 16: ensuring public access to verified and truthful information, combating corruption and illegal

arms trafficking, and involving the public and civil society organizations in public decision-making (Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice, 2017).

Crime rate

The crime rate is one of the most important indicators of the strength of state institutions (in particular, the courts).

Figure 36. Crime rate of the Czech Republic in 1995-2020 (number of homicides per 100 000 population)
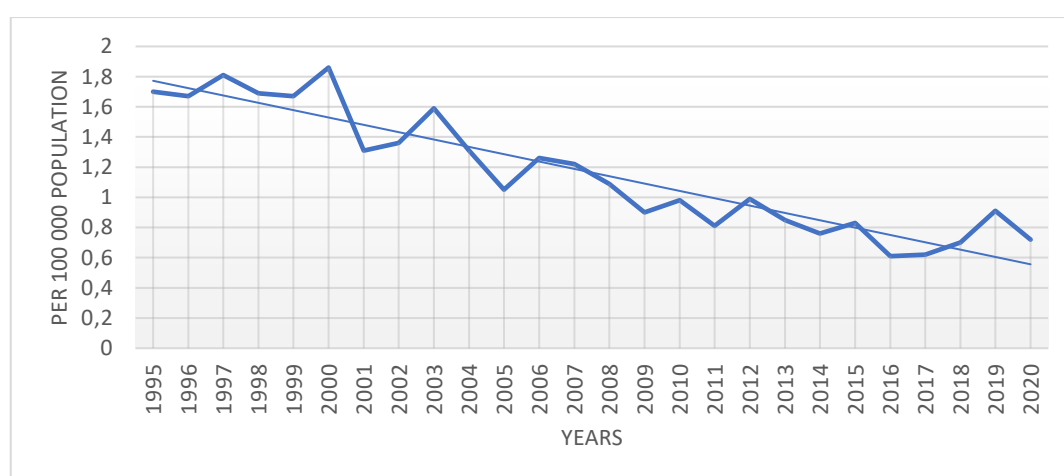
Own work based on data from World Bank

Figure 36 shows the change in the crime rate from 1995 to 2020. Overall, according to the trend line, the crime rate is declining, but there are sharp increases in 2000, 2003, and 2019. In 2019, the crime rate increased by more than 46%. The lowest rate was 0.7 per 100,000 people in 2018 (World Bank, 2022).

4.3 Correlation analysis

For the correlation, I have chosen macroeconomic, social and environmental indices related to different sustainable development goals and covering as large a time horizon as possible, so that the correlation results are statistically significant. Thus, based on the parameters, the following indicators were chosen:

Macroeconomic: GDP per capita, GNI per capita, the unemployment rate, inflation rate

Environmental: renewable energy consumption rate, CO_2 emission rate

Social: life expectancy rate, urban population rate, crime rate, infant mortality rate

They are presented in the period 1996 - 2020. A detailed table with the indicators is presented in the appendix.

Table 2. Results of correlation analysis

	GDP/cap.	GNI/cap.	Unemp. R	Inflation rate	Ren. En. Prod.	CO2	Life expect.	Crime rate	Urban popul.
GDP/cap.	1								
GNI/cap.	0,94624	1							
Unemp.R	-0,6058	-0,48043	1						
Inflation.R	-0,5053	-0,48369	-0,19441	1					
Ren. En. Prod.	0,84649	0,824485	-0,59855	-0,422495	1				
CO2	-0,7925	-0,7867	0,510527	0,46721942	-0,96133023	1			
Life expect.	0,95472	0,915429	-0,49658	-0,5788411	0,910940665	-0,864	1		
Crime rate	-0,9092	-0,90153	0,440941	0,57724151	-0,84969092	0,8034	-0,93468	1	
Urban popul.	-0,5346	-0,66017	-0,23681	0,65656275	-0,33174681	0,3104	-0,58686	0,638306	1
Infant	-0,8955	-0,90052	0,224086	0,73249302	-0,75554726	0,7508	-0,91736	0,901798	0,78701

Own work based on the data from World Bank

Table 2 shows a correlation analysis table between all indicators. It is justified to analyze in this paper the correlation coefficients between macroeconomic and social/environmental indicators in order to demonstrate how each indicator related to the Sustainable Development Goals depends on the indicators of the economic performance of the Czech Republic.

Table 3. Chosen correlation coefficients from the correlation table

	GDP/cap.	GNI/cap.	Unemp. R	Inflation rate
Ren. En. Prod.	0,846491	0,82448501	-0,59854692	-0,422495
CO2	-0,79255	-0,78670258	0,51052698	0,46721942
Life expect.	0,954717	0,91542949	-0,49657609	-0,5788411
Crime rate	-0,9092	-0,90153275	0,440940871	0,57724151
Urban popul.	-0,53457	-0,66017363	-0,23681392	0,65656275
Infant	-0,89545	-0,90052284	0,224085853	0,73249302

Own work based on the data from World Bank

The whole table of correlation analisys resuts is represented in the appendix.

Table 3 presents a correlation table of economics indicators and indicators related with SDGs. The statistical significance of the correlation coefficients was verified by regression analysis.

Correlation coefficients highlighted in bright red are statistically insignificant, so they cannot be applied to the whole population. The coefficients highlighted in green indicate a

strong positive correlation (r > 0.5), light red indicates a strong negative correlation (r < -0.5), and gray indicates a medium-weak correlation.

The relationship between macroeconomic rates and SDG indicators is clearly shown in the figure 37.

Figure 37. Linear relationship between economic indicators and indicators of SDGs
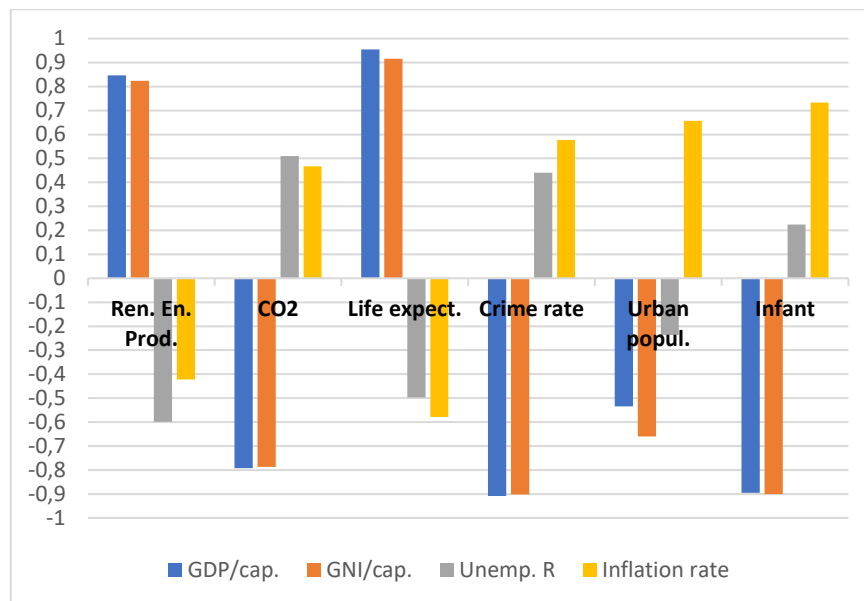
Own work based on the data from World Bank

First of all, it should be noted that GDP per capita and GNI per capita have largely similar results regarding their correlation with the SDG indicators. This is due to the fact that GDP is used in the formula for GNI calculation, as shown in equation (2) of the theoretical part.

When analyzing the links of environmental indicators with economic indicators, it can be seen that the renewable energy production rate and CO_2 emissions rate have opposite relationships to the economic indicators. In particular, there is a positive correlation between energy prodaction and GDP per capita and GNI per capita, and a strongly negative one with the unemployment indicator. Whereas CO_2 emissions are inversely strongly correlated with GDP per capita and GNI per capita, but strongly positively with unemployment rate. In the case of both indicators, their correlation with inflation is weak: renewable energy production rate is negative (-0.422), while CO_2 emissions rate is positive (0.467).

As far as life expectancy is concerned, there is a very strong positive correlation between GDP per capita (0.956) and GNI per capita (0.915), it means that with increasing life expectancy, GDP per capita and GNI per capita are also increasing. With the other economic indicators, a negative correlation was found: with the unemployment rate a weak negative correlation (-0.497), with the inflation rate a strong negative correlation (0.579).

The correlation coefficients for the crime rate are in the opposite direction as compared to life expectancy. For example, there is a very strong negative correlation between the crime rate and GDP per capita (-0.909) and GNI per capita (-0.902), while the relationship with the inflation rate is strongly positive. Regarding the unemployment rate, the correlation coefficient is less than 0.5, which indicates a weak positive relationship between crime and unemployment.

Analyzing the coefficients concerning the level of the urban population, it can be noted that its correlation with GDP and GNI is strongly negative (-0,535 and -0,660 respectively). On the contrary, the correlation with the inflation rate is strongly positive - 0,657. On the unemployment indicator, it should be noted that although the correlation coefficient is -0.237 (a weak negative relationship), it is statistically inapplicable.

Similarly, the correlation coefficient between infant mortality rate and unemployment rate is statistically insignificant and shows a weak positive correlation (0.224). The infant mortality rate, as well as crime rate, have a very strong negative correlation with GNI per capita (-0.9) and a strong inverse correlation with GDP per capita (-0.895); the correlation with inflation rate is strongly positive and equals 0.732.

5 Results and Discussion

During the theoretical and practical parts, the following questions were answered.

Foundation of WEF, its purpose, main mission, and members

The World Economic Forum was founded as a non-governmental organization by Klaus Schwab in 1974. The main location of the forum is the city of Davos in Switzerland. The main mission of the WEF is to unite politicians, SEOs, representatives of different countries, and influential people to solve international problems and achieve global goals.

The main purpose of the WEF is to establish an institutional culture based on stakeholder theory. This theory states that companies are accountable to all people and all organizations that may be affected by their activities.

The activity of the forum manifests itself in the organization of annual meetings (regional meetings may also be held more than once a year), whose participants are political leaders, representatives of countries and international organizations, scientists, company managers, journalists, and other influential people. The composition of the participants varies from year to year. More than 100 countries are represented at the meetings on average.

The main goals of the WEF at the present time

Nowadays, the Sustainable Development Goals have been adopted as major goals because they are global and affect all humanity. It is possible to achieve them only through joint efforts, and the effectiveness and success of these efforts directly determine whether humanity will prosper in the future or perish.

Since the main mission of the forum is to bring companies and people together to solve global problems, the SDGs fit exactly into this mission.

The WEF develops many programs and strategies to achieve the SDGs. Specifically, the 2030 Vision, which is a strategic direction to maximize the impact of digital technologies on the SDGs in order to improve countries' progress towards achieving the goals.

According to this strategy, the world may not achieve all of the goals by 2030, so the use of supporting tools, particularly digital technologies, is justified. The 2030 Vision proposes viewing the goals as a system divided into sub-themes rather than individual elements. And the first theme has been chosen: climate adaptation. The initiative intends to have an impact

on problems through three channels: agenda setting, innovation sprints, and system leadership.

Fourth industrial revolution and its relation to WEF's goals

According to Klaus Schwab, humanity will soon be facing a fourth industrial revolution based on the mobile Internet, miniature manufacturing devices, artificial intelligence, and learning machines. What makes the fourth revolution special is that it will be much more comprehensive and faster than the previous ones. Because, the fact that technology is developing very rapidly, a synthesis between the physical, biological, and digital aspects is emerging.

This revolution offers many opportunities for humankind and can contribute to the achievement of sustainable development goals. Such as strong economic growth, improved quality of life, and higher income levels. However, there are also threats that people may face. In particular, cybersecurity problems and the possibility of software hacking and data theft, job cuts - mass layoffs, transhumanism, and more.

In general, technological progress, which is embedded in the fourth industrial revolution, can be an effective tool to help achieve a range of sustainable development goals, such as Goal 8 – Economic growth and decent work, Goal 3 – good health and well-being, and others).

However, humanity must learn to use this tool wisely. Because using it to achieve some goals can lead to the exacerbation and negative progress of others, such as 10 – reducing of inequalities, 1 - no poverty, and others.

In other words, technology can be actively changed to produce progress, but there must also be other approaches that will compensate for the harm it causes.

How does WEF help nations in achieving SDG? Which agreements were signed between the Czech Republic and WEF?

The World Economic Forum cannot enter into legal agreements with countries because it is not a governmental organization. So, the forum actively collaborates with the United Nations and the European Union (the European Commission and the European Parliament), both of which are committed to achieving sustainable development goals, promotes their initiatives through them and have opportunity to make some legal agreements and laws.

In particular, to reduce the use of fossil fuels and reduce carbon dioxide emissions, the European Parliament has decided to ban the sale of cars with internal combustion engines from 2035. This is expected to contribute to progress in achieving environmental goals.

Speaking specifically about agreements or R&D grants between the Czech Republic and the WEF, it is justified to note that no legislative agreements can exist between the Czech Republic and the forum due to its non-governmental position. However, the Czech Republic supports many initiatives emanating from the UN and the EU and creates legislation based on them. Thus, the EU, the UN, and the WEF work together, promoting agendas and concluding relevant agreements.

Of course, the Czech Republic also interacts directly with the WEF. In particular, some Czech companies participate in the programs and meetings of the forum. For example, in 2022, the Czech company MIWA became a member of the Technology Pioneers 2022 initiative for fast-growing companies in the field of innovative technologies.

Changes in the development of main macroeconomic indicators, indicators related to climate change and social indicators of the Czech Republic

1. **No Poverty**

For the first goal, the GNI per capita, poverty rate, and the unemployment rate were analyzed.

GNI has an overall upward trend, especially between 2017 and 2021, when, despite a slight fall in 2020 due to the coronavirus, by 2021 GNI per capita growth resumed to reach the highest level since 1995, at USD 24430.

There is also an overall positive trend with respect to the unemployment rate. It is trending downwards. However, in the period from 2020 to 2021, the unemployment rate was also negatively affected by the crisis caused by the coronavirus pandemic. And unlike GNI, it has not decreased again by 2021, indicating that the impact of the economic crisis is still being felt. Regarding the poverty rate, it also increased by 2019 by 0.1% despite the general downward trend.

Thus, it is justified to say that the Czech Republic's progress in eradicating poverty is generally positive but unstable, as in the last 3 years 2 out of 3 indicators show negative changes, caused, for example, by the coronavirus pandemic.

2. **No Hunger.**

As part of the analysis of the performance of the second SDG, the hunger indicator was analyzed.

According to the statistics given by the World Bank, the poverty rate in the Czech Republic does not change and remains at 2.5% (as of 2021). Therefore, it can be concluded that there is stagnation in the achievement of the second goal.

3. Good health and well-being

Two indicators were assessed in relation to this goal: infant mortality rate and life expectancy rate at birth.

The infant mortality rate is trending downward. From 1995 to 2021 it decreased almost by 3 times, from 7.1 to 2.3 without any dramatic increase during the period. In terms of changes in life expectancy, it has tended to increase, but in 2020 it was affected by the coronavirus pandemic, and life expectancy decreased by one year.

From this, it is possible to say that the Czech government's efforts to reduce mortality and increase life expectancy by improving the quality of medicine can be considered effective. But it was not enough to cope with the enormous strain caused by the pandemic. So the country is making progress toward achieving Goal 3 but it was effected by crisis 2020 as SDG 1.

4. Quality education

To determine the progress in this area, the indicator of the share of educational expenses in the total state budget was chosen.

According to the graph, on average, the government of the Czech Republic spends 9.72% of the state budget on education development. And this rate has been increasing over time. In 2021 it was 10.51%.

It is very important that the government invests in the education system, because it contributes to the development and improvement of the quality of education, which leads to a more developed population with high potential.

As government spending on education increases over time it can be concluded that the Czech Republic is making progress towards achieving the 4 SDGs.

5. Gender equality and 11. Reduced inequalities

The Czech Republic's gender equality index in 2022 is 57.2, which is more than 10 points below the European Union average. The index is on an upward trend from 2019 to 2022, however, the difference between the EU average and the Czech average is increasing.

And although there has been progress, it has been relatively slow. This means that the Czech Republic is not taking enough measures for gender equality. And the problem of gender inequality still exists.

6. Clean water and sanitation

Analysis of the graph showing the clean water access rate showed that from 2000 to 2014 1% of the Czech population got access to clean water. However, from 2014 to 2020, the rate remained unchanged at 97.9% of the population. That means that more than 200 thousand people still do not have an access to clean water. This means that the government is either not taking measures to improve this indicator or they are not effective, and there is no progress towards achieving the 6 SDGs from 2014.

7. Affordable and clean energy

The study showed that in 2021 renewable energy accounted for 12.79% of the total energy produced. Between 1995 and 2007, the increase in this indicator was not stable and had amplitude of change. But after 2007, the indicator began to increase steadily, at about 1% per year, indicating that the Czech Republic is taking steps to increase the amount of energy produced from renewable energy sources. However, after 2016 and up to 2021, the figure was again unstable, but there was still an overall increase in the share of renewable energy in this period. And it can be concluded that the Czech Republic is getting closer to achieving this target.

8. Decent work and economic growth

Three indicators were analyzed to determine the achievement of this goal.

An analysis of the GDP growth rate showed that even though the Czech Republic's GDP is increasing, growth still does not reach the minimum percentage determined by the WEF and the UN of 7%. On average, the Czech Republic has a GDP growth rate of 4.82%. And in 2020, because of the economic crisis due to the coronavirus pandemic, GDP growth was even negative (-5.8%). From this, it can be concluded that although the GDP of the Czech Republic is increasing, its growth is insufficient.

Analysis of the inflation rate showed that currently (2018 - 2021) Czech inflation is increasing, resulting in higher prices.

The minimum wage was also analyzed. It was found that since 2015, the minimum wage in the Czech Republic has been increasing steadily, both in local currency and in U.S. dollars. This means that the population earns more, not only relative to their country but also relative to the global market.

Overall, we can conclude that progress towards the eighth objective in the Czech Republic is mixed. On the one hand, the minimum wage is increasing, but on the other hand, prices are increasing and the national currency is depreciating and economic growth is insufficient.

9. Industry, innovation, and infrastructure

For this SDG, an indicator of how efficiently the Czech Republic uses energy in the production of goods was analyzed. This indicator is critical in this case because increased resource and energy productivity mean that the country is using innovative approaches and developing infrastructure. Also, the efficient use of resources helps to solve both economic and environmental issues.

An analysis of the energy intensity rate has shown that the Czech Republic steadily consumes less and less energy per unit of output. From 1995 to 2018, energy efficiency increased by 54%. From this, it can be concluded that the Czech Republic has made entertaining and steady progress about the 9 SDGs.

10. Sustainable cities and communities

Concerning this goal, the urban population rate was analyzed. It has been recognized that the majority of GDP is accounted for by the urban population. And an optimally high and stable share of the urban population indicates not only favorable urban development but also increases the potential for economic growth. The urban population rate in the Czech Republic has been increasing since 2012, reaching 74.06% in 2020. The overall amplitude of the change was 1.3%, indicating that the share of the urban population of the Czech Republic varies between 73.2% and 74%. This figure is approximately equal to the EU average, indicating a fairly high and stable urban population. This can be assessed as a positive trend in achieving the 10 SDG.

12. Responsible consumption and production

One of the most important indicators about this goal is the consumption of fossil fuels because fossil resources are non-renewable and excessive consumption can lead to serious negative consequences.

Overall, the share of fossil fuels is declining. In 2015, it was less than 80%. However, despite the reduction, the Czech Republic's progress toward this goal is tremendous. Countries such as Sweden and France have fossil fuel use rates of less than 50%.

13. Climate action, 14. Life below water 15. Life on land

It is justified to combine the three objectives into one, as they have one main point - environmental protection.

The CO2 emissions were analyzed. This tends to decrease, from 1995 to 2021 the number of emissions has decreased by more than 200,000 kilotons of carbon dioxide and the amount is still decreasing. However, from 2020 to 2021 this figure has increased. This is due to the fact that in 2020 emissions decreased sharply against the background of reduced production and less human activity in general due to the lockdown. And in 2021 the restrictions were partly lifted, leading to an increase in emissions. Nevertheless, based on the analysis, it can be concluded that the Czech Republic is moving towards this sustainable development goal.

16. Peace, justice, and strong institutions

The crime rate has been analyzed in an analysis of achievements toward the goal. Although it tends to decrease, its changes are not smooth. However, compared to other countries, crime is low in the Czech Republic. So it can be said that there is a progress according this goal.

17. Partnerships for the goals

In terms of the goal, the Czech Republic has progressed for this goal because in its SDG program, for almost every previous goal, a separate paragraph is written about cooperation with other countries and the exchange of experience and information with them.

Correlation analysis results

A correlation analysis between the macroeconomic indicators and the social, and environmental indicators associated with the SDGs has identified how and to what extent these indicators are linked. This is important because it contributes to the understanding of which goals and how they are concretely linked, it also helps to identify unobservable

linkages and to see the Sustainable Development Goals not as a list of 17 separate items, but as a system with interconnected elements.

First of all, it is worth noting that GDP per capita and GNI per capita have similar results. They have a strong negative relationship with CO_2 emissions rate, crime rate, urban population ratio, and infant mortality rate; and a strong positive relationship with renewable energy production rate and life expectancy rate. It can thus be said that the first SDG (GNI per capita) as well as one of the indicators of the eighth SDG (GDP per capita) are strongly correlated with the 3, 7, 13-15, and 16 goals, that is, if the first goal (increase in GNI per capita) and eighth (increase in GDP per capita) have a positive trend in achieving these six goals (the correlation is particularly strong with goals 3 and 16).

Importantly, concerning the relationship between GDP per capita and GNI per capita and the urban population, an interesting correlation was found: with an increase in the proportion of the urban population, there is a decrease in these economic indicators. This may contradict the argument that a larger share of GDP and GNI is accounted for by the urban population and with an increase in the urban population these economic indicators should also increase. Speaking about the unemployment rate, which is correlated with both SDG 1 and SDG 8, it is worth noting that this has a weak relationship with the life expectancy and crime rates (i.e. changes in these indicators are weakly correlated with each other). The results concerning the correlation between urban unemployment and infant mortality did not apply to the whole population, so they cannot be considered. However, a strong correlation was found between this economic indicator and environmental indicators (a direct correlation with CO_2 emissions and an inverse correlation with renewable energy production). Thus, changes in the unemployment indicator are positively correlated with changes in the environmental indicator, i.e., if one indicator changes favorably, the others also change favorably.

Finally, it is worth considering the results concerning the inflation indicator. It is worth noting that inflation has a weak relationship with environmental indicators, but it is strong with social indicators. In particular, when the inflation rate decreases, life expectancy increases, and crime, infant mortality, and urban population decrease. This, as in the case of GNI and GDP, suggests that if the inflation indicator (associated with SDG 8) changes favorably, the indicators associated with SDGs 3, 7, 13-15, and 16 also change favorably. As for the urban population indicator, inflation increases as well, which again creates a kind of conflict in achieving the eighth and tenth SDGs.

6 Conclusion

The main goal of this thesis was to identify the developmental trends in economic performance of the Czech Republic in accordance with WEF's goals.

It was found out that the main objectives of the WEF at present are the goals of sustainable development because it is believed that their achievement is the key to a long and happy life for mankind.

Many countries and organizations have recognized the critical importance of the SDGs and shared the WEF Vision and are taking action. One such country is the Czech Republic.

In 2017, its government adopted a program on Sustainable Development Goals. And now, with about 7 years to go until the deadline, it is justified to analyze how close the Czech Republic's Economic Performance is to achieving each of the SDGs.

It is justifiable to say that the Czech economic performance is not only about economic indicators but also environmental and social. Because it was found that there is a correlation between macroeconomic indicators (related to SDGs 1 and 8) and indicators for the social and environmental SDGs. Thus, it can be concluded that the SDGs are a system of interlinked problems that cannot be solved in isolation. It is necessary to develop complex programs that address several objectives simultaneously, which would increase their effectiveness.

Overall, it was found that while there is a positive change in indicators associated with 12 of the 17 SDGs, but some of the changes are unstable (SDG 1), insufficient (SDG 5, 10, 8), or adversely affected by the COPD 19 pandemic (SDG 1, 3 and 8). There are also those aspects for which there is either no change or insufficient change (SDG 2 and 6). So it can be concluded that in general Czech economic performance is developing according to WEFs' goals but there are aspects that still need a lot of work. And the government of the Czech Republic should make the economic performance development more tangible and sustainable according to the SDGs.

7 References

Brynjolfsson, E. and McAfee, A. (2018) *The Second Machine Age: Work, progress, and prosperity in a time of Brilliant Technologies*. Vancouver, B.C.: Langara College.

Contributors to Wikimedia projects, C.to W. (2019) *Bohemia – travel guide at Wikivoyage*, *Wikivoyage*. Wikimedia Foundation, Inc. Available at: https://en.wikivoyage.org/wiki/Bohemia (Accessed: March 11, 2023).

Corral, D., Álvarez, C. and Gidrón, M. (2023) *Davos Forum 2023: Cooperation in a Fragmented World*, *NEWS BBVA*. BBVA. Available at: https://www.bbva.com/en/whats-happening-davos-forum/ (Accessed: February 8, 2023).

Dornbusch, R. and Fischer, S. (1993) *Macroeconomics*. 6th edn. Mcgraw-Hill College.

Giesen, K.-G. (2018) "Le transhumanisme comme idéologie Dominante de la Quatrième Révolution Industrielle," *Journal international de bioéthique et d'éthique des sciences*, 29(3), p. 189. Available at: https://doi.org/10.3917/jibes.293.0189.

Hasell, J. *et al.* (2022) *Poverty*, *Our World in Data*. Available at: https://ourworldindata.org/poverty (Accessed: December 12, 2022).

Cheever, F. and Campbell-Mohn, C.I. (n.d.) *Sustainable development*, *Encyclopædia Britannica*. Encyclopædia Britannica, inc. Available at: https://www.britannica.com/topic/environmental-law/Sustainable-development (Accessed: February 10, 2023).

Maitah, M. (2015) *Macroeconomics*. Prague, Czech Republic: CZU.

MZV (2017) *Implementace Agendy 2030 pro udrzitely rozvoj v Ceske republice*, *MZP*. Available at: https://www.mpo.cz/cz/prumysl/prumysl-a-zivotni-prostredi/udrzitelny-rozvoj/hodnotici-zpravy-implementace-cr-2030-a-agendy-2030-byly-schvaleny--259640/ (Accessed: January 10, 2023).

No author (2020) *Sustainable development goals (SDG 10): UN Western Europe*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-10/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 11): UN Western Europe*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-11/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 12): UN Western Europe*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-12/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 13): UN Western Europe*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-13/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 14): UN Western Europe*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-14/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 15): UN Western Europe*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-15/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 16): UN Western Europe*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-16/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 17): UN Western Europe*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-17/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 3)*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-3/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 4)*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-4/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 5)*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-5/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 6)*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-6/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 7)*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-7/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 8)*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-8/ (Accessed: March 5, 2023).

No author (2020) *Sustainable development goals (SDG 9)*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-9/ (Accessed: March 5, 2023).

No author (2022) *Gender equality index: 2022: Time: European union*, *European Institute for Gender Equality*. Available at: https://eige.europa.eu/gender-equality-index/2022/domain/time (Accessed: January 11, 2023).

No author (2022) *NMW - National Minimum Wage 2023*, *countryeconomy.com*. Available at: https://countryeconomy.com/national-minimum-wage (Accessed: January 30, 2023).

No author (2022) *Sustainable development goals (SDG 1)*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-1/ (Accessed: March 5, 2023).

No author (2022) *Sustainable development goals (SDG 2)*, *United Nations Western Europe*. Available at: https://unric.org/en/sdg-2/ (Accessed: March 5, 2023).

No author (2022) *WEF. Technology Pioneers 2022*, *World Economic Forum | Technology Pioneers 2022*. Available at: https://widgets.weforum.org/techpioneers-2022/index.html (Accessed: March 5, 2023).

No author (2023) *EU ban on sale of new petrol and diesel cars from 2035 explained: News: European parliament*, *EU ban on sale of new petrol and diesel cars from 2035 explained / News / European Parliament*. Available at: https://www.europarl.europa.eu/news/en/headlines/economy/20221019STO44572/eu -ban-on-sale-of-new-petrol-and-diesel-cars-from-2035-explained (Accessed: February 20, 2023).

No author (2023) *Gross National Income (GNI) definition, with real-world example*, *Investopedia*. Investopedia. Available at: https://www.investopedia.com/terms/g/gross-national-income-gni.asp (Accessed: February 8, 2023).

No author (n.d.) *2030Vision*, *initiatives.weforum.org*. Available at: https://initiatives.weforum.org/2030vision-network/home (Accessed: March 5, 2023).

No author (n.d.) *Economy of the Czech Republic*, *Encyclopædia Britannica*. Encyclopædia Britannica, inc. Available at: https://www.britannica.com/place/Czech-Republic/Economy (Accessed: February 11, 2023).

No author (n.d.) *Health status - infant mortality rates - OECD data*, *OECD*. Available at: https://data.oecd.org/healthstat/infant-mortality-rates.htm (Accessed: February 9, 2023).

No author (n.d.) *The 17 goals | sustainable development*, *United Nations*. United Nations. Available at: https://sdgs.un.org/goals (Accessed: March 5, 2023).

No author (n.d.) *WEF - Water environment federation*, *Water Environment Federation: The Water Quality People*. Available at: https://www.wef.org/publications/news/ (Accessed: February 15, 2023).

No author (n.d.) *WEF History*, *World Economic Forum*. Available at: https://www.weforum.org/about/history (Accessed: March 5, 2023).

No author (n.d.) *WEF mission*, *World Economic Forum*. Available at: https://www.weforum.org/about/world-economic-forum (Accessed: March 5, 2023).

Okalow, S. (2022) *What is poverty? it's not as simple as you think*, *World Vision Canada*. Organization. Available at: https://www.worldvision.ca/stories/child-sponsorship/what-is-poverty#1 (Accessed: October 10, 2022).

Oner, C. (2010) "Back to Basics: What Is Inflation?," *Finance&Development*, 22 March. Available at: https://www.elibrary.imf.org/view/journals/022/0047/001/article-A017-en.xml?ArticleTabs=fulltext (Accessed: May 25, 2022).

Ritchie, H., Roser, M. and Rosado, P. (2020) *Czechia: CO2 country profile*, *Our World in Data*. Available at: https://ourworldindata.org/co2/country/czech-republic (Accessed: March 11, 2023).

Scott, L. (n.d.) *Accelerating sustainable development in the 4th Industrial Revolution*, *PwC*. Available at: https://www.pwc.com/gx/en/services/sustainability/publications/accelerating-sustainable-development.html (Accessed: February 8, 2023).

Schwab, K. (2016) *The Fourth Industrial Revolution*. World Economic Forum.

Team, W. (2023) *Gross national income*, *WallStreetMojo*. Available at: https://www.wallstreetmojo.com/gross-national-income/#h-gni-formula (Accessed: March 5, 2023).

The Investopedia Team (2023) *Gross National Income (GNI) definition, with real-world example*, *Investopedia*. Investopedia. Available at: https://www.investopedia.com/terms/g/gross-national-income-gni.asp (Accessed: January 25, 2023).

Turney, S. (2022) *Pearson correlation coefficient (R): Guide & examples*, *Scribbr*. Available at: https://www.scribbr.com/statistics/pearson-correlation-coefficient/ (Accessed: March 5, 2023).

World Bank (2022) *Czechia*, *Data*. Available at: https://data.worldbank.org/country/czechia (Accessed: March 8, 2023).

Xu, M., David, J.M. and Kim, S.H. (2018) "The Fourth Industrial Revolution: Opportunities and challenges," *International Journal of Financial Research*, 9(2), p. 90. Available at: https://doi.org/10.5430/ijfr.v9n2p90.

8 List of figures, tables, and abbreviations

8.1 List of figures

8.2 List of tables

8.3 List of abbreviations

SDG   Sustainable Development Goals

UN   United Nations

WEF   World Economic Forum

GDP   Gross Domestic Product

GNI   Gross National Income

9 Appendix

Table 4. Indicators of correlation analysis

GDP/cap.	GNI/cap.	Unemp. R	Inflation R	Ren. En. Prod.	CO2	Life expect.	Crime rate	Urban popul.	Infant	
11711	5980	0,0389	0,0876	0,0354	126740	74	1,67	0,7451	7,1	1996
11663	6160	0,0427	0,0860	0,0342	124790	74,1	1,81	0,7438	6,3	1997
11632	6110	0,0590	0,1070	0,0307	118920	74,5	1,69	0,7425	5,8	1998
11805	6110	0,0849	0,0214	0,0368	111950	74,6	1,67	0,7412	5,1	1999
12312	6340	0,0876	0,0378	0,0313	123170	75	1,86	0,7399	4,9	2000
12734	6350	0,0799	0,0466	0,0347	122720	75,1	1,31	0,7388	4,5	2001
12959	6650	0,0702	0,0190	0,0395	118530	75,2	1,36	0,7381	4,4	2002
13428	8110	0,0754	0,0012	0,0227	122770	75,1	1,59	0,7374	4,1	2003
14070	10260	0,0821	0,0276	0,0327	123440	76	1,31	0,7367	3,9	2004
14978	12480	0,0793	0,0186	0,0382	119990	76,2	1,05	0,736	3,7	2005
15948	14000	0,0715	0,0253	0,0421	120600	76,5	1,26	0,7353	3,6	2006
16739	15850	0,0532	0,0285	0,0389	123620	76,6	1,22	0,7346	3,4	2007
17046	18510	0,0432	0,0636	0,0448	118310	76,7	1,09	0,7339	3,2	2008
16160	18840	0,0666	0,0102	0,0570	111170	76,7	0,9	0,7332	3	2009
16506	19400	0,0728	0,0147	0,0692	112250	77	0,98	0,7326	2,9	2010
16761	19460	0,0671	0,0192	0,0835	109170	77,6	0,81	0,7319	2,7	2011
16607	19440	0,0698	0,0329	0,0930	106070	77,8	0,99	0,732	2,6	2012
16593	19410	0,0695	0,0144	0,1082	101150	77,9	0,85	0,7329	2,6	2013
16951	18900	0,0611	0,0034	0,1078	97510	78,8	0,76	0,7338	2,5	2014
17829	18370	0,0505	0,0031	0,1140	99140	78,5	0,83	0,7348	2,5	2015
18247	17670	0,0395	0,0068	0,1145	101730	79	0,61	0,7357	2,5	2016
19139	18310	0,0289	0,0245	0,1123	101830	78,9	0,62	0,7368	2,6	2017
19689	20560	0,0224	0,0215	0,1086	100900	78,9	0,7	0,7379	2,6	2018
20206	22120	0,0201	0,0285	0,1175	96290	79,1	0,91	0,7392	2,5	2019
19048	21800	0,0255	0,0316	0,1296	91850	78	0,72	0,7406	2,5	2020

Own work based on data from World Bank