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SUPPORT FOR SUSTAINABLE DEVELOPMENT

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DEVELOPMENT AND ADMINISTRATION OF BORDER AREAS OF THE CZECH REPUBLIC AND POLAND

SUPPORT FOR SUSTAINABLE DEVELOPMENT

Conference Proceedings of RASPO 2022

Editor

Eva Ardielli

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DEVELOPMENT AND ADMINISTRATION OF BORDER AREAS OF THE CZECH REPUBLIC AND POLAND - SUPPORT FOR SUSTAINABLE DEVELOPMENT

Conference Proceedings of RASPO 2022

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DEVELOPMENT AND ADMINISTRATION OF BORDER AREAS OF THE CZECH REPUBLIC AND POLAND - SUPPORT FOR SUSTAINABLE DEVELOPMENT

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Prologue

Dear readers,

this is the Proceedings of papers that were presented at the 5th International Scientific conference “Development and Administration of Border Areas of the Czech Republic and Poland - Support for Sustainable Development” (RASPO) organized by the Department of Public Economics, Faculty of Economics of the VSB - Technical University of Ostrava. The Scientific Conference RASPO was organized on September 8, 2022. This year's RASPO conference was realized from the project "Increasing the knowledge and skills of university students in the field of implementation of public policies in the Czech Republic and Poland and improving their applicability in the labor market" No. CZ.11.3.119/0.0/0.0/16_013/0003093, that was co-financed from the sources of EFRR within the programme INTERREG V-A Czech Republic – Poland through the Fund of microprojects 2014 – 2020 of the Euroregion Silesia.

The conference RASPO traditionally responds to common issues of the Czech-Polish border and the most discussed topics usually include economic and social challenges of sustainable development, economics and public services at the local level, sustainable public administration and cross-border cooperation, culture and education and environmental education.

Academics and students from Czech and Polish universities shared their professional experience and scientific research in real time. Many topics included the issue of Ukrainian migration, impacts of the pandemic and the health of the population. This Proceedings of the RASPO 2022 conference include the peer-reviewed papers that have been successful in the review procedure and were approved by the Scientific Committee for publication.

Ostrava, August 2022

Iveta Vrabková
Head of the Department of Public Economics
Faculty of Economics
VSB-TUO

Prologue in Czech

Vážení čtenáři,

máte v rukou sborník příspěvků, které byly prezentovány na 5. mezinárodní vědecké konferenci „Rozvoj a správa příhraničních oblastí České republiky a Polska - podpora udržitelného rozvoje“ (RASPO) pořádané Katedrou veřejné ekonomiky, Ekonomické fakulty VSB - Technické univerzity Ostrava.

Vědecká konference RASPO se konala 8. září 2022. Konference RASPO byla realizována v rámci projektu „Zvýšení znalostí a dovedností vysokoškolských studentů v oblasti implementace veřejných politik v České republice a Polsku a zlepšení jejich uplatnitelnosti na trhu práce“ reg. č. CZ.11.3.119/0.0/0.0/16_013/0003093, který byl spolufinancován z prostředků Evropského fondu pro regionální rozvoj z Programu INTERREG V-A Česká republika – Polsko prostřednictvím Fondu mikroprojektů 2014-2020 v Euroregionu Silesia.

Konference RASPO tradičně reaguje na společné problémy česko-polského pohraničí a mezi nejdiskutovanější témata obvykle patří ekonomické a sociální výzvy udržitelného rozvoje, ekonomika a veřejné služby na místní úrovni, udržitelná veřejná správa a přeshraniční spolupráce, kultura a vzdělávání a environmentální výchova.

Akademici a studenti českých a polských univerzit sdíleli své odborné zkušenosti a vědecké poznatky. Mnoho témat zahrnovalo ukrajinskou migraci, dopady pandemie a zdraví populace. Tento sborník konference RASPO 2022 obsahuje recenzované příspěvky, které uspěly v recenzním řízení a byly vědeckou komisí schváleny k publikaci.

Ostrava, srpen 2022

Iveta Vrabková
vedoucí Katedry veřejné ekonomiky
Ekonomická fakulta
VSB-TUO

Prologue in Polish

Szanowni Czytelnicy,

trzymacie w swoich rękach materiały konferencyjne zawierające artykuły wygłoszone na V Międzynarodowej Konferencji Naukowej "Rozwój i administracja obszarów przygranicznych Republiki Czeskiej i Polski – wspieranie zrównoważonego rozwoju" (RASPO) zorganizowanej przez Katedrę Gospodarki Publicznej, Wydziału Ekonomii, VSB - Uniwersytetu Technicznego Ostrawa.

Konferencja naukowa RASPO odbyła się 8 września 2022 r. i została sfinansowana z projektu „Podnoszenie wiedzy i umiejętności studentów wyższych uczelni w zakresie realizacji polityk publicznych w Czechach i Polsce oraz poprawy ich stosowalności na rynku pracy" nr CZ.11.3.119/0.0/0.0/16_013/0003093, współfinansowany z EFRR przez Program Interreg V-A Republika Czeska - Polska poprzez Fundusz Mikroprojektów na lata 2014-2020 w Euroregionie Silesia.

Konferencja RASPO tradycyjnie odpowiada na wspólne problemy czesko-polskiego pogranicza, a do najczęściej poruszanych tematów należą zazwyczaj ekonomiczne i społeczne wyzwania zrównoważonego rozwoju, gospodarka i usługi publiczne na poziomie lokalnym, zrównoważona administracja publiczna i współpraca transgraniczna, kultura i edukacja oraz edukacja ekologiczna.

Pracownicy naukowi i studenci z czeskich i polskich uczelni dzielili się swoim doświadczeniem zawodowym i wiedzą naukową. Wśród wielu tematów znalazły się m.in. migracja z Ukrainy, wpływ pandemii i zdrowie populacji. Niniejsze materiały konferencyjne RASPO 2022 zawierają artykuły, które zostały pomyślnie rozpatrzone w procesie recenzowania i zatwierdzone do publikacji przez konferencyjny komitet naukowy.

Ostrawa, sierpień 2022 r.

Iveta Vrabková
Kierownik Katedry Gospodarki Publicznej
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Content

Multi-Criteria Evaluation of Health Care Performance in the Czech Republic and Poland

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Abstract

Health is considered as the most important value in a person's life. It follows, therefore, that health care evaluation is very important aspect from a societal point of view. Evaluating of health care is an essential component to determine the functioning of national health care system and to improve its performance. The paper is focused on the evaluation and comparison of health care performance in the Czech Republic and Poland based on a multicriteria analysis. The research is monitoring the selected health care indicators for the period of six years from 2014 to 2019. The obtained data are processed by TOPSIS method. the output of the research is the ranking of the countries of the European Union according to the level of health care performance, the results of the Czech Republic and Poland are also compared. Based on the results achieved it was found that the Czech Republic is one of the above-average EU countries in terms of health care performance in the period under review and that the performance of health care in the Czech Republic is on the higher level than in Poland.

Keywords: *Czech Republic, health care systems, health indicators, Poland, performance, TOPSIS*

JEL Classification: *C10, I14, I15, I18*

1 Introduction

Performance is used in a variety of fields from sports to economic matters. And the use of performance evaluation methods is indicated at all levels of government (Taticchi, 2014; Suleimenova, 2018 or Vodáková, 2016). However, even though the term is so widespread, there is no clear definition. Wagner (2009, p. 17) states that performance means a characteristic that describes the way in which the surveyed entity carries out a certain activity, based on similarity with the reference way of performing (the course of) this activity. The interpretation of this characteristic presupposes the ability to compare the investigated and the reference phenomenon in terms of a set criterion scale.

Performance measurement is a crucial activity for any organization in the purpose of improving its performance (Sorooshian et al. 2015). It is a process of creating indicators of the fulfillment of predetermined goals and comparing the actually achieved performance with these indicators (Oncioiu et al., 2022). It can be said that it is

a complex of interconnected elements including the target and the object of measurement, the subject of measurement, measuring tools and methods or a set of monitored scales (Rojas-Lema et al., 2021; Taticchi, 2014). The main reason and also the goal of performance measurement is to achieve the planned performance of the organization (Vodáková, 2016). However, there are many reasons why measurements are made. The most important reasons for the measurements reported by Wagner (2009) are that measurement has the function of supporting comparison - the ability to compare the characteristics of objects regardless of measurability.

Performance measurement is used in the field of health care evaluation, see Grigoroudis, Orfanoudaki and Zopounidis (2012), Barták (2012) or Elg, Palmberg Broryd and Kollberg, (2013). In the context of healthcare, performance is used to make an overall assessment of healthcare activities. The extent to which resources are used in health care is mainly assessed. It is used to achieve the best results in specific conditions, while the most favorable result is considered to be the achievement of the best possible health, the highest possible responsiveness, and the most favorable financing (Holčík, Kaňová and Prudil, 2015). According to Smith, Mossialos, Papanicolas and Leatherman (2010), performance measurement seeks to monitor, evaluate and communicate the extent to which all aspects of the health system meet key objectives. According to WHO (2000), health care performance can be measured by three indicators: responsiveness, better health and fairness of financial contribution. Responsiveness means how the health system works in relation to non-health aspects and whether the population's expectations of how they should be treated are met. Better health is the primary goal of the health system, while Maaytová (2012) claims that it can be measured, for example, by means of life expectancy indicators. The fair financing index focuses on correct and decent financing. Maaytová (2012) says that traditional indicators are used to evaluate health care performance, such as life expectancy, infant mortality, health care costs, number of doctors, patient satisfaction with the quality of health care, or waiting time. By contrast, according to Papanicolas and Smith (2013), health care performance mainly concerns the areas of population health, health outcomes, health justice, financing justice, and responsiveness to health system situations. Population health includes life expectancy, mortality by age groups or population risk factors.

The aim of this paper is to evaluate the performance of health care in the Czech Republic and Poland on the basis of selected health care indicators for the period of six years from 2014 to 2019 through a selected method of multicriteria evaluation - TOPSIS.

The reason for choosing these countries is their mutual social and economic affiliation and the use of the same model of health care financing models. The Bismarckian model is based on general health insurance (Janečková and Hnilicová, 2009). In this model, health care is guaranteed by the state in such a way that there is a statutory obligation to pay premiums to the health insurance fund, which is managed by the health insurance company. The principle of solidarity applies here, which means that everyone pays according to their income and then receives health care according to their needs, while the scope and quality of care provided is determined by the doctor. The predominant method of payment here is payment for performance, which is usually combined with capitalization payment, see Ardielli, Bémová (2021) and Durdisová (2005). This model is used, among others, by the Czech Republic, but also by other EU countries such as Germany, Switzerland, Poland (Durdisová, 2005). In terms of use, this model is most often represented in EU countries.

For the purposes of presented research, hypothesis H1 and H2 were set as follows:

- *H1: The Czech Republic is one of the above-average EU countries in terms of health care performance in the period under review.*
- *H2: The performance of health care in the Czech Republic is on the higher level than in Poland.*

The assumption for hypothesis H1 and H2 is that the performance of health care in the Czech Republic is at a high level based on the OECD assessment, as the Czech public health insurance system provides general health care, extensive paid services, high access to health care and financial protection of citizens (OECD, 2019).

2 Health Policy in the Czech Republic and Poland

Health policy means a purposeful activity of the state, which is focused on the protection, restoration and support of the health of the population (Pekarová, 2017). However, the purpose of this policy is not only to restore and retrieve the health of individuals, but also to prevent disease (Krebs, 2015). The mission and goal of this policy is to create and improve living conditions and the environment so that people can live a healthy life and strive for the right choice of a healthier way of life, which will lead to an improvement in the social and natural environment (Stoewen, 2017; Holčík, 2010).

This is a coordinated effort of many institutions, bodies and organizations at global, European, national, regional and local levels. At the international level, for example, the WHO, the OECD and the EU dominate. The creation

of international health policy is based primarily on the strategies of international comparative studies or the creation of databases that make available indicators related to health care in individual countries (Fabreau et al., 2018; Potůček et al., 2005). At EU level, these can be, for example, EU recommendations or various EU strategies implemented by competent authorities, Member States, regional and local authorities or interest groups. These EU strategies include the "Together for Health - A Strategic Approach for the EU" (EUR-Lex, 2022), the anti-alcohol strategy and the anti-drug strategy (EUR-Lex, 2022). At the national level, the main functions are taken over by the central state bodies, which are the government, ministries and the parliament. The scope of their work is to create concepts and strategies, national programs or legislative processes in the country (Potůček et al., 2005). The main instruments of health policy are systems of laws, norms and standards, financial resources, institutions and mutual negotiations between health care participants (Gladkij, 2003).

2.1 Health Care in the Czech Republic

Health is enshrined in the Constitution of the Czech Republic as one of the basic human rights (Hamplová, 2019). Health is multidimensional and is defined by various criteria such as life expectancy, ability to work, the need for medical care, and the ability to meet personal and social needs of individuals (McCartney et al., 2019; Fuchs, 2018). Čeledová et al. (2017) state that health is the basis of a quality, fertile and full - fledged life, and understanding this concept will improve people's health. It is also an inevitable condition for a successful social and economic life (Stoewen, 2017).

The content of health care is mainly including activities aimed at treatment, but also activities aimed at disease prevention, but only those, that can be provided by the health system (Durdisová, 2005). Health care in the Czech Republic is characterized in § 2 of Act No. 372/2011 Coll., "On health services and conditions of their provision", as amended (the Health Services Act) as a "set of activities and measures aimed at prevention, detection or elimination of the disease, maintenance, restoration and improvement of health status, prolongation of the life expectancy of the individual, assistance in reproduction and childbirth and assessment of health status." Furthermore, health services mean preventive, diagnostic, curative, nursing and other health services performed by health professionals and professional medical examinations in accordance with the Act on the Protection of Health from the Harmful Effects of Addictive Substances (Sbírka listin, 2022).

According to the type of facility and specialization, health care can be divided into primary, specialized secondary and super specialized tertiary (Durdisová, 2005). These three types of health care form a pyramid of health services in terms of efficiency and economy, and the resulting availability and consumption of these services (Gladkij, 2003).

The health care system in the Czech Republic is based on solidarity and the availability of health care for citizens (Jarošová, 2007). Since the early 1990s, there has been a system of health insurance, which is mandatory, with insurance companies acting as payers and purchasers of health care for their policyholders (Barták, 2012).

The main strategy in the field of health in the Czech Republic is currently the "Health Strategy 2030" (MZČR, 2021), which sets the direction within the development of health care for the Czech population in the decade from 2020 to 2030. In connection with this strategy it is expected the improving the health of the population, optimizing of the health system and promoting science and research.

The basic resolution of the Czech Republic is the Charter of Fundamental Rights and Freedoms (LZPS). According to LZPS Art. 31 "everyone has the right to health protection. On the basis of public insurance, citizens have the right to free health care and medical aids under the conditions stipulated by law". In addition to LZPS, there are also a large number of legislative documents regulating health care in the Czech Republic. These are, for example, the Constitution of the Czech Republic, Decree No. 98/2012 Coll., On medical documentation, Act No. 374/2011 Coll., On the emergency medical service, Government Regulation No. 307/2012 Coll., On local and time availability health services, Decree on the determination of point values, the amount of reimbursement of paid services and regulatory restrictions, Act No. 372/2011 Coll., on health services and the conditions for its provision and others (Sbírka listin, 2022).

Health care in the Czech Republic is financed from three main sources: health insurance companies, public budgets and households. Other sources of health care financing in the Czech Republic are private sources. Health insurance companies pay for 80 % of health care. They started their activities in 1993, when a total of 12 insurance companies were operating in the Czech Republic. Currently there are a total of seven health insurance companies operating in the Czech Republic, of which one is a general health insurance company and six are employee health insurance companies (MZČR, 2021).

Pursuant to Act No. 48/1997 Coll., On Public Health Insurance and on Amendments to Certain Related Acts, health insurance payers are insured persons, employers and the state. An insured person is a payer of insurance

premiums if he or she is an employee or a self-employed person and has a permanent residence in the territory of the state. The employer pays the premium for his employees. The state is a payer of insurance premiums in the case of, for example, dependent children, recipients of parental allowance, job seekers or students (Sbírka listin, 2022).

The health care in the Czech Republic is mainly financed from public sources, when in 2019 expenditures on health care from public budgets accounted for 82.84 % of all expenditures, while the expenditures of health insurance companies are also included here. Household expenditures in 2019 represented a total of 13.34 % and the smallest part of 3.82 % is represented by private sources.

2.2 Health Care in Poland

In Poland, the right of every citizen to health protection and equal access to publicly funded health care services is guaranteed in the Constitution of the Republic of Poland, 1997 (SEJM, 2022). There are many other legislative documents regulating health care system in Poland, for example: Act No. 2021.0.1285, On health care services financed from public funds, Act No. 2021.0.1956, On the public health, Act No. 2021.0.790, On the professions of doctor and dentist, Act No. 2021.0.2053, On the public emergency medical service.

According to the Act on health care services financed from public funds the health care system is organized in accordance with the principles of: equal treatment, social solidarity, ensuring the choice of healthcare providers (Journal of Laws, 2004). The system is mandatory, and its universality is evidenced by the fact that about 90 % of citizens participate in it (Paszkowska, 2020).

Thanks to the health care system, it is possible to implement the health policy of the state, which can be defined as activities aimed at improving health, satisfying health needs and providing health services (Sygit, 2017). The health services provided to patients are human-based and therefore very diverse, and their quality depends largely on the knowledge, experience, competence or even empathy of the medical employee (Krawczyk-Sołtys, 2013).

Since 1999, the Polish health care system has been based on an insurance model and for the first four years there were 17 Health Insurance Funds in it. Since 2003, the only entity operating this system is the National Health Fund. It distributes revenues from the contributions of insured persons and is responsible for concluding contracts for the provision of health services with public and non-public service providers (WHO, 2011). Every citizen is entitled to guaranteed benefits under: primary and outpatient health care, hospital treatment, psychiatric care and addiction treatment, therapeutic rehabilitation, emergency medical services and many others (Paszkowska, 2020).

Expenditure on health care in Poland is financed from several sources, with public expenditure having a significant share in this expenditure. In 2019, they accounted for 71.8 % of total expenses, and 61.8 % came from a mandatory insurance system. More than 1/5 of the expenditure was financed by households, and 8.1 % by other private entities. It should be emphasized that public spending on health care in Poland in 2020 accounted for only 5.2 % of GDP. Gradually, however, this indicator is increasing (GUS, 2021).

3 Material and Methods

The aim of this paper is to evaluate the performance of health care in the Czech Republic and Poland on the basis of selected health care indicators for the period of six years from 2014 to 2019 through a selected method of multicriteria evaluation - TOPSIS. For the purposes of this research, hypothesis H1 and H2 were set as follows:

H1: The Czech Republic is one of the above-average EU countries in terms of health care performance in the period under review.

H2: The performance of health care in the Czech Republic is on the higher level than in Poland.

Models of multicriteria decision-making are mainly used in solving decision-making problems, where the consequences of decision-making are evaluated according to several criteria. Almost every decision-making situation is characterized by multi-criteria. Considering multiple criteria brings problems and conflicts resulting from the inconsistency of these criteria. The aim of multicriteria models is to find the best variant from all possible points of view, to exclude inefficient variants, or to arrange a set of variants (Šubrt, 2019). However, these criteria are not mutually consistent, and thus the option best rated under one criterion may not have the best rating under another criterion. The specific goal may be the selection of one of the variants that will become the basis for the final decision (Jablonský, 2007).

The output of the research is a comparison of health care performance in the Czech Republic and Poland based on selected health care indicators, and therefore this work uses a model of sorting a set of variants, from which variants (EU countries) are sorted according to the relative distance indicator from best to worst.

3.1 Model and Data

The research is based on the usage of methods of multicriteria evaluation of variants, which are used in modeling the tasks of multicriteria decision making. An important method of multicriteria evaluation is the TOPSIS method (The Technique for Order of Preference by Similarity to Ideal Solution) which has been applied for the purposes of this research. The advantage of TOPSIS over other multicriteria models is its simplicity, good computational efficiency and the ability to measure relative performance for each variant in a simple mathematical form (Ardielli, 2019).

The sample of data consists of 28 EU countries, including the United Kingdom. The United Kingdom is included in this sample, as it was part of the EU in 2014-2019, when health care indicators are monitored. At present, the EU consists of a total of 27 countries. Selected health indicators for the performed multi-criteria analysis are health care indicators and health status indicators. These are the following 9 indicators, which are monitored in the Eurostat database (Eurostat, 2022):

- Health care expenditure (% of GDP)
- Number of beds (100,000 inhabitants)
- Number of doctors (100,000 inhabitants)
- Share of nurses on total employment (%)
- Healthy life years (in years)
- Health expectancy at birth (in years)
- Health expectancy at 65 (in years)
- Gross mortality (1,000 inhabitants)
- Infant mortality rate (1,000 live births)

The analysis of selected health care indicators is performed for the monitored period from 2014 to 2019, when the averaged values for the above six years are applied as input data. The averaging of values is performed due to the higher informative value of the result, which thus captures the situation for the entire period under review. The latest data obtained are for 2019, as complete and comparable data for individual EU countries were not available in the following years. The main data sources for the presented research were obtained from Eurostat (Eurostat, 2022), OECD (OECD, 2019) and the World Bank (World Bank, 2022).

3.2 Methods

The TOPSIS method is one of the methods of multicriteria decision-making, specifically it falls under methods based on minimizing the distance from the ideal variant and maximizing the distance from the basal variant (Šubrt, 2019; Jablonský, 2007). The TOPSIS method can therefore be expressed as a technique for ordering preferences according to the similarity of an ideal solution. The TOPSIS method can be used to evaluate the performance or quality of services and programs in the public and private sectors. This method is a suitable tool for the process of selection or evaluation of a defined segment in terms of evaluation criteria, whether qualitative or quantitative. This process is considered to be one of the most important factors affecting the performance of the organization, and therefore the sector of the national economy (Vrabková et al, 2021).

The process of TOPSIS procedure is as follow:

- data are organized into the criteria data matrix
- the normalized data matrix is created
- weight normalized data matrix is created
- determination of the ideal and basal variant relative to the matrix values
- distance calculation of variants from the ideal variant, respectively basal variant is made

Calculation of the relative distance indicators of individual variants from the basal variant was performed according to formula (1):

$$c_i = \frac{d_i^-}{d_i^+ + d_i^-} \quad (1)$$

where $i = 1,2, \ldots m;$

The values of the result of the relative distance indicator c_i range from 0 to 1, where the value 0 indicates the basal value and the value 1 acquires the ideal variant. Subsequently, the variants are sorted in descending order according to the values of the relative distance index c_i and the number of variants with the highest values is considered to be the final solution to the problem (Ardielli and Bémová, 2021; Šubrt, 2019).

When calculating the TOPSIS method, it is important to determine the weights of individual indicators (criteria), which reflect the relative importance. Weights can be determined using the point method, the Saaty method, or the Fuller triangle (Vrabková et al, 2021). The scoring method was used in the presented research. The scoring method is one of the basic methods for determining the weights of individual input indicators. It is used to give the importance of criteria in the selected scoring scale, mostly from 1 to 10. The more important the criterion, the higher the scoring and vice versa (Jablonský, 2007).

4 Results and Discussion

The presented chapter focuses on multi-criteria analysis and evaluation of health care performance in EU countries in 2014–2019 using the multi-criteria method TOPSIS. It includes an evaluation of health care performance in the Czech Republic and Poland and a comparison of the results of both countries. The significance of individual indicators within the multicriteria analysis was determined by the weight assignment through the scoring method. In the Tab. 1 are shown the set weights and assignment of points to individual health care input indicators (criteria).

Table 1 – Weights of individual indicators

Indicator I_1 – I_9	**Score**	**Weight of indicator**
Health care expenditure (I_1)	7	0.16667
Number of beds (I_2)	5	0.11905
Number of doctors (I_3)	6	0.14286
Share of nurses on total employment (I_4)	6	0.14286
Healthy life years (I_5)	4	0.09524
Health expectancy at birth (I_6)	3	0.07143
Health expectancy at 65 (I_7)	3	0.07143
Gross mortality (I_8)	4	0.09524
Infant mortality rate (I_9)	4	0.09524

Source: Eurostat (2022), OECD (2019), WHO (2022), own processing

The input data for the multi-criteria analysis using the TOPSIS method were processed as averaged values of selected health care indicators for the six-year period 2014–2019.

In Tab. 2 is shown descriptive statistic of the relative distance indicator c_i. The minimum value detected is 0.29, the maximum value is 0.70. The average of EU countries reaches the value of 0.49. The standard deviation is 0.10. The results show that the differences between countries are significant. The Czech Republic is above average with a value of 0.54 while Poland is below average with a value of 0.39. The average value of EU countries is exactly 0.488945.

Table 2 – Evaluation of TOPSIS method outputs using descriptive statistics

Descriptive statistics indicator	**Weight of indicator**
Max-min difference	0.41
Minimum	0.29
Maximum	0.70
Standard deviation	0.10
Total	13.69
Average	0.49

Source: Eurostat (2022), OECD (2019), WHO (2022), own processing

The following Tab. 3 shows the order of the EU countries sorted according to the relative distance indicator c_i. Based on these results, it is clear that Germany (0.69964), Austria (0.69701) and Finland (0.62730) perform best in terms of health care performance in the period under review. By contrast, Romania (0.28938), Latvia (0.30463) and Bulgaria (0.34268) had the lowest values. The Czech Republic (0.53947) ranked 8th in health care performance and Poland (0.38995) ranked on 23rd position.

Table 3 – Evaluation of health care performance in EU countries using the TOPSIS method in 2014–2019

Position	Country	c_i
1	Germany	0.69964
2	Austria	0.69701
3	Finland	0.62730
4	Belgium	0.61221
5	France	0.59324
6	Sweden	0.57152
7	Ireland	0.55462
8	Czech Republic	0.53947
9	Netherlands	0.53549
10	Denmark	0.52849
11	Slovenia	0.51840
12	Malta	0.50806
13	Cyprus	0.50104
14	Greece	0.49679

Position	Country	c_i
15	Spain	0.48443
16	Portugal	0.48129
17	Italy	0.47547
18	United Kingdom	0.46853
19	Slovakia	0.44110
20	Luxembourg	0.44061
21	Lithuania	0.41758
22	Estonia	0.40765
23	Poland	0.38995
24	Croatia	0.38480
25	Hungary	0.37909
26	Bulgaria	0.34268
27	Latvia	0.30463
28	Romania	0.28938

Source: Eurostat (2022), OECD (2019), WHO (2022), own processing

In Tab. 4 is shown the comparison of the performance indicators in the Czech Republic and Poland with the EU average. The Czech Republic reaches the above-average values in indicators I_2, I_3, I_5 and I_9. In case of indicators I_1, I_4, I_6, I_7 and I_8 are the values below the EU average. Poland is above average only in indicator I_2, in all other indicators it shows values lower than the EU average.

Table 4 – Comparison of the performance indicators in the Czech Republic and Poland

	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_9
EU average	8.30	493.70	375.03	1.95	61.85	73.47	14.71	10.31	3.58
Czech Republic	7.40	664.00	402.00	1.92	62.75	72.10	13.40	10.38	2.60
Poland	6.41	653.83	236.39	1.43	58.05	68.90	11.70	10.43	3.97

Source: Eurostat (2022), OECD (2019), WHO (2022), own processing

The Czech Republic ranked 8th in health care performance. In terms of health care expenditures, the Czech Republic ranked 18th with a value of 7.40% of GDP. Poland ranked 25th in this indicator with a value of 6.41 Expenditure is desirable to be maximizing in nature, as the more the expenditure, the better the health care delivery the country will have, and more spending will also lead to better health care delivery, which can strengthen human capital and contribute to economic performance. Increasing health care spending has a positive impact on economic performance (Frontiers, 2022).

The Czech Republic had an above-average number of beds, namely 664 beds per 100,000 inhabitants, thus gaining 7th place in the ranking. Poland is in 8th place with a value of 654 beds per 100,000 inhabitants. Both countries ranked above-average. In connection with the number of physicians, the Czech Republic had an above-average number of 402 physicians per 100,000 inhabitants, thanks to which it ranked 10th, with the share of nurses in total employment it gained 15th place with a value of 1.92 %. Poland reaches the number of doctors at 236 physicians per 100,000 inhabitants. With this value, it ranks on the last position within the EU countries. The share of nurses in total employment reaches a value of 1.43 %, which represents the 23th position.

The number of beds needs to be as high as possible, but to the extent that the beds are used properly and inefficient, as the hospital should not face a situation where it will be forced to reject a patient due to low bed occupancy (Science Direct, 2022). A similar situation occurs with the number of doctors and nurses. Doctors are the cornerstone. Although the increase in doctors is guaranteed to improve the health system, it can improve

overall access to healthcare (Healthaffairs, 2022). Nurses make up the largest part of the medical profession and the profession is still in short supply due to the absence of potential educators, high turnover and unfair distribution of the workforce. Lack of caregivers leads to errors, higher morbidity and mortality (NCBI, 2022).

Mortality in the Czech Republic was 10.38 per 1,000 inhabitants, so position of the Czech Republic among EU countries reached 17th place. On the contrary, in terms of infant mortality, the Czech Republic performed well and ranked 6th with a value of 2.60 per 1,000 live births. Mortality in Poland reaches 10.43 per 1,000 inhabitants and ranked on 18th position. Infant mortality in Poland reaches 3.97 per 1,000 live births and ranked on 23th position.

The Czech Republic also reached above-average values in connection with the indicator of healthy life years, when it placed on 12th position in the ranking with an age of 62.75. Poland placed on the position 20 with an age of 60.13 years. Concerning the indicators life expectancy at birth and life expectancy at age 65, the Czech Republic placed on the18th position in both of these indicators. The value of life expectancy at birth reached 72.1 and life expectancy at age 65 reached value of 11.7 years. Poland reached in case of life expectancy at birth the value 78.3 years and placed on the position 22. In case of life expectancy at age 65 the value was 18.25 and placed on the position 22 also. For years of healthy living, life expectancy at birth and at the age of 65, it is clearly desirable to have the highest possible value, as a healthy state of health also confirms how well the health care is provided in the country. On the contrary, it is desirable to minimize mortality and infant mortality due to the performance of the provided health care.

Based on the research outputs hypothesis H1 was confirmed. *The Czech Republic is one of the above-average EU countries in terms of health care performance in the period under review.* These results are in line with the OECD's good assessment of the country which states that the Czech health insurance system provides general health care, a wide range of paid services, a high level of accessibility and good financial protection of citizens (OECD, 2019).

Hypothesis H2 was also confirmed. *The performance of health care in the Czech Republic is on the higher level than in Poland.* While the Czech Republic ranked above average based on a multi-criteria analysis (8th position among EU countries), Poland ranked below average (23rd position among EU countries).

The achieved results are also in accordance with the studies of various national or international organizations and other authors, see European Commission (2022), OECD (2019), OECD (2021), NZIP (2022), WHO (2021). In Ardielli and Bémová (2021) the EU member countries were clustered according to the performance of health care based on the Cluster analysis, Ward´s method. In this research, the Czech Republic belonged to the group of countries with an above-average level of health care performance, while Poland was placed in the group of below-average countries. Both the Czech Republic and Poland are among the countries that have low expenditures on health care, but in some indicators they are above average in EU countries (number of beds) unfortunately, however, there is a shortage of healthcare workers, which can lead to inefficiencies due to resource mismatches (PwC, 2021).

5 Conclusion

Evaluating healthcare performance in EU countries is important to understand how the healthcare system works in each country. Good knowledge of the functioning of the systems in each country leads to more effective proposals for improving healthcare for patients (European Commission, 2022). According to Fuchs (2018), comparing performance between countries is an important topic at all levels of government. International comparisons of health systems are increasingly prevalent due to the growing availability of comparable data sets and the growing demand for accountability (Fabreau et al., 2018; Papanicolas and Smith, 2013).

The aim of the research was to evaluate the performance of health care in the Czech Republic and Poland in the years 2014–2019 using the multicriteria method TOPSIS. The research was supported by two hypotheses. Hypothesis H1 was confirmed, the healthcare system in the Czech Republic is at an above average level compared to other EU countries. The Czech Republic performed well in terms of the number of beds, the number of doctors, years of healthy living and infant mortality. On the contrary, in comparison with other EU countries, the Czech Republic performed worse in terms of health care expenditures, in the share of nurses in total employment, in life expectancy at birth, life expectancy at age 65. It approached the average with respect to the gross mortality rate. Regarding mortality in the Czech Republic, almost half of deaths in 2019 were caused by poor eating habits. The density of doctors in the Czech Republic is relatively high, but the problem is the availability of nurses, which became apparent during the Covid-19 pandemic. Expenditures on health care in the Czech Republic are below average, in 2014 they were 0.78 % of GDP, but in 2019 they increased by 0.52 % of

GDP. The Czech Republic is lagging behind in funding for healthcare. This underfunding is currently reflected in the state of some Czech hospitals (NZIP, 2022).

Hypothesis H2 was also confirmed. While the performance of health care in the Czech Republic is above average in EU countries (8th position), the performance of health care in Poland was evaluated as below average (23rd position among EU countries). According to the OECD (2021), healthcare in Poland is underfunded. Over the past decade, spending on health in Poland has remained consistently below the EU average, both in per capita terms and as a share of GDP. The COVID-19 pandemic prompted additional funding injections in 2020 to support the health sector response. Mortality in Poland is above the EU average. Efforts are being made to tackle obesity and there is also scope to strengthen tobacco and alcohol policies to improve population health. Tobacco consumption is a longstanding public health issue in Poland, particularly among men. According to Eurostat data, Poland has the lowest number of practicing doctors in the EU, and the number of nurses is also among the lowest. Continued outward migration of health workers and the heavy mental health burden experienced during the COVID-19 pandemic further exacerbate these concerns. Since 2012, the Ministry of Health has issued regulations specifying medical priority areas where there are acute staff deficits and more residency places, and higher remuneration has been offered to doctors pursuing these priority specializations. Since 2017, the basic salaries of health professionals have been progressively increased to reach government-set minimum targets by the end of 2021. However great effort has been made in recent years to implement an electronic health data platform and related e-health tools. As stated by Ardielli (2020), the implementation of e-health contributes to savings in the provision of health care services and to an increase in the performance of health care.

Considering the achieved results, it is possible to specify measures to improve the situation in the Czech Republic and Poland. The public health policy in both countries should focus on the health of the population in terms of risk factors such as obesity, for example through campaigns focused on exercise and a healthy diet, support sports in schools and leisure time and focus on advertisements of this nature. Improving the health of the population could increase life expectancy and reduce mortality, leading to the assumption that the country will move to a better position in health care performance. Better health of the population will also result in savings in the area of paying sickness benefits, care for the sick and the aging population.

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Youth Financial Literacy and Children's Debts in the Czech Republic and in Comparison, with the EU

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Abstract

Childhood debts are currently a problem that is being addressed worldwide. Currently, the amendment to the Insolvency Act facilitates the resolution of insolvency over-indebtedness for young debtors. The solution to this problem is to launch a strategy for financial literacy education in schools in the Czech Republic. According to a survey of knowledge of financial literacy in primary and secondary schools, it was found that the level of knowledge is the same, which is reflected in practice when working with debtors. There is a need to focus on the development of financial literacy of pupils in primary and secondary schools and thus prevent the problems of juvenile debt in the future.

Keywords: *children's debt, financial literacy, insolvency, schooling*

JEL Classification: *A22, G33, G39, G51*

1 Introduction

This article is focused on the debts of youths, a very real topic and issue. In general, level of these debts initially usually reach only a few hundred Czech crowns, however they are to increase several times over the following years. In addition, children who incur these debts mainly due to the lack of care of their parents often find out about their indebtedness once they reach the age of majority, and thus enter adult life burdened with not negligible debts. They find it very difficult to discover a way out of their situation, while it should be noted that the current legislation does not even provide them with many opportunities to successfully solve this issue. In addition to the above, part of this work is an analysis of legislation and case law in relation to the legal representatives. However, this is not only an imperfection of the legislation itself, but also a problematic execution of ordinary courts, which often do not approach youths with sufficient caution and do not seek maximum protection of their rights. Thus, debts are usually imputed to them without being informed of the ongoing proceedings so that they could react properly on this matter. This strategy focuses on promoting literacy to youths and adults and providing them with a sufficient literate environment, whilst other UNESCO initiatives focus on further improving of school attendance Financial literacy among youth (2016) as the best prevention against the low levels of literacy and numeracy. Unesco (2020-2025)

2 Children's Debts in the Czech Republic

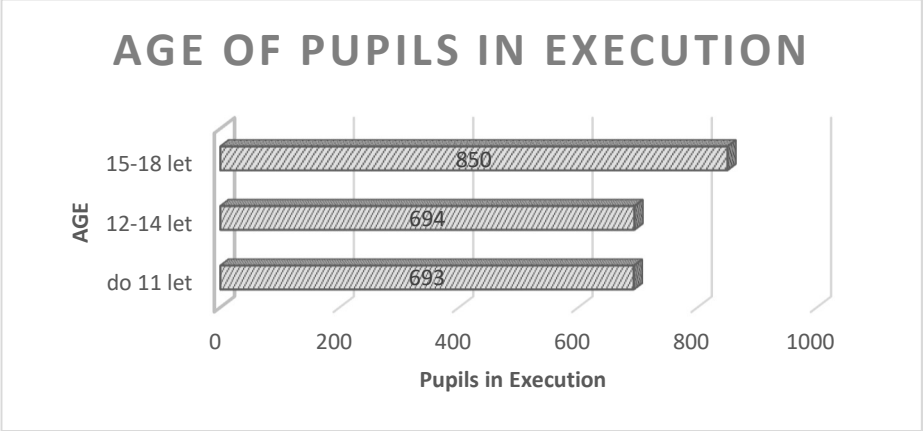
The settlement of children's debts have been a long-standing issue of the Czech legislation, when young people at the age of 18 became debtors of receivables arising in their childhood, e.g. for unpaid waste fees or no-ticket journeys in public transport. The approved amendment to the Insolvency Act also provides that a minor under the age of 13 should not bear the financial consequences of the damage caused, but possibly educational and moral only Richter (2017). The damage caused by such a minor should be compensated by the one who neglected proper supervision of it i.e., most often the parents. There will be two exceptions to this rule: if damage caused by an intentional crime or if compensation of the minor's property would allow for

compensation, for example, when the child inherits a sufficient fortune Statistics of the Czech Distrainer´s Chamber (2021).

According to data of the Distrainer´s Chamber from last November, there are more than 2,200 teenagers in distraint in the Czech Republic. Another tens of thousands people have debts originally arising in their childhood Hampl (2020). These are most often unpaid rides to pay fines on public transport or for reminders from the library. In the past, there had also been child debts due to unpaid waste fees Ministry of Finance (2020).

Young people, whose at least two-thirds liabilities had been issued in their childhood, can thus be debt-free within three years, just like the elderly. Široký et al. (2020)

Figure 1 – Age of pupils in execution



Source: Statistics of the Czech Executors' Chamber (2018-2021) (2021)

3 Current State of Discharge of Debt in Czech Republic

The waiver of the condition that the debtor repays at least 30 % of all his debt is perceived as a fundamental change in favor of the debtors Glogar (2021). The debt relief amendment implements a so-called "1 + 1" system, i.e. the debtor only has to prove that he is able to pay the remuneration and cash expenses to the insolvency administrator on the one hand and has the same amount available to the creditors on the other. The debtor must be therefore able to repay the creditors in at least the amount of the cash costs and the insolvency administrator's remuneration throughout the whole debt relief period Krajňák et al. (2018).

The original 30% debt relief limit by the debt relief amendment has not remained as a condition for successful debt relief, not even at its end - there is only a rebuttable legal presumption enshrined in the provisions of § 412a para. c) of the Insolvency Act. It defines the obligations of the borrower to actively participate in maximising his income Krzikallová et al. (2017). Regarding the transitional provisions, this procedure may also be used in proceedings in which a bankruptcy decision was issued after 31st May 2019 (Glogar, 2021). The basis for the solution described above is the provision of § 412a para*.: "If at least two thirds of the amounted claims of unsecured creditors arose before the debtor reached the age of 18, the debt relief shall be completed by fulfilling the repayment schedule if it has not been canceled within three years of the debt relief approval. As such a receivable arising before the debtor's age of 18 is also considered to be an accessory of such a receivable, a contractual penalty arising from the same contract as such a receivable, and a receivable arising from a contract concluded in the creditor's business at last three years from the debtor's age of 18, if the debtor has used at least two-thirds of the amount received to settle the claim under the first sentence." The main point here is maximum two-thirds of debts been issued by age of 18 and three following years if these debts were undertaken with the intention of satisfying the childhood debts. There is a need to pay particular attention to the debt which the 2/3 majority should be calculated of – whether from the total sum of registered claims, from the total amount of only established receivables, or from the total amount of all debtor's liabilities. It should also be mentioned that the relevant receivable for the purposes of assessing those 2/3 is not only the principal itself, but also accessories based on legal fiction Paseková et al. (2015).*

Another significant change is the possibility of the debt relief reduced period for selected categories of particularly vulnerable individuals excluded from the labor market, who in practice do not have the opportunity to obtain income other than the income guaranteed and provided by the state Sprinz et al. (2019). These people are mainly old age pensioners and people who have been granted a second or third degree of disability (Glogar, 2021). If such a debtor meets the relevant conditions on the date of the debt relief decision, the court will

subsequently reduce the debt relief period for the purposes of assessing debt relief to three years. The debt relief will then be completed regardless of the actual level of satisfaction of the creditors. The only condition is that the debt relief must not be canceled during these three years Paseková et al. (2016). However, even in these cases, the criterion of the ability to pay the insolvency administrator's remuneration and cash expenses and at least the same amount on the creditors 'claims, ex-spouse' claims on behalf of their children and the remuneration for setting a debt relief permit must be still met.

Current legislation on bankruptcy and debt relief also contributes to make it increasingly easy to get into debt relief (e.g., last year's amendment allowing debtors to include their business debts into debt relief). In practice, we increasingly encounter a situation where the institution of debt relief is "abused" (these are mainly situations where each member of the family or household becomes indebted and then ultimately ends up in debt relief, and then followed by the turn of others). In some specific cases, it is therefore possible to argue as to whether debt relief is their only way out of the situation of non/intentional situations and whether these facts should not be taken into consideration when approving debt relief.

A detailed look into the banking and non-banking sectors reveals that the resolution of their receivables is also not optimal. First and foremost, the problem is the ever-increasing number of debtors in bankruptcy and so subsequent debt relief. This growth increases the bank's administrative costs with a followed recovery of receivables even though the total amount of payment from the borrower is uncertain. Another problem is the ever-decreasing value of the debtor's performance during the repayment schedule, when most debtors try to pay the lowest possible installments so that their final debt-settlement exceeds the set minimum of 30 % (e.g. failure of a gift or loss of employment as mentioned above). Based on the above data, it may be seen that the difference between the anticipated performance at the beginning of the approval and realised one during the debt relief (on average for the 24th installment) is 5 percentage points, and this is the half of the payment schedule that is usually higher (the debtor has not recovered 30 % yet)) and it can be therefore assumed that by the end of the payment schedule (considered the 25th installment to the 60th), there would be a further decrease in the range of 5 - 15 percentage points.

4 Methodology

As for the evaluation method was chosen a chi-square test, statistical nonparametric method used to determine whether there is a demonstrable significant relationship between the two characters Hendl (2020). If the calculated p-value of the Pearson Chi-square test is lower than the level of significance (α = 5 %), then H0 is rejected and rather H1 ought to be accepted (Agresti, 1992). The essence was to compare the observed and expected frequencies. The observed frequencies are in the contingency table whilst the expected frequencies were calculated. An alternative hypothesi assumes that the level of knowledge of high-school and primary-school pupils is not the same. The magnitude of the differences between the observed and expected frequencies was assessed using the test statistic $\chi 2$. On the basis of the chi-square probability distribution, the probability of the occurrence of such or even more extreme values was calculated Friesl (2002). This probability was called the achieved level of significance of the statistical test (p-value). If it is less than 0.05, the null hypothesis was not rejected Cyhelský et al. (1999).

$$x^2 \geq x^2_{(r-1)(c-1)}(1-\alpha) \tag{1}$$

Given the current situation where a large number of people are in execution, it is necessary to find out the current state and level of financial literacy of primary and secondary-school pupils and the influence of this knowledge on potential overneatness Ševčík et al. (2018). Statistical methods were used to determine whether the level of financial literacy knowledge of primary school pupils differs from secondary school ones. It was also necessary to verify whether the higher educational level of primary school pupils differs from the level of knowledge of secondary school pupils and to identify possible causes of over-indebtedness in the future. Primary and secondary schools in northern Moravia were contacted to determine the current level of financial literacy of primary and secondary school pupils and to see whether there is any difference in between them. Two primary schools and two secondary schools were addressed in the city whose share of inhabitants in execution is 10.87%. Of the schools contacted, one primary and one secondary school agreed running the survey there. Epidemiological measures caused by Covid-19 had also an impact on small interest in the survey. 74 eighth graders and seven secondary-school pupils took part in this survey.

a) Do primary and secondary-school pupils face the same issues in the field of FG?

H^0 Problems in the area of financial literacy of primary-school pupils are the same as those of secondary-school and hypothesis H^1 Problems in the area of financial literacy of primary-school pupils are not the same as those of secondary-school.

Table 1 – Answers of the responses asked about question 1

Number of responses							
14	10	20	17	8	5	74	Elementary school students
16	2	22	15	11	6	72	Secondary school students
30	12	42	32	19	11	146	In total

15,205	6,082	21,288	16,220	9,630	5,575
14,794	5,918	20,712	15,791	9,370	5,425

Source: own processing

The achieved value of statistical significance is 0,29 and is greater than 0.05. **We do not reject** the null hypothesis meaning the problems in the area of financial literacy of primary-school pupils are the same as of the secondary-ones. Hence higher graders have comparable knowledge of financial literacy as pupils in the primary education system.

b) Do you understand the concept and are you consious of the family budget?

H^0 Elementary and high school pupils have familiar understanding of the family budget and hypothesis H^1 Elementary and high school pupils do not have familiar understanding of the family budget.

Table 2 – Answers of the responses asked about question 2

Number of responses				
31	13	30	74	Elementary school students
37	10	26	73	Secondary school students
68	23	56	147	In total

34,231	11,578	28,190
33,769	11,422	27,810

Source: own processing

The achieved value of statistical significance is 0,55 and is greater than 0.05. **We do not reject** the null hypothesis, primary and secondary pupils are oriented in it in the same way in the family budget. Elementary and high-school pupils have both familiar understanding of the family budget.

c) Do you know how loans work?

H^0 Primary and secondary school students similarly understand the way how loans work and hypothesis H^1 Primary and secondary school students have different understanding of how loans work.

Table 3 – Answers of the responses asked about question 3

Number of responses				
32	18	24	74	Elementary school students
34	15	24	73	Secondary school students
66	33	48	147	In total

33,224	16,612	24,163
32,776	16,388	23,837

Source: own processing

The achieved value of statistical significance is 0,85 and is greater than 0.05. **We do not reject** the null hypothesis, and so both primary and secondary-school students understand how loans work. Pupils in higher education have comparable loan orientation as younger pupils.

d) What requirements must a credit agreement have?

H^0 Primary and secondary school pupils have comparable knowledge of the requirements of the loan agreement and hypothesis H^1 Primary and secondary school pupils have different knowledge of the requirements of the loan agreement.

Table 4 – Answers of the responses asked about question 4

Number of responses					
Žáci ZŠ	6	30	38	74	Elementary school students
Žáci SŠ	7	31	35	73	Secondary school students
In total	13	61	73	147	In total

6,5442	30,707	36,748
6,4558	30,293	36,252

Source: own processing

The achieved value of statistical significance is 0,90 and is greater than 0.05. **We do not reject** the null hypothesis; pupils in higher education are as familiar with the requirements of loan agreements as pupils in primary education.

e) Do you know the risks of contactless payments' usage?

H^0 Primary and secondary school pupils have comparable knowledge of the risks of contactless payments' usage and hypothesis H^1 Primary and secondary school pupils have different knowledge of the risks of contactless payments' usage.

Table 5 – Answers of the responses asked about question 5

Number of responses				
41	18	15	74	Elementary school students
30	26	17	73	Secondary school students
71	44	32	147	In total

35,741	22,150	16,109
35,259	21,850	15,891

Source: own processing

The achieved value of statistical significance is 0,19 and is greater than 0.05. **We do not reject** the null hypothesis, both primary and secondary school pupils both know the risks of contactless payments at the comparable level. Higher graders are as aware of the risks of using contactless payments as their younger mates.

f) Do you know for what purpose is a postal order and can you fill it in?

H^0 Primary and secondary school pupils have comparable understanding of what a postal order is for and can fill it in and hypothesis H^1 Primary and secondary school pupils have different understanding of what a postal order is for and can fill it in.

Table 6 – Answers of the responses asked about question 6

Number of responses				
32	18	24	74	Elementary school students
18	30	25	73	Secondary school students
50	48	49	147	In total

25,17	24,163	24,667
24,83	23,837	24,333

Source: own processing

The achieved value of statistical significance is 0,03 and is less than 0.05. **We reject** the null hypothesis hence primary and secondary-school pupils would have comparable understanding of what a postal order is for and can fill it in and rather accept alternative hypothesis that pupils in higher education have different level of knowledge of postal orders than pupils in primary education.

g) Do you understand the concept of a non-bank loan and do you know its risks?

H^0 Primary and secondary-school students have comparable knowledge of the concept of a non-bank loan and know its risks and hypothesis H^1 Primary and secondary-school students have not comparable knowledge of the concept of a non-bank loan and know its risks.

Table 7 – Answers of the responses asked about question 7

Number of responses				
27	28	19	74	Elementary school students
18	30	25	73	Secondary school students
45	58	44	147	In total

22,653	29,198	22,150
22,347	28,803	21,850

Source: own processing

The achieved value of statistical significance is 0,26 and is greater than 0.05. **We do not reject** the null hypothesis that pupils of primary and secondary schools would know the concept of non-bank loans at the comparable level.

h) Does a lack of financial literacy cause you problems in everyday life?

H^0 Lack of financial literacy does not cause problems for primary and secondary-school students in everyday life nd hypothesis H^1 Lack of financial literacy does cause problems for primary and secondary-school students in everyday life.

Table 8 – Answers of the responses asked about question 8

Number of responses				
6	40	28	74	Elementary school students
9	37	27	73	Secondary school students
15	77	55	147	In total

7,551	38,761	27,687
7,449	38,238	27,312

Source: own processing

The achieved value of statistical significance is 0,70 and is greater than 0.05, **we do not reject** the null hypothesis that the lack of financial literacy for primary and secondary-school students does not cause problems in their everyday lives. Pupils in higher education have comparable problems with a lack of financial literacy in everyday life compared to pupils in primary education. All the results will be summarized in the section 6.

5 Current State of Financial Literacy

The current state of financial literacy is indicated by the execution map, which states that in 2019, according to the last update of the execution map, the Moravian-Silesian region is the fourth worst of the 14 regions in the Czech Republic in terms of the share of people in execution, which is astonishing 10.6 %. The number of individuals in execution is 103,330 with 5.7 – the average number of executions per person. According to the detail of people in execution, there are 171 children and juveniles. There are another 13,064 individuals aged 18 to 29 in execution. The bankruptcy map was updated in 2020 with 17,011 people in personal bankruptcy in the Moravian-Silesian region itself only. Of this, the number of youngsters in personal bankruptcy aged 18 to 29 is 1,418 (8 % of total), Statistics of the Czech Executors' Chamber (2021).

The Ministry of Finance measured the level of financial literacy of the adult population in the Czech Republic. The research was carried out by ppm factum research, and data collection took place in January 2020. Shönfeld et al. (2020). Part of the data obtained is to be used by the International Network on Financial Education at the Organization for Economic Cooperation and Development (OECD) for international comparisons of adults' financial literacy. Respondents were divided based on their financial knowledge and economic responsibility, and the research results indicate the current state of financial literacy Directive (EU) 2019-2023.

6 Conclusion

Based on the obtained results, it may be seen in the future that more young people will get to financial problems and also to distraint due to the lack of knowledge in the area of financial literacy. On the other hand, the ever-increasing availability of fast and "cheap" loans only exacerbates the situation, and more often we encounter a situation were taking out a loan is a completely natural thing that simply belongs to life. This approach is observed in television commercials, on billboards and, last but not least, via the Internet (e-mails, social networks or flashing links around the entire page). The system of financial literacy education at primary and secondary schools, which is set according to the will of each particular school and the extent to which they will devote themselves to educate this topic, contributes significantly to this issue and deepens it. At the same time, being the fourth worst region according to the share of people in execution indicates the level of education in this area and subsequently reflects the number of personal bankruptcies there. Low financial literacy of the teenagers has impact on the amount of their debts in the future, distraints included.

We did not know or use the term financial literacy until 1989. The state decided for us and we had someone to bitch about. Financial literacy has now become a compulsory part of primary education. However, it is clear from the above research results that the knowledge of the Czech youth in the area of financial literacy is at an average level. The overall survey concluded that financial education needs to be introduced as soon as possible. In the authors' opinion, it is a good thing that financial literacy has already been introduced at the first level of primary school. Children become more familiar with the issue of money and learn to manage it. At the beginning, the family should also provide the basis for financial education. The basic aim is to prevent child debt.

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The Importance of Recruitment and Employment Agencies for Effective Employment of Residents in the Czech Republic

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Abstract

The aim of the paper is to evaluate the position of recruitment agencies on the labor market, where they represent specialized service providers capable offering opportunities to a diverse range of workers. They provide employers themselves with relief from the personal and administrative issues involved in the worker-hiring process. The article contains a definition of the market for recruitment agencies, including effects such as the migration crisis or the Covid-19 pandemic, and mentions the opportunities and risks of cooperation with these agencies. In this article, an evaluation of an anonymised recruitment agency is carried out through semistructural interviews with HR managers and HR specialists. A total of seven interviews with anonymous respondents and a SWOT analysis show that the most easily usable opportunity for a job agency is to expand to other regions of the Czech Republic. For the agency, this would mean the need to employ additional implementers and recruiters, but it would gain new clients and a greater position on the market. Opportunities that are sensitive to vulnerabilities especially include, but are not limited to, a broader portfolio of services. If the employment agency were to focus on this opportunity, it would not be a problem for it to change this position of opportunity. It is recommended to focus primarily on expanding the internal staff team and acquiring new clients.

Keywords: *economic analysis, employment agency, financial indicators, financial statements, labor market, SWOT analysis*

JEL Classification: *C10, D29, E24*

1 Introduction

The difference between an employment agency and a recruitment agency is not regulated in any way, so the Czech law perceives them in the same way. Aemployment agency, or employment agency, employs job seekers whom it "rents" to companies where they perform the same or similar work as the core employees of the company; it is therefore controlled by the employees of the company. However, the worker is still an employee of the employment agency that pays him a wage and invoices the work to the company where the worker performs his work. Agency employment is often referred to as a three-party legal relationship. Employment agencies are an important player in the labor market and the interest in employment through a work agency is still growing. Not only are the services of employment agencies used by people who are looking for work, but a great attraction are employment agencies for their potential clients in the form of companies, who need to employ a larger number of employees in their company and want to make their work easier with searching and subsequent administration with recruitment of new employees, and thus be as effective as possible in today's modern times. The key role of employment agencies is to employ the "right" people in the "right" jobs. The activities of recruitment agencies are primarily focused on providing services to other businesses. However, employment agencies also provide services to individuals. According to Evangel and Juřička (2013, p. 55), these

include, in particular, "targeted or general job searches, career counseling, personnel-psychological counseling and education."

The recruitment agency does not employ the applicant, it only mediates the applicant's employment with the employer. Therefore, it is important that the applicant becomes an employee of the company. Job seekers do not pay for registration and the job in a recruitment agency (Jouza, Ženíšková, Salačová, 2005).

Recruitment agencies can be defined as employment agencies that cooperate primarily with organizations in recruiting new employees. It is usually advantageous for organizations to cooperate with recruitment agencies because they know the conditions of a particular labor market and have a database of job seekers. They are able to quickly and relatively cheaply secure a sufficient number of suitable candidates for the job. HR consulting agencies deal with advisory activities that may be related to partial or complex activities in the field of human resources management in an organization (Dvořáková, 2004).

A recruitment agency is a commercial institution that works on the principle of the Labor Office. Registration at the Labor Office is, in a certain sense, mandatory if the unemployed person wants to receive financial benefits in unemployment, whereas registration in an employment agency is purely voluntary. However, there is also a difference in the fact that in the records of a recruitment agency there may also be a person who is employed, but in the future willing to change the job. The Labor Office is a state institution that is primarily non-profit, opposite to a recruitment agency. Therefore, for its existence, it does not need to acquire job seekers who would be assigned and offered to the required positions. However, it cannot be said that the recruitment agency prefers profit to helping people. However, its existence and further development are dependent on its earnings, because unlike a state institution, e.g. the Labor Office, it therefore does not receive any funding from the government, for example, for the wages of its employees. Employment agencies mediate the employment free of charge or for a fee.

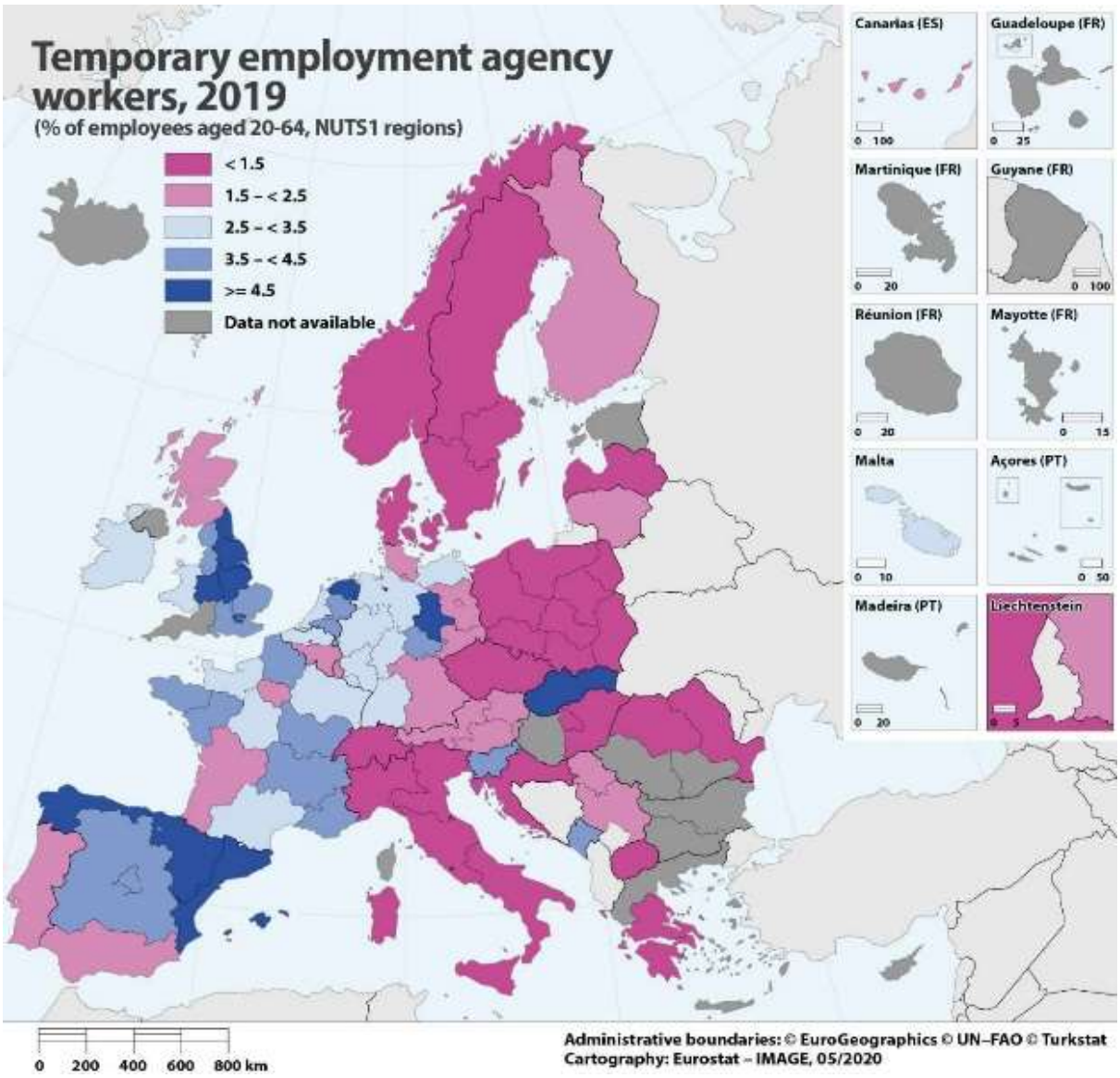
In the case of the second option, payment cannot be requested from the individual to whom the employment is mediated. Therefore, this payment is required from companies looking for candidates (Květoňová, 2012).

Recruitment agencies are those that mediate employment in the sense of finding suitable workers for an employer looking for new labor from external sources. Recruitment agencies usually advertise, conduct interviews with candidates, and make preselections. They ensure a professional approach and reduce the laboriousness in attracting workers for the enterprise. These agencies are defined as commercial employment offices. They are therefore dealing with permanent allocation, the so-called permanent placement. They then charge the fee based on the monthly salary of the addressed worker. The fee is usually much higher if it is a headhunting agency (direct addressing of suitable candidates, usually senior management positions) – it is also possible to meet the term executive search (Gregar, 2010).

1.1 Development of the Number of Job Agents in the EU and the Czech Republic

In 2019, 2.1 % of the total number of employees in the European Union aged 20 – 64 years were allocated by temporary employment agencies. At the NUTS 14 regional level, the form of temporary employment was most common in the northern Netherlands with 6.6 %. This was followed by Bremen in Germany (5.3 %) and three regions in Spain (all three with 5.1 %). The lowest percentage of employees working on a temporary contract was recorded in the region comprising the islands of Italy – Sardinia and Sicily with 0.2 %. This region was followed, for example, by Attica in Greece and Central Hungary (Hraško, 2022).

Figure 1 – Temporary employment agency workers in the EU in 2019.



Source: EUROSTAT (Temporary agency workers across EU regions, 2019)

Figure 2.2 shows the color differentiation of EU countries according to the percentage of agency employees to the total number of employees in 2019 based on a Eurostat report. It may be seen that the Czech Republic belongs to a category with percentage lower than 1.5 %. This group also includes, for example, Italy, Poland, Norway and Sweden. However, this report may be biased, as not all data are always available.

One of the reasons for the increase and expansion of work through recruitment agencies was the migration crisis in Western Europe. Following the reception of a significant number of Syrian refugees and migrants, it was necessary to ensure their integration into the labor market. It was them who got a job using the services of the labor agencies, which employed Syrian refugees on construction sites, cleaning, and other manual labor. Between 2014 and 2016, more than 2 million people came to Germany, mostly men under 30 years of age, who are ideal employees of recruitment agencies (Obschonka, Hahn, Bajwa, 2018).

The situation associated with the Covid-19 pandemic has significantly affected the state of this issue in a negative way. Employment agencies have become one of the heavily impacted sectors having an existential crisis in 2020 and 2021. As a result of government measures in individual countries, agency employment has fallen to 0 – 0.5 %, including countries such as Germany and Spain, according to EUROSTAT data. In the Czech Republic, agency employment was near zero, too, fluctuating between 0.1 – 0.3 % during 2020 – 2021 (Eurostat, 2022).

The job agency industry also faces a number of challenges that negatively affect its competitiveness and the difficulty of entering this sector. Agency employment is undoubtedly one of the most regulated branches of labor law. Legislation in this area is relatively volatile, changes frequently, and agencies are under increasing pressure from the state authorities. If we look back, for example, in 2014, 1,587 agencies were registered in the Czech Republic. According to information from the Directorate General of the Labor Office, almost 2,102 agencies were registered in mid-2019, only five years later. In 2020, this number increased to 2,210. This shows the popularity of this legal instrument in recent years.

Table 1 - Development of the number of employment agencies in the Czech Republic

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
No. of agencies	1,458	1,491	1,592	1,587	1,700	2,011	1,938	2,102	2,102	2,210

Source: MPSV, own processing

Table 1 shows the development of the number of employment agencies in the Czech Republic in the last decade. Data are always as of December 31 in the given year.

The largest number of employment agencies was in 2020. This increase could be explained by the situation in the world due to Covid-19. This was the time when we could not count on any security at work, which is why employment agencies were an interesting choice for employers. Companies were using employment agencies to quickly hire new employees who had to be laid off during the largest wave of the pandemic. Using an employment agency, employers saved time in searching and related administrative work. At the same time, people who unexpectedly lost their jobs needed to get a new job as soon as possible and began to use employment through employment agencies. As of December 31 2020, 2,210 employment agencies were registered in the Czech Republic. Of this number, 1,948 were licensed by employment agencies.

The lowest number of employment agencies was in 2011, which could be considered an ultimate consequence of the Great Recession in 2008 (Hraško, 2022). In August 2022, a total of 2,083 agencies were registered at the Labor Office in the Czech Republic, which shows that during the Covid-19 pandemic their number decreased but still has not caused any significant fluctuations in the sector. Between 2020 and 2022, the number of Employment Agencies in the Czech Republic decreased by 6.75 % (Labor Office, 2022).

1.2 Relations between AP, Agency Amployee, Client, and Applicant of Agency Employment

The following chapter summarizes the advantages and disadvantages of agency employment both from the perspective of the client (company), job seeker, and employment agency. Knowledge is drawn from both theoretical sources and from the author's own experience.

Several authors in the Czech and foreign professional literature have dealt, for example, with the topic of obtaining and selecting a suitable worker.

Dvořáková (2004) describes these steps as follows: "Recruitment and selection of workers are very important personnel activities aimed at identifying human resources, addressing suitable candidates, attracting them, and selecting among them those who best correspond to the organizational culture and requirements of the job.

Koubek (2007) writes: "Recruitment is an activity designed to ensure that vacancies in an organization attract a sufficient number of adequate applicants for these posts, at a reasonable cost and within the desired time..."

Armstrong (2007) describes the entire process of recruiting and selecting employees as follows: "The general goal of recruiting and selecting employees should be to obtain, at minimal cost, the quantity and quality of workers that are desirable to meet the company's human resource needs."

Dvořáková and Koubek agree in their publications that the main objective of the selection of workers is to identify and select among the job seekers those who will best meet the requirements for the job to be filled.

1.2.1 Advantages and Disadvantages for the Employment Agency

Running an employment agency, like everything, has its advantages and disadvantages. Since the employment agency acts in a trilateral relationship as an intermediary, where it has to satisfy the requirements of both the client and the job seeker, it is not always easy to satisfy the requirements of both parties equally. Another disadvantage of agency employment for an employment agency is also the fact that in the case of a reduction in the client's orders in such quantity that there are redundancies, agency employees are the first in line (Armstrong (2006)).

Agency employment also has its advantages from the point of view of the employment agency. The main goal of the employment agency, as any other corporation, is to achieve the highest possible profit. A labor agency can also specialise in more than one sector; that is, for example, taken into account the current pandemic, employment agencies had the advantage that if the pandemic hit the very sector in which it specialises, there would still be an opportunity to start focusing on another sector that would be doing well at this time (Dvořáková, 2007).

Pitfalls of an employee working through an employment agency:

Before signing a contract with an agency, it is necessary to check whether it is reliable. The agency must have a permit from the Ministry of Labor and Social Affairs, it must be insured and, among other things, it must have a capital of CZK 500,000. It should be remembered that the employee is employed by the agency itself, not by the company to which he is temporarily assigned (here after referred to as the "user"). Therefore, termination of employment is dealt with with the agency, not the user. The agency also deals with any discrepancies with the user. The period of secondment to the user, which can exceed 12 months. The agent's employee is entitled to comparable conditions, as any comparable employee, that is, a "core" employee of the company who does the same work. If this is not the case, it is recommended to contact the agency again.

The assignment to the company may be terminated unilaterally in writing. An employee of the Agency shall not be entitled to a period of notice or severance pay.

Last but not least, the long-term impacts are also discussed through recruitment agencies, which assign staff to various posts. This may be related to the disruption of some basic needs, which are referred to in Maslow's pyramid as a need for security. Although changing jobs and positions provide better stimulation, it can lead to burnout and mental health threats in the long run, according to a study conducted on the model of 2,500 agency workers. Prevention against this threat is the development of strategies to strengthen personal resources in organizations with an emphasis on the prevention of burnout syndrome (Ferreira, Gomez, 2022).

1.2.2 Advantages and disadvantages for an agency employee

Many job seekers consider working through an employment agency as such a transfer station. Agency work is an interesting option for applicants, as employment agencies offer a wide portfolio of job offers from which the applicant can choose. This type of employment also allows for, in most cases, a quick start to a new job. A common myth about agency employment is the information that, when employed through an employment agency, employees are lost.

Kahn and Rose (2021) report that agency work helps to improve the situation in work collectives, especially in terms of relations between managers and their subordinary team members. Agency employees tend to be happier with the same managers rather than workers working full-time for their employers.

However, the fact is that due to comparable wage conditions, an agency employee has the same benefits as a regular employee. However, this myth may be true in rare cases, namely when the applicant is employed by an unreliable and unverified employment agency. Therefore, it is very important to choose the right employment agency (Greenberg, 2019).

There are measures by which the quality of any recruitment agency could be evaluated. One of the main criteria is their ability to understand both end consumers and companies. It is about assigning the right workers to those companies where their skills are most needed, as well as where employees may exercise all their personal potential (Borron, Lamm, Atkins, 2021).

The employment agency acts on behalf of employees in all areas. It negotiates his remuneration, place of work, and pays him remuneration for his work. The agency has an overview of all bonuses, bonuses, employee benefits, etc. There are also disadvantages for employees of employment agencies. Agency employees are employed under a secondment agreement, which allows users to both recruit these employees quickly and quickly terminate them without compensation. Secondment agreements are concluded for a fixed period and agency staff often provide users with reserves to cover a high number of contracts.

1.2.3 Advantages and Disadvantages for the User (client)

The main advantages of using the services of recruitment agencies definitely include saving time and money. By finding a suitable candidate on behalf of a user, the agency can save time and money that the user would otherwise spend on searching or advertising. A recruitment agency provides a better service through better mapping of the labor market and can have more effective tools at its disposal to search for and select an employee.

In practice, it is very common for a client to search for an applicant through several employment agencies. Of course, the future remuneration for a successfully appointed worker belongs only to the one agency. It is precisely because of this fact that pressure is exerted on HR consultants, which can lead to insufficient presentation of the position and the submission of an inappropriate candidate. In practice, we also encounter the phenomenon when a consultant himself is evaluated for the number of interviews performed over a certain period of time (Kazdová, 2013).

Thus, the main advantages of using a recruitment agency on the part of the client include:

- Saving time and money;
- Better client database;
- Detailed evaluation of clients;
- Discretion;
- Better knowledge of the labor market.

As part of the benefits for employees, it is also possible to point out the social problem of employing criminally convicted individuals. While for employers the criminal record is often a reason for non-acceptance, recruitment agencies do otherwise. The survey from 2017 of several anonymous firms paying the employment agencies shows that companies require incentives to hire people with one conviction for a non-violent crime. This is due to the guarantee of replacing the worker in case of difficulties, ensuring the transport of the worker, and obtaining reliable references from previous work activities (Hunt, Smart, 2020).

In the opinion of the authors, they find the disadvantages on the part of the client to be minimal, since the client, as a client of employment agency, can dictate its conditions. Therefore, the disadvantages can manifest themselves only if the client chooses a low-quality or unreliable employment agency. The quality of the employment agency is reflected in a good knowledge of the local labor market, a wide database of agency workers.

2 Material and Methods

Data analysis and processing was carried out at a selected anonymized employment agency that was going through a difficult period affected by C-19.

Anonymized employment agency is a limited liability company and was founded in 2008. It is one of the 10 largest and most efficient employment agencies in the Czech Republic.

Anonymized agency specializes mainly in the automotive industry. The number of agency employees currently averages around 1,000. The agency provides comprehensive personnel services (provision of recruitment campaigns, implementation of the selection procedure, administration, communication with employees, etc.).

The services offered by this selected employment agency include, in particular:

- Temporary Help
- Staff seeking (Recruitment Support, Permanent Placement)
- Try & Hire
- Outstaffing
- Outplacement
- Payroll management

Data collection was carried out through semi-structured interviews with HR managers and HR specialists with a focus on agency employment. These interviews were carried out and their evaluation is realized by synthesis of the findings. A SWOT analysis is created from the data obtained.

Both revenues and expenses decreased in 2019 and 2020. The consequences of the C-19 pandemic have had a great impact on steps to reduce operations and declare a state of emergency, for some of its long-term users. Users (firms) of the employment agency were forced to close or reduce their operations and thus did not require any agency employees. They were able to cover their limited operations with their core employees. As mentioned earlier, one of the disadvantages of agency employment is that in the case of a reduction in the number of employees, it is the agency employees who are first dismissed from their employment.

By losing clients and limiting the operation of those who continued to cooperate with the employment agency, the company lost a significant part of its standard revenues. Of course, the dismissal of agency employees has also reduced the personnel costs of the employment agency. Based on the above, it is possible to conclude that employment agencies are among those affected by the global pandemic and have limited their activities, whether partially or completely (Hraško, 2022).

2.1 Model and Data

SWOT analysis was selected for data processing, which uses analytical techniques to evaluate internal and external factors that influence the success of a company (Fleisher, Bensoussan, 2015). The method was created by Albert Humphrey, who in the 1960's and 1970's was in charge of the research project at Stanford University, funded by major American corporations (Kalouda, 2016). The aim of the project was to analyze the shortcomings in the existing planning of these companies and to create a new change management system for them (Hendl, 2015). Albert Humphrey, as part of his work at the Stanford Research Institute, created a team method for planning, which he named SOFT analysis and later reworked it into a SWOT analysis (Grasserová, Dubec, Řehák, 2012).

SWOT stands for S = Strengths, W = Weaknesses, O = Opportunities, T = Threats. SWOT is therefore an abbreviation for the internal strengths and weaknesses of the organization and the opportunities and threats from the external environment of the organization (Grasserová, Dubec, Řehák, 2012).

The factors listed in Table 2 will be evaluated using the plus/minus method of the SWOT analysis matrix. "This method compares the interrelationships between our identified 'S' strengths, 'W' weaknesses, along with 'O' opportunities and 'T' threats." (Vaštíková, 2014).

The following are distinguished:

- Strong mutually positive bond (++),
- strong negative bond on both sides (--),
- weaker positive link (+),
- weaker negative binding (-),
- no relationship (0).

Table 2 - SWOT analysis of the anonymized employment agency

	STRENGTHS (S)	**WEAKNESSES (W)**	
S1	Financial stability	High amount of receivables	W1
S2	Well-known employment agency	Fewer agency employees	W2
S3	Promotion	Lower number of users	W3
S4	Young-aged team	Overload of order implementers	W4
S5	Knowledge of internal employees	Cross-maturity of receivables vs. payables	W5
	OPPORTUNITIES (O)	**THREATS (T)**	
O1	Wider portfolio of services	Changes in legislation	T1
O2	Focus on new industries	Low unemployment rate	T2
O3	Economic growth	New competitors	T3
O4	Expansion to other regions of the Czech Republic	High inflation	T4
O5	Marketing – new methods	Increased education of the population	T5
O6	Favorable changes in policy	Government regulations affecting the activities of agencies work	T6
O7	Legislative influences	Demographics – moving, aging	T7

Source: MPSV, own processing

Table 2 lists the factors that represent a strength and weakness for the employment agency, an opportunity or a threat. The evaluation is prepared on the basis of a subjective evaluation that results from the knowledge of the given employment agency, its activities, and situation.

Table 3 - Results of SWOT matrix

	S1	S2	S3	S4	S5	W1	W2	W3	W4	W5	Sum	Order
O1	+	+	+	0	++	0	-	--	--	0	**0**	**4.**
O2	+	+	++	0	++	0	-	0	--	0	**3**	**2.**
O3	+	++	++	0	+	0	--	-	-	0	**2**	**3.**
O4	+	++	++	+	+	0	0	0	--	0	**5**	**1.**
O5	0	0	++	0	+	0	0	0	0	0	**3**	**2.**
O6	0	0	0	0	0	0	0	0	0	0	**0**	**4.**
O7	0	0	0	0	0	0	0	0	0	0	**0**	**4.**
T1	+	0	0	0	0	0	0	0	0	0	**1**	**3.**
T2	+	0	0	0	0	0	0	0	0	0	**1**	**3.**
T3	+	-	-	0	0	0	0	--	0	0	**-3**	**1.**
T4	0	0	0	0	0	0	0	0	0	-	**-1**	**2.**
T5	0	0	0	0	0	0	0	0	0	0	**0**	**4.**
T6	+	0	0	0	0	0	0	0	0	0	**1**	**3.**
T7	0	0	0	0	0	0	0	0	0	0	**0**	**4.**
Sum	**8**	**5**	**8**	**1**	**7**	**0**	**-4**	**-5**	**-7**	**-1**		
Order	**1.**	**3.**	**1.**	**4.**	**2.**	**4.**	**3.**	**2.**	**1.**	**4.**		

Source: MPSV, own processing

Table 2 shows the results of the plus-minus matrix of the SWOT analysis. The results show that the most easily usable opportunity for a labor agency is expansion to other regions of the Czech Republic. For the agency, this would mean the need to employ additional implementers and recruiters, but it would gain new clients and a greater market share. Opportunities that are vulnerable include, but are not limited to, a broader portfolio of services. If the employment agency were to focus on this opportunity, it should not be a problem for it to change this position of opportunity. The solution may again be the expansion of the team of order implementers and the employment of experienced senior HR specialists.

3 Results and Discussion

The biggest threats to the selected employment agency are mainly competition and any possible government regulations, which could again limit the activities of both employment agencies and the activities of users who seek out agency employees. However, it can be argued that the number of recruitment agencies decreased by only 6.75 % during 2020 – 2021, which can be considered a relatively small fall in such a major crisis (Labor Office, 2022).

The biggest threat to the selected employment agency is new competition. There are quite a lot of employment agencies on the Czech market, and any additional employment agency may endanger the existing clientele of the current agency or possibly have an impact on obtaining new contracts. Here, the complexity of entering the industry becomes a question. Compared to other enterprises, Law No. 435/2004 set up special conditions such as the need to pay a deposit of 500,000 CZK to the Director General of the Labor Office, insurance of the guarantee against bankruptcy, application for permission to mediate employment, and the concurring opinion of the Ministry of the Interior (Evangel, 2013). In the opinion of the authors, it can be said that the risk of easy entry into the industry in the Czech Republic is eliminated by a legislative barrier.

Threats posed by changes in legislation, government regulations affecting the activities of employment agencies, or low unemployment do not have much impact due to the strengths of the employment agency.

Financial stability and promotion ranked first among the strengths. Of these two strengths, a business should mainly support promotion, which it can directly influence and can eliminate threats. Financial stability is very important for the agency, but there are many factors that might threaten it. It can be argued that some surveys point to the occurrence of fraudulent practices in the advertising environment. In particular, recruitment agencies

often use online advertising to raise awareness of their services and to increase their competitiveness in the market. Research estimates that up to 10 % of online ad content may be deceptive and fraudulent. Any bad experience of a company or worker can thus contribute to the deterioration of public opinion and thus the competitiveness of recruitment agencies in the labor market (Dörney, 2020).

The weakest side of the employment agency is the work overload of the contractors. This problem appeared several times in the results, and the authors recommend agencies to focus on this issue. It seems paradoxical that recruitment agencies have difficulties in the area of personnel. The authors believe that a high personnel workload reduces the agency's personnel costs. It is possible to point out the issue of career satisfaction and mental health of employees of recruitment agencies, recruiters, etc. Surveys conducted between 2000 and 2016 show that employees of recruitment agencies are not satisfied. This is a long-term and permanent issue. They also point to factors such as job insecurity or frequent changes. As for recruiters, it is a low or no fixed salary, where the resulting remuneration for a certain period is stored based on their performance. A higher rate of depression and fatigue was found among employees of recruitment agencies compared to full-time workers employed directly by companies (Hünefeld et al., 2019).

The weakest side of the employment agency is the workload of contractors. This problem has often appeared in the results, and the authors highly recommend focusing on this issue.

The job agency has many strengths and opportunities that it may take advantage of. If the employment agency focuses on improving its weaknesses and eliminating threats, it has the potential to increase its bottom line in the coming years. However, it should be noted that the Covid-19 pandemic, which began in 2020 and was of long-term nature, had a significant impact on the Agency's activities.

It is recommended to focus primarily on expanding the internal staff team and acquiring new clients. The presence in other regions of the Czech Republic represents a great opportunity for the employment agency. The acquisition of new clients can be supported by trying out new forms of marketing and also by building better relationships with the current ones, as these often have more plants throughout the Czech Republic, which would mean additional orders for the employment agency.

The knowledge of internal employees has been identified as a strength of the company. However, it is also appropriate to further support this strength, for example, through staff training – whether in the field of personnel or marketing.

4 Conclusion

The importance of recruitment and employment agencies is particularly suitable for job seekers who have a certain opportunity to secure a job for various reasons. Employment agencies usually employ people in the positions of workers and manual workers, where no special knowledge is needed but only skill is enough.

Employment agencies in the labor market operate mainly in the area of temporary employment. The number of agency employees usually increases at a time of economic growth, which means that employers choose this form of employment at a time of increased demand for their production. Employment agencies can be an interesting and, in certain cases, advantageous option for companies. An employer who needs more workers in the season or has more of his permanent employees at the same time on sick leave may need the employment agency to very quickly find the alternative employees. At the same time, it is an advantage for the company that it does not have to worry about administrative matters for individual agency employees. Employment agencies might potentially be a tool to improve and stabilize the labor market.

On the part of the job seeker, the employment agency is often sought after by people who have executions. These employees can often have trouble finding a job, especially as soon as possible. By turning to a job agency, they often manage to find a new job in a short period of time.

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Budgets in the Conditions of Selected Municipalities in the Czech Republic with a Focus on Expenditure on Culture

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Abstract

Culture is an important factor in the lives of citizens. It helps the development of the individual in the intellectual, moral, and emotional spheres and thus can fulfill its educational function. Spending on culture is beneficial for both individuals and society. The contribution evaluates the budget structure (revenues and expenses) of selected municipalities in the Czech Republic with an emphasis on the evaluation of expenditures and their comparability between municipalities in the field of culture in the years 2010 to 2020. The assessment of the mutual comparability of selected municipalities is expressed by the share of spent cultural expenditures to the total volume of the own budget in individual assessed years. Based on the results found, it is possible to claim that, in the long term, the degree of comparability between the analyzed municipalities is not very high. On average, within the monitored period, the value of spending on culture reached a median value of 3.38%, at its minimum in 2011 it was 2.59% and at its maximum in 2020 it was 3.81%. Relatively low volatility was found and out of a total of 205 evaluated municipalities in the territory of the Czech Republic, within the monitored period, only 21 municipalities of the evaluated sample can be considered comparable to each other in terms of spending on culture. Above the value of the established median, there are mainly municipalities in the regions of South Bohemia, Karlovy Vary region, Hradec Králové region, Olomouc region, Pilsen region, Pardubice region, the Ústí and the Zlín region. The town of Chomutov can be identified as the municipality with the most balanced share of spending on culture.

Keywords: *culture, Czech Republic, municipalities, public expenditure*

JEL Classification: *H44, H71, H72, L31, N34, R12*

1 Introduction

In all advanced civilizations, the power structure was concerned with the development of culture and art. The result of this fact is the cultural heritage and various artistic monuments of which the states can be deservedly proud and can currently profit from them. The field of culture is, in terms of its spectrum of interest, very broad and operates mainly on a non-profit basis. One of the priorities of the local government is the creation of the most suitable conditions for the support and implementation of those cultural activities that are provided on a non-profit basis and would not be able to exist for financial reasons to the extent that the majority society takes for granted in market conditions.

Funding of certain areas of culture is secured through public resources, flowing from individual levels of public budgets, especially municipal budgets. Specific parts of the field of culture are also financed through other sources, especially private ones. The importance of supporting the field of culture through public funds lies in a whole range of positive externalities and benefits that culture brings. This is, for example, the cultivation of human capital, the development of the emotional side of a person, or the development and support of the creation

of social ties between individual segments of society. From an economic point of view, it makes sense to support culture not only for historical reasons, but especially because of the creation of new markets, jobs, and monetary benefits from realized cultural goods and services. Caring for high-quality and effective cultural development through systematic, long-term, and sufficient financial support within individual levels of public budgets is desirable for a developed democratic society.

The aim of the paper is to evaluate the structure of income and expenditure in a selected sample of municipalities in the Czech Republic with an emphasis on publicly spent expenses from municipal budgets in culture in the years 2010-2020. As part of the paper, the following hypothesis will be verified: "In selected municipalities in the conditions of the Czech Republic, there is a significant difference in the % of public expenditure from the own budget directed to the area of culture".

2 Culture and Review of Literature

In democratically managed economies, the private sector should play a primary role, but each of its failures leads to the development of the public sector, where the needs of society and citizens are met in the public interest, usually in the form of pure or mixed public goods and services. In economic literature, the issue of estates was already mentioned in the works of Pareto and Schwier (1927). However, the definition of public goods is attributed to Samuelson (1954), further extended in the context of financing by Musgrave (1959) and discussed by Arrow (1963), Niskanen (1971), Pollitt (1993), Buchanan (1998), Samuelson, Nordhaus (2010) or Stiglitz and Rosengard (2015).

In Western countries, the area of culture is considered a complex part of the national economy, which is further divided into several sub-areas. The division of individual areas of culture also corresponds to the professional interest of Czech and foreign authors who publish in the given area. As a rule, it is based on the application of performance management principles and comparison with others in the field through the method of Benchmarking or in the context of the concept of "Value for Money" (VFM). This was noted by Boyne (2002); Radnor and McGuire (2004); Emery et al. (2008) or Antinoja et al. (2011). According to Kaluganga and Kakwezi (2013), the basis of the concept of VFM for publicly established organizations should be the best possible use of public funds to achieve the intended results, while the management of the organization should be responsible for the economic, efficient, and effective management of the organization. Pressure from the public then forces cultural organizations supported by public resources to monitor and improve the services they provide (Vavrek, 2015) and to increase performance to compete with other organizations providing public goods (Varadzin, 2017) on the market (albeit not on a profit basis)) and thus ensured long-term existential security.

Among the sub-areas of culture that cannot do without public funding at the local level to secure mixed assets in culture, we can mention, for example, the area of librarianship, theater or museums. This is evidenced by several professional Czech and foreign works. Within librarianship, for example, Vrabková (2019) can be mentioned, which deals with the evaluation of the technical efficiency of municipal libraries in the Czech Republic or the productivity of the basic services of municipal libraries. Among foreign authors, we can mention, for example, Najafi, Sefiddashti, Sheikhshoaei and Hajiagha (2020), who deal with a comprehensive evaluation of the performance of libraries using data package analysis, or Šebová and Maličká (2019) or Kozuń-Cieślak (2018). Bečica (2018) or Bečica, Vavrek, Gałecka and Smolny (2021), who examine the effectiveness of theaters using multicriteria analyses, and Ardielli and Bečica (2018), who deal with the financial and technical availability of professional theater for citizens, deal with the evaluation of effectiveness in the field of theater. Foreign authors include, for example, Gałecka and Smolny (2019). In the area of museums and galleries, we can mention, for example, Frey (2003) or Kolb (2005), Vrabková and Bečica (2021), or Vavrek and Bečica (2020). Other authors include Šebová (2018), who examines the economic effectiveness of cultural institutions. Loach, Rowley, and Griffiths (2017) deal with strategies for the long-term sustainability of clients of cultural organizations, for example, who state that the activity of cultural institutions is not only in the maintenance of culture, but also extends to the social, economic, or environmental level. Ardielli (2020), for example, deals with the comparison and evaluation of the performance of the cultural sector in the EU member states. The general issue of financing (including culture) through public resources is addressed in their works by several authors, e.g., Bečica (2014), Provazníková (2015), Bečica, 2015), Nevima (2018), Sedmihradská (2018) or Shevtsova (2020). Examples from abroad include Silva, Burgos and Madeiros (2018) or Papcunová et al (2020). It is also appropriate to mention authors who deal with the financial analysis of public organizations, which also includes cultural organizations, e.g., Knápková (2017) or Kislingerová (2008).

3 Data and Methodology

Although it may not be obvious at first glance in society, culture, and everything else related to this area surrounds us omnipresently and influences us to a large extent. Although many individuals in civil society do not admit it, culture combines elements of history and at the same time it is culture that shapes the future. These facts in themselves justify the main purpose of this contribution, i.e., to evaluate the level of financial support for culture from public sources at the local (municipal) level in the conditions of the Czech Republic.

According to (Towse, 2020), a supporting argument for analyzing the financing of culture is the fact that the culture sector has undergone a series of dynamic changes in the last decade, which are increasingly convincing even experts who have not shown much interest in the economics of culture to integrate this knowledge with mainstream knowledge economy. At the same time, according to (Thorsby, 2010), there is an interest in supporting culture as a creative and creative industry that is and will be a source of innovation and economic dynamism. The period from 2010 to 2020 was chosen for the analysis of spending on culture from the local level and testing the hypothesis.

The key data source is the data collected within the SP 2021/18 project "Evaluation of the performance of public service providers in the Czech Republic", which was implemented as part of a student grant competition at the Faculty of Economics VŠB-TUO in the largest cities located in the Czech Republic. The default data source is the MONITOR information portal of the Ministry of Finance of the Czech Republic, which offers a comprehensive overview of public finances in the Czech Republic. Data collection was based on the current budget structure of the Czech Republic, which guarantees their methodological uniformity in reporting.

To be able to evaluate the above-mentioned expenses for culture, it was necessary to collect data according to the sectoral classification of the budget structure, broken down into groups, sections and subsections of expenses. For the needs of the assessment, the assessed group was expenditure on services for the population, the section Culture, Churches and religious societies and their individual subsections. Expenditure in culture was evaluated in a total of 205 municipalities with extended jurisdiction out of a total of 6,258 municipalities in the Czech Republic. Because the powers of individual municipalities in the Czech Republic differ, municipalities with extended jurisdiction were selected for evaluation, which are a kind of intermediate link within the state administration between regional authorities and ordinary municipalities. A specific feature of ORP is, in addition to a greater degree of powers and duties in the field of state administration, also the obligation to provide selected services for other municipalities falling within their administrative district. In the field of culture, they are important units mainly due to the implementation of selected activities and duties within the sphere of heritage conservation. They financially support restoration and restoration work on selected cultural monuments that are outside protected areas and whose main purpose is the preservation and mediation of cultural heritage. The ORP, through its departments of culture, further functions as a project coordinator of municipalities in their administrative districts for the selection of investment projects supported through the Ministry of Culture of the Czech Republic. Among other things, the departments of culture and heritage care provide professional methodological and management activities in the field of culture for the municipalities in the territory of their administrative district. Finally, the ORP fulfills the function of a "catchment" municipality for the surrounding municipalities falling within the administrative district. Thanks to this, ORPs can, for example, provide a certain type of cultural asset or service for a larger number of users, thereby spreading the costs associated with it among several entities.

As already mentioned in the introduction, the aim of the paper is to evaluate public spending on culture from the budget of selected municipalities in the Czech Republic in the years 2010–2020. For the purposes of the evaluation, the following hypothesis will be verified: "In selected municipalities in the conditions of the Czech Republic, there is a significant difference in the % of public expenditures from the own budget directed to the field of culture". The purpose of the analysis of public expenditure at the local level in the specific area of culture assumes that if the gross domestic product of the Czech Republic did not decrease in the analyzed period of 2010-2020 in a total of eight periods apart from 2012 and 2020, the growth of public expenditure should be reflected positively in specific areas of culture.

To determine the test criterion, the sum of expenditures on culture (subsections 331 and 333 of the sectoral aspect of the budget structure of the Czech Republic) is given as a proportion to the total expenditures selected by the ORP in the monitored period of 2010-2020. The resulting value of the test criterion is given as a percentage and rounded to two decimal places. A median is calculated from the resulting values of the test criteria for each observed period. A value within ± 10% of the determined median in the given period is considered a comparable value of the test criterion within the allowance. Test criteria that are more than ± 10% away from the calculated median in each period are considered significantly different. For the purposes of the article, the selected municipalities are all ORPs in the territory of the Czech Republic, apart from the capital city

of Prague, which is deliberately omitted for methodological reasons, due to the reported extreme values in the monitored indicators, which distort the resulting values.

The median ($\tilde{x}$) is the middle value in a group of values, where exactly half of the values are higher, and half are lower than the median value. The formula is used to calculate the median value:

$$Mdn\ (\tilde{x}) = (x\_((n/2))+x\_((n/2)+1))/2 \quad (1)$$

where:

x … observed value

n … number of monitored values

4 Results and Discussion

In the following text, the observed results are commented on, which are divided separately into the revenue side and separately into the expenditure side of the budgets of the evaluated municipalities, which are further divided into expenditures according to the type and sector classification of the budget structure.

4.1 Results in the Income Side of Municipal Budgets

In table number one, the resulting values of the incomes of the assessed municipalities with extended jurisdiction in the period from 2010 to 2020 are shown according to the type of classification of the budget composition.

Table 1 - Income structure according to type of budget composition within the ORP in the years 2010–2020 in billion CZK

Year	Total income	Tax income	%	Capital income	%	Non-tax income	%	Transfers (subsidy)	%
2010	201,8	101,8	50,45	8,1	4,02	16,1	7,99	75,7	37,53
2011	190,8↓	101,2↓	53,03	4,9↓	2,55	17,3↑	9,09	67,4↓	35,33
2012	166,9↓	103,6↑	62,08	5,7↑	3,42	17,7↑	10,58	39,9↓	23,91
2013	171,5↑	110,1↑	64,19	4,4↓	2,57	16,9↓	9,86	40,1↑	23,38
2014	182,2↑	115,1↑	63,18	3,6↓	1,99	20,6↑	11,31	42,9↑	23,53
2015	181,7↓	118,3↑	65,1	2,7↓	1,5	18,6↓	10,22	42,1↓	23,19
2016	187,1↑	128,2↑	68,5	4,7↑	2,53	18,1↓	9,69	36,1↓	19,28
2017	195,6↑	138,2↑	70,68	3,1↓	1,6	16,9↓	8,65	37,3↑	19,07
2018	218,5↑	151,1↑	69,15	3,3↑	1,53	19,0↑	8,69	45,0↑	20,6
2019	237,7↑	163,7↑	68,87	3,1↓	1,29	20,1↑	8,47	50,7↑	21,33
2020	239,6↑	153,5↓	64,07	3,0↓	1,25	21,5↑	8,97	61,6↑	25,71
MIN	**166,9**	**101,2**	**50,45**	**2,7**	**1,25**	**16,1**	**7,99**	**36,1**	**19,07**
MAX	**239,6**	**163,7**	**70,68**	**8,1**	**4,02**	**21,5**	**11,31**	**75,7**	**37,53**
Mdn ($\bar{x}$)	**197,58**	**125,89**	**63,57**	**4,24**	**2,20**	**18,44**	**9,41**	**48,98**	**24,81**
σ	**24,70**	**22,57**	**6,50**	**1,60**	**0,91**	**1,71**	**1,01**	**13,34**	**6,11**

Source: MONITOR 2022. Own processing.

From table number one, it is possible to interpret the structure of public revenues of a sample of municipalities

over an eleven-year period. The second column of the table shows the development of total public revenues for the monitored period, from which the trend of year-on-year growth in the total volume of funds received is evident. After the rapid development of 2010 and 2011, year-on-year growth is the rule, except for 2015. The minimum value of income in the monitored period was recorded in 2012, on the contrary, the highest value was recorded in the last monitored period in 2020. The rate of growth between individual periods can be considered relatively moderate, i.e., there are no significant jump changes.

Since 2011, there has been a gradual growth in the absolute volume of tax revenues, apart from the last observed period, when there was both an absolute and a relative decrease in this class of revenues. Since the development of the budgetary determination of taxes is towards a higher level of redistribution of tax revenue between municipalities, the values found in the table for the sample of monitored municipalities have their justification. The volume of public revenues of tax origin flowing into the budget of the evaluated municipalities is also

influenced by the overall development of the Czech economy in the monitored period. A long period of positive GDP development in the Czech Republic logically brings with it a positive development in the volume of collected tax revenues. In 2020, however, it is most likely possible to observe the effects of the coronavirus pandemic, which were manifested by a drop in the total volume of collected funds of tax origin. The importance of the class of tax revenues in terms of ORP in the Czech Republic is underlined by the fact that in the monitored period their representation did not fall below 50% and on average constituted 63%, and at its maximum almost 71%. Although the class of tax income is the majority in absolute and relative terms, it is desirable to analyse income from other classes as well. Capital income in the monitored period was approximately 2% on average, which speaks of the activity of the sample of municipalities within activities generating income of capital origin. On average, 10% of the total income directed to the ORP budgets in the Czech Republic is non-tax income. The development of the class of non-tax income is to some extent a reflection of the success of the management of a sample of municipalities with their property. The class of non-tax income typically consists of income from the rental of own property, from organizations established and founded by municipalities and user fees. It is therefore undoubtedly desirable that the class of non-tax income grows over time. The last class, which is the second in order in terms of volume and percentage representation, is the class of income from received transfers. On average, within the monitored period, the received transfers constituted less than CZK 50 billion per year in absolute terms and relatively less than 25% of budget revenues. Municipalities draw entitlement and non-entitlement subsidies from various sources. At first glance, there is a clear, significant difference between the first and last monitored period. Of course, the current economic situation of the state or the number of implemented and supported subsidy programs has an impact on the total volume of received transfers. At the same time, however, the decreasing share of transfers in the total income of municipalities signals a certain increasing degree of independence of municipalities from support from other types of budgets (state, region, state funds, funds from the EU).

4.2 Results in the Expenditure Side of Municipal Budgets

In table number two, we can see the volume of expenditure incurred within the ORP in the territory of the Czech Republic, broken down into current and capital expenditure. The public expenditure component was also analysed from a different point of view in table number three, namely from the point of view of the sectoral classification of the budget composition, which is more comprehensible to ordinary citizens for the interpretation of spent funds and is more commonly used in everyday practice.

Table 2 - Structure of expenses according to the species aspect of the budget structure within the ORP in the years 2010–2020 in billion CZK

Year	Total expenditure	Common expenditure	%	Capital expenditure	%
2010	207,9	150,1	72,18	57,8	27,82
2011	193,4↓	145,5↓	75,24	47,9↓	24,76
2012	161,8↓	120,0↓	74,16	41,8↓	25,84
2013	160,2↓	122,8↑	76,66	37,5↓	23,41
2014	177,9↑	126,4↑	71,04	51,6↑	28,99
2015	164,7↓	126,6↑	76,86	38,1↓	23,14
2016	159,9↓	131,5↑	82,23	28,0↓	17,52
2017	181,2↑	145,7↑	80,42	35,5↑	19,58
2018	214,4↑	160,9↑	75,04	53,5↑	24,96
2019	218,8↑	171,3↑	78,3	47,5↓	21,7
2020	228,7↑	179,5↑	78,46	49,3↑	21,54
MIN	**159,9**	**120**	**71,04**	**28**	**17,52**
MAX	**228,7**	**179,5**	**82,23**	**57,8**	**28,99**
Mdn ($\bar{x}$)	**188,08**	**143,66**	**76,42**	**44,41**	**23,57**
σ	**25,82**	**20,31**	**3,36**	**8,96**	**3,41**

Source: MONITOR 2022. Own processing.

Table number two shows the structure of public expenditures according to the species aspect of the budget composition within the ORP in the years 2010-2020 in CZK billion. It can be seen from the table that, at first glance, the development of total ORP expenses fluctuates relatively within the monitored period. The total volumes of public expenditures of the ORP are undoubtedly influenced by the current economic situation of the

Czech Republic and the amount of disposable income because municipalities cover their expenses with their income. Since 2017, the year-on-year growth of total expenses can be observed, which on average in the evaluated municipalities amounted to CZK 190 billion in the monitored period. In general, it can be said that there is more and more pressure on municipalities in terms of the quantity and especially the quality of goods and services provided and secured, which is reflected in the expenditure component of the budget. The positive fact is that, except for 2010 and 2011, the revenues achieved were higher than the realized expenses. This fact allows municipalities to create a certain amount of reserve funds to secure future spending needs. Most expenses belong to the so-called current expenses. On average, they make up about 75% of the total expenses. Current expenses are related to ensuring the implementation of public goods and services and the normal operation (running) of municipalities. Since 2012, there has been year-on-year growth in this category of expenses, which is also related to the general pressure to increase the quantity and quality of activities implemented and secured by municipalities, and at the same time, the category of current expenses is reflected in the growing demands for increasing the wage level of public sector workers. In the capital expenditure class, relative volatility can be observed between individual periods. The importance of capital expenditures lies in their long-term nature and ability to generate additional income for the given municipality in the future. Municipalities typically prepare for the implementation of large investment projects over several budget periods, when they allocate funds from income to secure the investment. On average, capital expenditures make up a quarter of the total expenditures of the evaluated municipalities. It is very important to support municipalities in effective investment activities because appropriate investment projects, in addition to increasing the quality and standard of public goods and services, can bring additional funds for the following period.

Table number three shows the structure of public expenditures according to the sectoral aspect of the budget structure within the evaluated municipalities with extended jurisdiction for the years 2010-2020 in CZK billion. Viewing public expenditures through a sectoral perspective offers an easier way to classify individual expenditure items according to their impact on individual sectors of the national economy.

Tabel 3 - Structure of expenditures according to the sectoral aspect of the budget composition within the municipalities in the years 2010-2020 in billion CZK

Year	Total expenditure	Agriculture, forestry, and fisheries	Ïndustrial and other sectors of the economy	Services for the population	Social affairs and the employment policy	State security and legal protection	Public administation and services
2010	207,9	0,6	51,9	82,1	30,0	6,2	37,2
2011	193,4↓	0,5↓	47,0↓	74,6↓	29,9↓	5,9↓	35,3↓
2012	161,8↓	0,5→	46,1↓	70,2↓	5,3↓	5,9→	33,7↓
2013	160,2↓	0,5→	44,0↓	69,8↓	5,0↓	6,2↑	34,7↑
2014	177,9↑	0,5→	52,4↑	79,3↑	6,0↑	6,1↓	33,6↓
2015	164,7↓	0,5→	44,1↓	74,6↓	7,7↑	6,2↑	31,7↓
2016	159,9↓	0,5→	41,6↓	70,4↓	7,5↑	6,7↑	33,2↑
2017	181,2↑	0,6↑	46,6↑	82,1↑	9,5↑	7,4↑	35,0↑
2018	214,4↑	0,5↓	53,3↑	101,3↑	12,0↑	8,0↑	39,3↑
2019	218,8↑	0,6↑	53,4↑	102,3↑	12,9↑	8,5↑	41,2↑
2020	228,7↑	0,6→	57,6↑	104,3↑	15,2↑	9,5↑	41,5↑
MIN	**159,9**	**0,5**	**41,6**	**69,8**	**5**	**5,9**	**31,7**
MAX	**228,7**	**0,6**	**57,6**	**104,3**	**30**	**9,5**	**41,5**
Mdn ($\bar{x}$)	**188,08**	**0,54**	**48,91**	**82,82**	**12,82**	**6,96**	**36,04**
σ	**25,82**	**0,05**	**5,04**	**13,47**	**9,07**	**1,22**	**3,32**

Source: MONITOR 2022. Own processing.

From table number three, some of the total six groups of expenses are significantly larger in terms of the absolute volume of funds spent within the monitored period. The group of agriculture, forestry and fishing is typically a minority for municipalities. This is due to the nature of expenses within this group, which are typical for other levels of public budgets than municipal budgets. The second smallest group of expenses are expenses for state security and legal protection. This group includes expenses related to ensuring the functioning of the

municipal police or expenses related to fire protection of the municipality, on average this group contributes less than CZK 4 billion to the total expenses. Third from the end in absolute volume, but already probably higher, is the group of social affairs and employment policy. Within this group, expenses associated with the functioning of homes for the elderly, care services or social services are shown. On average, this group participates in the total expenses in the sample of almost CZK 13 billion. At the same time, it is appropriate to note the relatively noticeable tendency of growth in expenses, since 2012. This is undoubtedly related to the growing requirements for the quantity, quality, and availability of social services, at the same time this may reflect the demographic development of the age of the population in the Czech Republic, which is increasing. The third largest group of expenses in the sample of municipalities is expenses connected with the provision of public administration and services. The expenses of this group include all public expenses related to the functioning of the municipal office, i.e., the actual implementation of self-government and state administration in the transferred competence. Among other things, this group includes expenses related to the functioning of representative bodies. On average, this group amounted to more than CZK 35 billion during the monitored period. Again, a gradual year-on-year increase is noticeable since 2015. The growth can be largely influenced by the growing demand for positive wage development and the associated contributions to the social and health insurance of employees. The second largest group is expenditure related to industry and other sectors within the economy of the Czech Republic. Typical expenses in this group are funds spent on the maintenance and construction of roads, on the operation and maintenance of public road or rail transport or water pipes, sewers, wastewater treatment plants, etc. On average, this group reached almost 49 billion per year. Again, this group also shows a growing tendency since 2015. The last and most important from the point of view of the total volume of funds issued is the group of services for the population. This group of expenses is the widest for municipalities in terms of the spectrum of the scale of expenses in terms of services for the population. These are expenses for education, culture, physical education, communal services, housing in municipal property or the environment. On average, this group of expenses during the monitored period amounted to almost CZK 83 billion per year for the evaluated municipalities. Here, too, a relatively significant tendency towards the growth of these expenses can be seen in recent years.

In the table number 4, we can see the above-described sectoral classification of expenses using a relative expression in %.

Tabel 4 - Structure of expenses according to the sectoral point of view of the budget composition within the ORP in the years 2010-2020 in %

Year	Total expenditure	Agriculture, forestry, and fisheries in %	Industrial and other sectors of the economy in %	Services for the population in %	Social affairs and the employment policy in %	State security and legal protection in %	Public administration and services in %
2010	207,9	0,28	24,97	39,49	14,41	2,97	17,89
2011	193,4↓	0,28	24,32	38,60	15,48	3,07	18,25
2012	161,8↓	0,32	28,47	43,41	3,30	3,64	20,85
2013	160,2↓	0,32	27,45	43,57	3,12	3,89	21,65
2014	177,9↑	0,29	29,43	44,57	3,39	3,45	18,87
2015	164,7↓	0,31	26,74	45,28	4,67	3,78	19,22
2016	159,9↓	0,32	26,01	44,05	4,68	4,19	20,75
2017	181,2↑	0,31	25,72	45,32	5,25	4,1	19,29
2018	214,4↑	0,23	24,86	47,25	5,60	3,74	18,32
2019	218,8↑	0,28	24,4	46,74	5,87	3,86	18,84
2020	228,7↑	0,28	25,17	45,61	6,64	4,17	18,14
MIN	**159,9**	**0,23**	**24,32**	**38,6**	**3,12**	**2,97**	**17,89**
MAX	**228,7**	**0,32**	**29,43**	**47,25**	**15,48**	**4,19**	**21,65**
Mdn ($\bar{x}$)	**188,08**	**0,29**	**26,14**	**43,99**	**6,58**	**3,71**	**19,28**
σ	**25,82**	**0,03**	**1,70**	**2,73**	**4,29**	**0,41**	**1,26**

Source: MONITOR 2022. Own processing.

From table number four, the expenses related to agriculture, forestry and fishing accounted for an average of 0.3 percent of the total expenses in the evaluated municipalities. The development of this group can be considered constant over time. Also, the group of expenses related to state security and legal protection recorded a relatively constant development, when on average these expenses amounted to 3.7%. The group of expenditures related to social affairs and employment policy is experiencing slow growth in relative terms, on average this group represents more than 6.5% of total expenditures. On average, less than 20% of total expenses are related to public administration and services, and another 26% to the group of industries and other sectors within the national economy. On average, almost 44% of the total expenditure of the monitored municipalities is shared by the group of services for the population, which is a group within which the specific area of culture is also included, which will be evaluated further.

4.3 Results of the Comparability of Public Expenditures in Culture Through the Share of the Budget

In the years 2010-2020, the mutual comparability of expenses was tested on a sample of all municipalities with extended jurisdiction. Table number five shows the comparability of ORP expenditures from the point of view of the percentage representation of the expenditures on culture (the subsections 331 and 333 from the sectoral point of view of the budget structure of the Czech Republic) on the total expenditures of the given municipality in the evaluated period.

Tabel 5 – Summary of the results of expenditure assessed by ORP in expenditure on culture in the period 2010-2020

Year	The observed median of the period in %	Lower bound of the hypothesis in %	Upper bound of the hypothesis in %	Number of municipalities below the limit - 10 % from the median	Number of municipalities meeting the conditions of the hypothesis	Number of municipalities above the limit + 10 % from the median
2010	2,66	2,39	2,92	94	20	91
2011	2,59	2,32	2,84	93	17	95
2012	3,58	3,21	3,93	90	20	95
2013	3,81	3,40	4,16	95	21	89
2014	3,51	3,11	3,80	91	19	95
2015	3,44	3,10	3,78	89	25	91
2016	3,60	3,23	3,95	91	24	90
2017	3,66	3,29	4,02	96	17	92
2018	3,51	3,15	3,84	87	26	92
2019	3,44	3,09	3,78	90	22	93
2020	3,38	3,04	3,72	91	18	96
MIN	**2,59**	**2,32**	**2,84**	**87**	**17**	**89**
MAX	**3,81**	**3,40**	**4,16**	**96**	**26**	**96**
Mdn ($\bar{x}$)	**3,38**	**3,03**	**3,70**	**92**	**21**	**93**

Source: MONITOR 2022. Own processing.

From the values in table number five, the upper and lower bounds for the hypothesis test in the field of culture expenditure are evident. The calculations showed that, on average, the value of the detected median in the sample was 3.38%, at its minimum the value of the detected median was at 2.59% and at its maximum at 3.81%. At first glance, relatively low volatility in the value of the detected median between individual periods is evident. In a total of six of the eleven monitored periods, even the value of the detected medians decreased year-on-year. The last three columns of table number five report on the state of culture spending at the evaluated ORPs in the Czech Republic in the years 2010-2020 according to the conditions set by the hypothesis. It can be seen from the table that significant differences were identified between ORPs, on average only 21 evaluated municipalities in the Czech Republic can be considered mutually comparable according to the conditions of the hypothesis. The period when the comparability of individual municipalities could be considered the greatest was the year 2018, when there was a total of 26 such municipalities. On the contrary, the least comparable periods from this point of view were the years 2011 and 2017, with only 17 municipalities that passed the test of the established

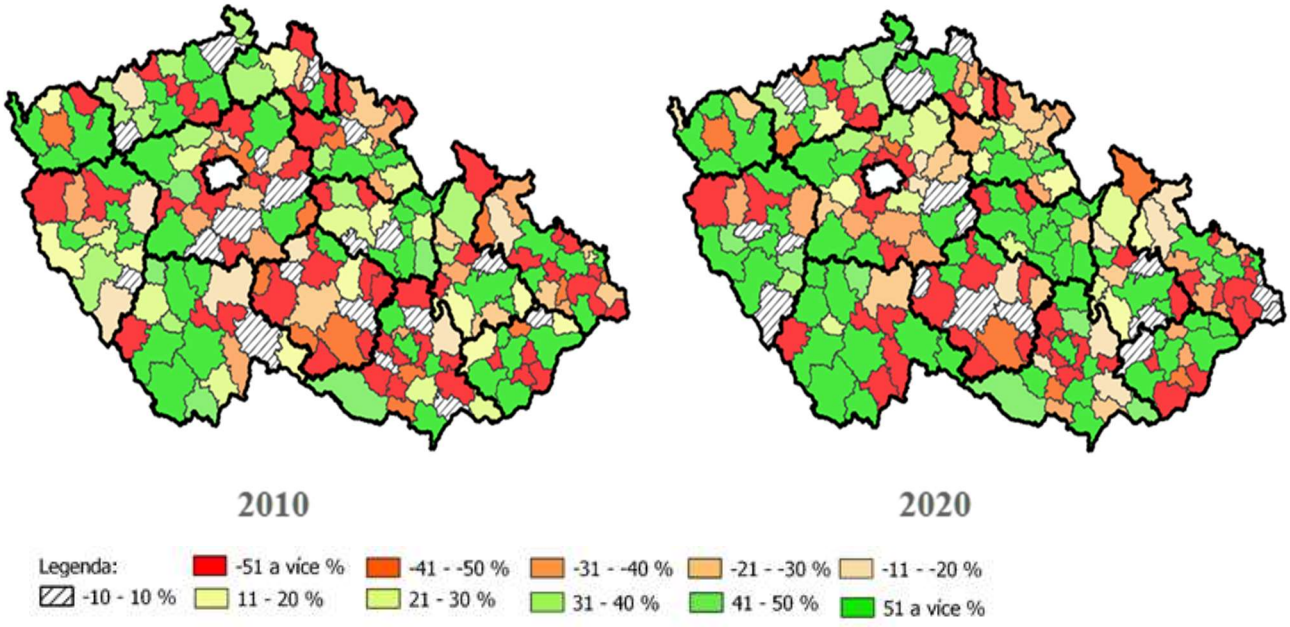
hypothesis. In a total of seven of the eleven monitored periods, there were more municipalities moving above the value + 10% from the established median than below the value - 10% from the established median. In a total of four periods, the opposite situation occurred, when a larger number of municipalities were identified moving below the set limit compared to municipalities with values above the set limit. In general, for the entire period, the overall structure of the evaluated municipalities in the territory of the Czech Republic, according to the conditions set by this hypothesis, tends to a higher number of municipalities moving above the threshold value of + 10% from the established median. In the total number, according to the conditions of the hypothesis, the municipalities can be considered mutually incomparable, and a relatively high variability of values is visible for some evaluated municipalities. It is also not easy to identify a specific trend in the long term for the entire evaluated sample of municipalities.

If we look at the evaluated municipalities through the lens of their regional integration, we will come to the fact that the regions in which the most municipalities that met the conditions set by the hypothesis are located include the Hradec Králové Region with an average of 18%, with the typically successful municipalities of Dvůr Králové nad Labem, Jaroměř, Náchod or Rychnov nad Kněžnou. Another region in which specific municipalities showed a higher average percentage of success regarding the conditions of the hypothesis is the Liberecký region with an average value of 15%. Semily and Tanvald can be included among the most successful municipalities. A relatively high average percentage of municipalities meeting the conditions of the hypothesis can also be identified in the Central Bohemia region, with an average value of 14%. Successful municipalities include Benešov, Čáslav and Kolín. Most municipalities in regions such as Jihomoravský, Moravskoslezský, but also Vysočina and Středočeský are typically in a larger number moving below the value - 10% from the established median of the year. Conversely, more municipalities in the territory of regions such as Jihočeský, Karlovy Vary, Hradec Králové, Olomouc, Plzeňský, Pardubický Ústecký or Zlínský

from a long-term perspective, it is possible to identify values above + 10% of the established median. Benešov, Čáslav, Český Těšín, Dvůr Králové nad Labem, Chomutov, Ivančice, Jaroměř, Kolín and Semily are among the municipalities that fulfilled the conditions set by the hypothesis in more than half of the cases, i.e., more than six times.

For a comprehensive and easier idea of the calculated structure of the comparability of the individual evaluated municipalities from the point of view of the percentage representation of the expenditures on culture (with subsections 331 and 333 from the sectoral point of view of the budget composition of the Czech Republic) on the total expenditures of the given municipality in the given period, graph number one presents a map of the geographical location of the individual municipalities (their municipal boundaries with extended scope) in the selection of the first and last evaluated period, i.e. the years 2010 and 2020.

Figure 1 - Geographical interpretation of the distance from the established median within the established hypothesis



Source: MONITOR 2022. Information system QGIS. Own processing.

From the visualization of individual municipalities in the maps for the year 2010 and 2020, the result of the established structure of expenditures on culture is visible according to their calculated distance from the established median of the entire set in the given year of assessment. For better orientation, the borders of higher territorial self-governing units are highlighted in bold on the map. The municipalities that met the conditions set by the hypothesis are marked with hatching in the individual maps, of which there were a total of 20 in eleven different regions in 2010. In 2020, a total of 18 evaluated municipalities in a total of eight different regions met the conditions set by the hypothesis. Looking at the individual maps, there is a relatively clear change in the structure of the distribution of municipalities in 2010 and 2020. Between the periods shown, there was a decrease in the number of municipalities that were in the zone marked in dark red, while at the same time a larger number of municipalities moved into the dark green zone, indicating municipalities at a distance greater than + 51% from the value of the determined median. The situation visible in individual maps may indicate a growing difference in the comparability of individual municipalities according to the conditions investigated by the stated hypothesis. A rather interesting fact that can be traced from the individual maps is the distinct effect of the so-called "cultural center", as the capital city of Prague is referred to in the Czech Republic. Individual municipalities that are adjacent to the capital city of Prague most often show a lower percentage representation of the expenditures on culture (with subsections 331 and 333) according to the sectoral aspect of the budget composition on the total expenditures of the given municipality in the given period at less than - 10% from the established median. Typically, these are e.g., the municipalities of Černošice, Brandýs nad Labem-Stará Boleslav, etc. From the geographical display of the calculated results, it follows that within the regions of the Czech Republic, municipalities in regions such as Plzeňský, Pardubický rank in the foreground in the long term regarding the positive distance from the established median, Karlovy Vary, or South Bohemia. On the contrary, a larger number of municipalities that are below the set limit - 10% of the value of the median can be found in regions such as Jihomoravský, Moravskoslezský or Vysočina.

Based on the above-mentioned facts, it is possible to confirm that under the conditions described in the methodology, the expressed hypothesis was confirmed, i.e., within the selected municipalities in the Czech Republic there is a significant difference in the % of public expenditures from the own budget directed to the area of culture.

5 Conclusion

Culture can be considered as an all-encompassing entity that has its esteemed place within contemporary modern society and should not be taken lightly. Although it is sometimes not very clear, culture combines elements of history, but at the same time influences the present and forms the basis for the future. Meaningful and long-term care for culture is indisputably necessary, at all levels of public expenditure, starting with state expenditure and ending with expenditure from the budgets of municipalities, which are also the most frequent founders of cultural institutions in the Czech Republic.

As part of the contribution, the existence of a significant difference in the % of public expenditure from the own budget directed to the field of culture was verified in all municipalities with extended jurisdiction within the Czech Republic between 2010 and 2020. On average, within the monitored period, the value of expenditure on culture reached median 3.38%, at its minimum in 2011 it was 2.59% and at its maximum in 2020 it was 3.81%. Relatively low volatility was detected in the value of the detected median between individual periods. It was found that out of a total of 205 evaluated municipalities in the territory of the Czech Republic, within the monitored period, an average of 21 municipalities can be considered mutually comparable, the smallest number of comparable municipalities was recorded in 2011, namely only 17. On the contrary, the largest in 2018, a total of 26 municipalities. In conclusion, it is possible to state that only 10% of all evaluated municipalities in the Czech Republic can be considered mutually comparable according to the conditions of the established hypothesis. At the same time, on average, 45.2% of the municipalities in the Czech Republic are above the set limit + 10% from the value of the established median, the rest of the municipalities are in the opposite range, i.e. - 10% from the value of the established median.

Among the regions in which, on average, there are the most municipalities that met the conditions set by the hypothesis, the Královehradecký, Liberecký and Středočeský regions are included. Most municipalities in the South Moravian, Moravian-Silesian and Vysočina regions are below the set value comparability of spending on culture, i.e., set hypotheses. On the contrary, most municipalities in the regions of South Bohemia, Karlovy Vary, Hradec Králové, Olomouc, Plzeňské, Pardubice Ústecký and Zlínské have long-term values above + 10% of the established median. Benešov, Čáslav, Český Těšín, Dvůr Králové nad Labem, Chomutov, Ivančice, Jaroměř, Kolín and Semily are municipalities that met the conditions set by the hypothesis in more than half of the monitored periods, i.e., more than six times. In the long term, the city of Chomutov showed the most comparable values according to the conditions set by the hypothesis, which met the conditions in 8 of the

total 11 evaluated years. It can therefore be stated that within the assessed municipalities there is a significant difference in the % of public expenditure from the own budget directed to the area of culture, which is clearly shown by the displayed maps of individual municipalities in 2010 and 2020.

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Expenditure on Education in the Czech Republic and Poland Compared to OECD Countries

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Abstract

The education system, its quality and the resulting education of individuals is a constantly highly inflected term in each of the developed countries of the world. The measurement of educational outcomes is highly debatable in the long term, as there is no agreement on specific measurable criteria across the entire educational system, which in the developed countries of the world includes both private and publicly established educational institutions. The outputs and quality of the entire educational system usually become apparent only after a certain period (usually several years to decades) and is dependent on several factors. However, it cannot be done without enough financial resources, which are one (not the only) of the limiting factors in the development of the educational system, established institutions and the outputs produced by them in the form of education of individuals. The aim of the paper is to compare the amount of funds spent on education in the Czech Republic and Poland compared to the most developed countries in the world (OECD). It follows from the results that the expenses spent in the Czech Republic and Poland in terms of per student are not at a comparable level and differ from one another in the individual stages of the education system. The positive thing is that in both countries' education spending is gradually increasing over time, but in most educational stages both per student and as a % of GDP are still below the average of OECD countries.

Keywords: *Czech Republic, education, expenditure, OECD, Poland*

JEL Classification: *H41, H52, I21, R52*

1 Introduction

The field of education is one of the most important branches of the public sector, which within the national economy ranks in the development services sector and among non-profit organizations. Both in the Czech Republic and in Poland, according to the statistical office, the largest number of non-profit organizations is reported in the field of education, culture or in the social field. Their goal is to influence the economic growth of the country, preserve and cultivate human potential and provide quality services to the population. A common feature of publicly (and often privately) established non-profit organizations is that they are financed mainly or partly from public budgets. Their goal is not profit (although they may report this), but the provision of concretely formulated services for broad segments of the population.

The services provided are difficult to measure, especially in a non-market environment and for converging long-term agreements on output standards. As a rule, there is a lack of performance, technical or economic outputs that could be evaluated and on which there would be agreement within the entire national economy or across different service providers. Comparing outputs between countries is even more complicated, as services that look the same can differ diametrically from one another due to the internal organization of the system. Inputs, on the other hand, can be measured relatively simply, through the number of financial resources spent or the number of providers, which is also the goal of this paper in the education system in the Czech Republic and Poland. Both systems will be compared according to the amount of funds invested from public budgets per student according to individual educational stages organized according to the international ISCED classification and compared with results in OECD countries using the most current available data. As part of the contribution, the shares of public and private resources as a percentage of GDP will also be shown for the evaluated countries, broken down into regional and tertiary education. In the end, the authors of the contribution will reflect on current trends and possibilities for improving educational systems based on practical experience.

2 The Education System and its History in the Czech Republic and in Poland

The beginnings of the education of people and educational systems were laid both in the territory of the Czech Republic and Poland already in the Middle Ages. But education was intended only for selected layers of the population (nobility, rich townspeople, church dignitaries). A drastic change in the education of broad sections of the population occurred in both countries only during the 18th century after the introduction of the so-called general school rules. Currently, in both states compulsory school attendance is applied at a certain level of education for all residents, which is a typical pure public good with mandated consumption, which is paid for from public funds. In essence, this is a guaranteed right to education for every individual, which is regulated by the articles of the Charter of Fundamental Rights and Freedoms, which are an integral part of the constitutional order of the Czech and Polish Republics. In these highest legal documents of both states, it is stated that school attendance is compulsory for the period specified by law, and free of charge in primary, secondary and, if society allows, also in universities. In the higher stages of the education system (secondary and higher education), the education of persons in both states is therefore voluntary. It thus depends on the decision of the individual whether and to what extent he will use the mentioned degrees of education.

The legislative anchoring of educational systems, including various sub-areas (specific types of education, interest and artistic education, education for the disabled, education and remuneration of teaching and non-teaching staff, etc.) is subsequently dealt with in both states by separate legal regulations, which are regularly amended. Given that both countries are part of the European Union and the Organization for Economic Cooperation and Development (OECD), the ISCED international classification of education is applied in the education system. Within this system, individual stages of the education system are distinguished into primary, lower secondary, upper secondary, post-secondary non-tertiary and lower and higher tertiary education. From the point of view of funds, in most countries of the developed world, finances are divided into two areas. The first of them consists of the so-called regional education, which ensures the primary, secondary and post-secondary level of the educational system and corresponding institutions of various legal forms and founders. The issue of funding within tertiary education is reported separately, which is divided into lower and higher levels of higher education, which is implemented in both countries through colleges and universities, which are established by different founders and in different legal forms. This basic structure of the education system also corresponds to the ISCED classification, as well as the distribution of funds from public sources at the central and regional level, and the organizational structure of central or regional control bodies in education, among which we include the Ministry of Education, Youth and Sports, the Ministry of Science and Research, various school inspections, accreditation authorities or other institutions operating in education.

2.1 Education and Public Service in Literature

In developed OECD countries, population education ranks among public services, and neither the Czech Republic nor Poland is an exception in this respect. From the point of view of their economic nature, public services are primarily public (collective) goods of public consumption, which are provided to the population without distinction. Musgrave (1959) stated that a public service can be defined as a service that is generally financed in whole or in part from public resources. Public resources can include those resources that, in democratic countries, are usually decided by the political representation elected by the population at the central, regional, or local level. In a similar vein, several authors draw attention to this in their works, e.g., Peková et al. (2012), Bečica (2014, 2015), Tománek (2015), Vavrek (2015), Sedmihradská and Bakoš (2016) or Tureckova and Nevima (2020).

Ochrana et al. (2007) then draws attention to several negative aspects that are associated with the provision of public services. It draws attention to emerging externalities and inefficiency in spending public funds, which subsequently leads to a general lack of public resources to secure public services to a sufficient extent and the required level of quality in individual areas (including education). This issue is addressed by several authors in the professional literature, depending on the individual areas. Among the general examples of efficiency evaluation in the area of public goods financed from public sources, we can mention, for example, the works of Galecko and Smolna (2019, 2017), Vaňková, Vrabková (2022), Vrabková, Ertingerová, Kukuliač (2021), Vrabková, Bečica (2021), Vavrek, Bečica (2020a, 2020b), Papcunová, Vavrek, Dvořák (2021). If we look directly at the field of education, then we can cite, for example, the works of the authors Bečica, Vavrek (2021), Chakraborty, Biswas, and Lewis (1999) or Chakraborty, Harper (2017); Conroy and Arguea (2007), or Ouellette and Vierstraete (2010) or Cordero, Santin and Simancas (2017).

From roughly the 60s of the 20th centuries the concept of teaching quality begins to appear within the professional literature in the field of education, mainly thanks to the works of Carroll (1963) and Bloom (1976). Einsiedler (2002) states that in the background of Carroll and Bloom's model there is an effort to compensate for the one-sidedness of the approach focused only on the quantity of teaching, by paying attention to characteristics (qualities) such as comprehensibility, structuredness and coherence of teaching. Carroll (1963) operates with the factors time required for learning and time available for learning. The lower the quality of teaching, the more time a student needs to learn. In his conception of teaching and its quality, Bloom (1973) considers not only the cognitive performance of pupils, but also motivational and affective goals (interest, attitudes, motivation, self-concept). Quality can be defined in different ways, including within the teaching process, or the assessed teaching level (primary, secondary, university). The definition of quality is given in their work by, for example, Harvey and Green (1993). Research examining the relationship between teacher behavior and student performance/results is presented, for example, by Brophy and Good (1986) or Wang, Haertel and Walberg (1993) or Seidel and Shavelson (2007). There are also several authors who deal with the issue of the quality of educational institutions. Examples include the works of Purkey and Smith (1983); Jackson (1990), Aurin et al. (1990); Steffens and Bargel (1993); Fend (2000) or Pol et al. (2005), Pol (2007); Blackmur (2008); Trnková, Knotová and Chaloupková (2010); Dvořák et al. (2010) or Janík et al. (2011).

Due to the fact, that even the professional public does not agree on specific measurable criteria in the field of education (quality measurement), the authors of the contribution further focus only on the comparison of the number of financial resources that flow in the Czech Republic and Poland from public funds to the field of education according to the breakdown into individual levels education (regional and tertiary education).

2.2 Methodology for Comparison Expenditure on Education

The comparison of the two evaluated countries (the Czech Republic and Poland) is based on the established methodology of regular surveys between individual EU and OECD member states, as can be seen from the document "Education at a Glance". The ascertained values of expenditures for the Czech Republic, Poland and other OECD countries are determined for individual countries by national statistical offices and subsequently converted within the OECD countries into a comparable unit, i.e., one enrolled student in the relevant level of the education system and converted to the equivalent of the US dollar (USD) in purchasing power parity in the relevant assessment year. As part of this contribution, the latest available data for the year 2018 are compared for the countries, which are published with an approximate four-year time lag in the publication published in 2022.

Expenditure per student in educational institutions at a certain level of education is calculated by dividing the total expenditure on educational institutions at that educational level. It is based on the actual number of enrolled students according to the statistics of the national authority, which is usually represented by the statistical office in cooperation with the relevant ministry that has the area of regional education, or the area of science and

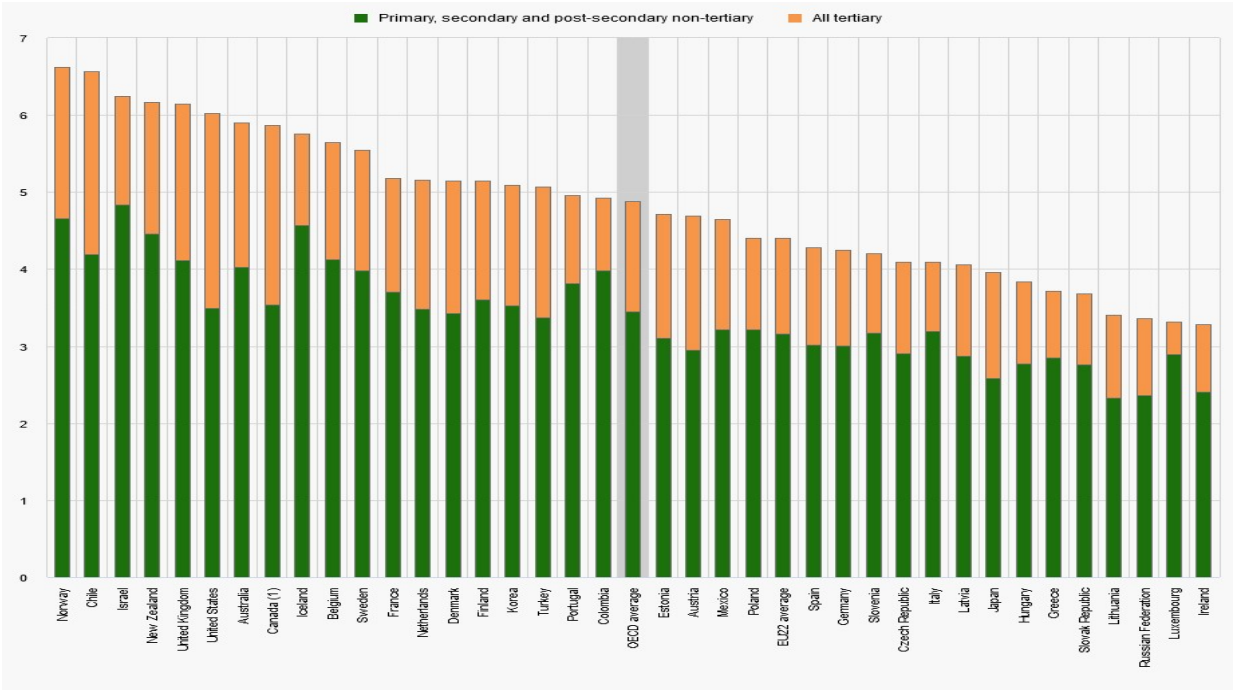
research under its administration. Expenditures per student are again converted to US dollar (USD) equivalents using purchasing power parity (PPP) in the year of assessment for comparability. Data for individual states are available with a delay of approximately four years and are always published in the publication "Education at a Glance". Now, the most up-to-date data are from the publication for 2021, which was published in 2022 with specific data for individual states for 2018. For this reason, Great Britain, which is currently no longer a member country, is also included among the average of EU countries within the OECD European Union.

As part of the contribution, the shares of public and private resources as a percentage of GDP will also be shown for the evaluated countries, broken down into regional and tertiary education. In the end, the authors of the contribution will reflect on current trends and possibilities for improving educational systems based on practical experience.

3 Results of the Comparison of Financing Education in the Czech Republic and Poland Compared to the Results of OECD Countries

A comparison of the total expenditure on education in individual OECD countries as a percentage of the country's GDP in 2018 is shown in figure number one. These are all expenses incurred from public, private and international sources according to the breakdown by level of education into regional education (primary, secondary and post-secondary non-tertiary education) and tertiary education (lower and higher level).

Figure 1 - Total expenditure on educational institutions as a percentage of GDP in year 2018 from public, private and international sources by level of education, in per cent



Source: OECD, Education at a Glance (2021).

Within the framework of tertiary education, the expenditure shown in graph number one may be slightly distorted in individual states. This is due to the different amount of funding that flows to tertiary education institutions in individual countries, in addition to per student expenditure, also for specific support in the field of science and research. In some OECD countries, the field of science and research is supported by various regional and national institutions (not only ministries, but also other national, regional, or transnational sources).

Specific expenses spent on individual educational levels for 2018, calculated per student in US dollars and % share of GDP for a given level of the educational system for the Czech Republic, Poland, the average of OECD countries and the average of 22 EU countries, which are also OECD member states, are shown in table no. 1.

Tabel 1 - Spending per student, as a share of GDP, 2018

Indicator	Czech Republic		Poland		OECD[1+2] average		EU[2] (22 countries)	
	in USD per student	in % as a share of GDP	in USD per student	in % as a share of GDP	in USD per student	in % as a share of GDP	in USD per student	in % as a share of GDP
Primary education	6.614	0,88	8.562	1,61	9.550	1,47	9.601	1,25
Lower secondary education	11.277	1,04	8.374	0,76	11.091	0,94	11.477	0,91
Upper secondary education	11.101	0,98	8.078	0,79	11.590	1,05	11.543	0,96
Short-cycle tertiary education	23.186	0,01	26.705	0,00	12.671	0,13	11.931	0,07
Long-cycle tertiary education	16.126	1,19	11.189	1,20	18.373	1,31	17.583	1,19
Primary to tertiary education	**10.523**	**4,10**	**8.963**	**4,41**	**11.680**	**4,88**	**11.767**	**4,40**

Source: OECD, Education at a Glance (2021)

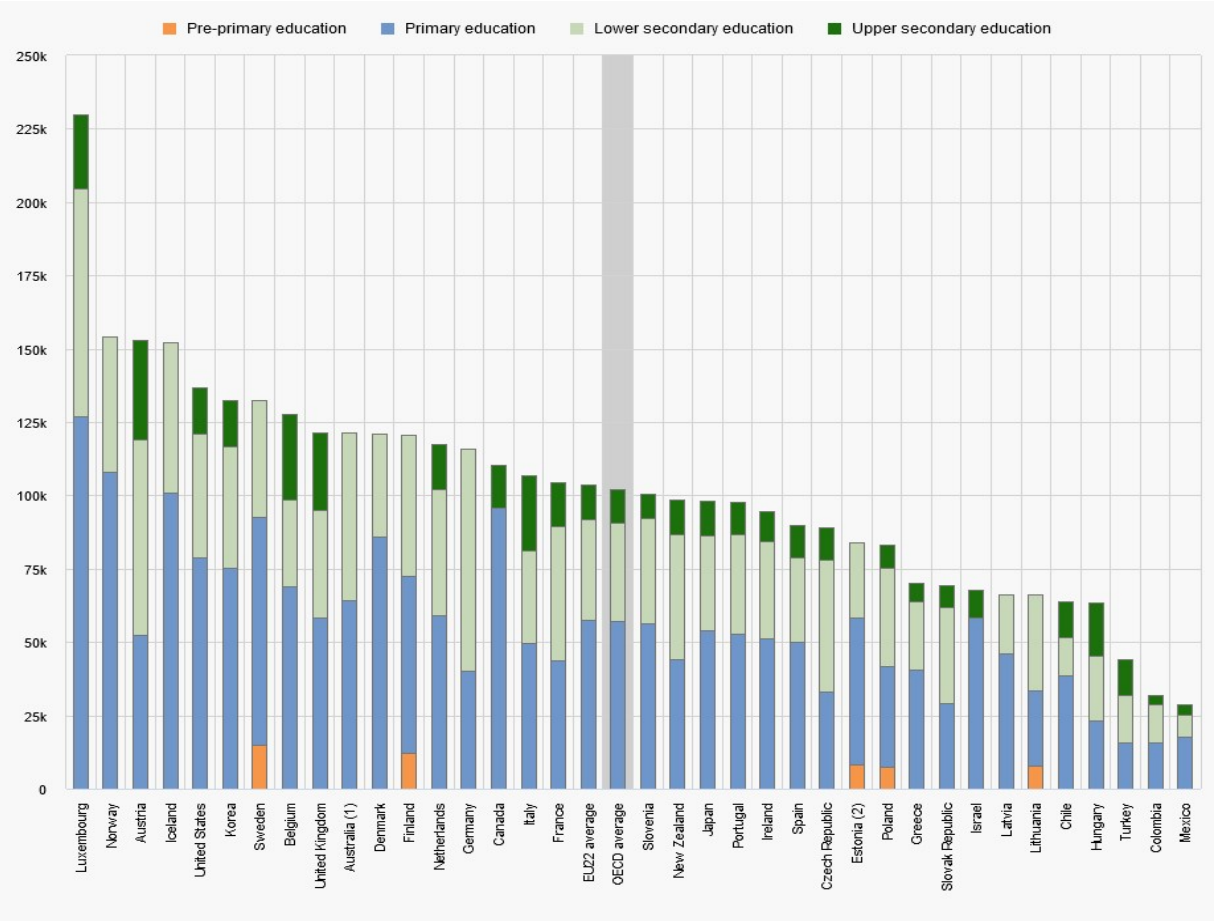
As can be seen from table number one and from the study Education at a Glance (2021), the most developed countries of the world (OECD) spend an average of 4.88% of GDP on the entire education sector. Poland's results are exactly in the average of 22 EU countries, slightly behind the Czech Republic with its 4.1%. But there are big differences in the individual levels of the education system, where the most financial resources per student are spent with the increasing level of education. This is due to the overall lower number of students in the higher stages of the education system, as this type of education is voluntary and thus differs fundamentally from primary education, which is compulsory for all students of a given age category in each country. The volume of funds spent within the framework of compulsory basic education (usually includes pre-primary, primary and lower secondary levels in the states) is the largest in terms of volume. This is illustrated by the data in graph number two. The level of compulsory schooling varies in individual OECD countries, but usually oscillates between 8-10 years of schooling.

As already mentioned, education is a supported public good in both the Czech Republic and Poland, which has positive social benefits. It ranks among the preferred public goods, in the consumption of which developed countries have an enormous interest. In graph number two, we can see the direct share of cumulative expenditure on educational institutions per full-time student aged 6-15 in individual OECD countries.

[1] Only in OECD: Canada, Iceland, Switzerland, Turkey, USA, Japan, Australia, New Zealand, Mexico, South Korea

[2] In the EU and OECD: Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Great Britain, Finland, Czech Republic, Hungary, Poland, Slovakia

Figure 2 - Cumulative expenditure on educational institutions per full-time equivalent student between the age of 6-15 in year 2018 in equivalent USD converted using PPPs for GDP, direct expenditure within educational institutions

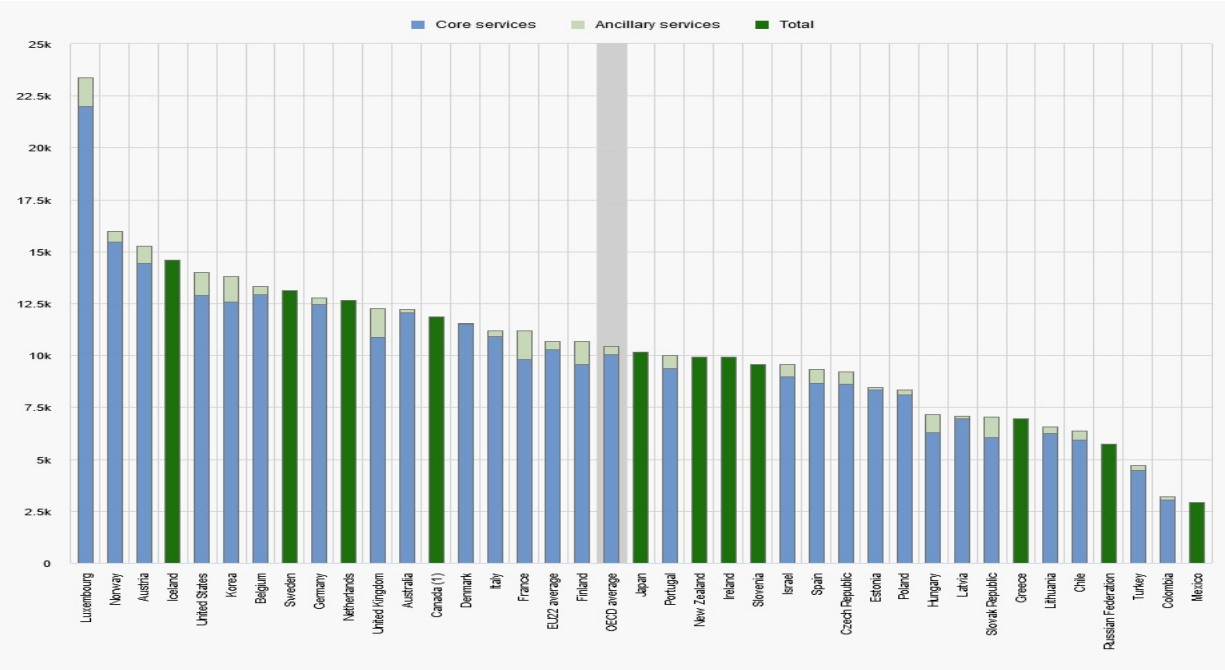


Source: OECD, Education at a Glance (2021)

From graph number two, it is clear that the number of financial resources spent per student is at a comparable level in both evaluated countries (the Czech Republic and Poland), but roughly below the average of 22 EU member states and the average of 30 OECD countries, and approximately half that of Luxembourg or Norway.

In graph number three, we can see the total expenditure on educational institutions per full-time student for the year 2018 in regional education, which includes primary, secondary and post-secondary non-tertiary education broken down into basic services, additional services and total. Both the Czech Republic and Poland are again below the average of 22 EU countries and the average of 30 OECD countries.

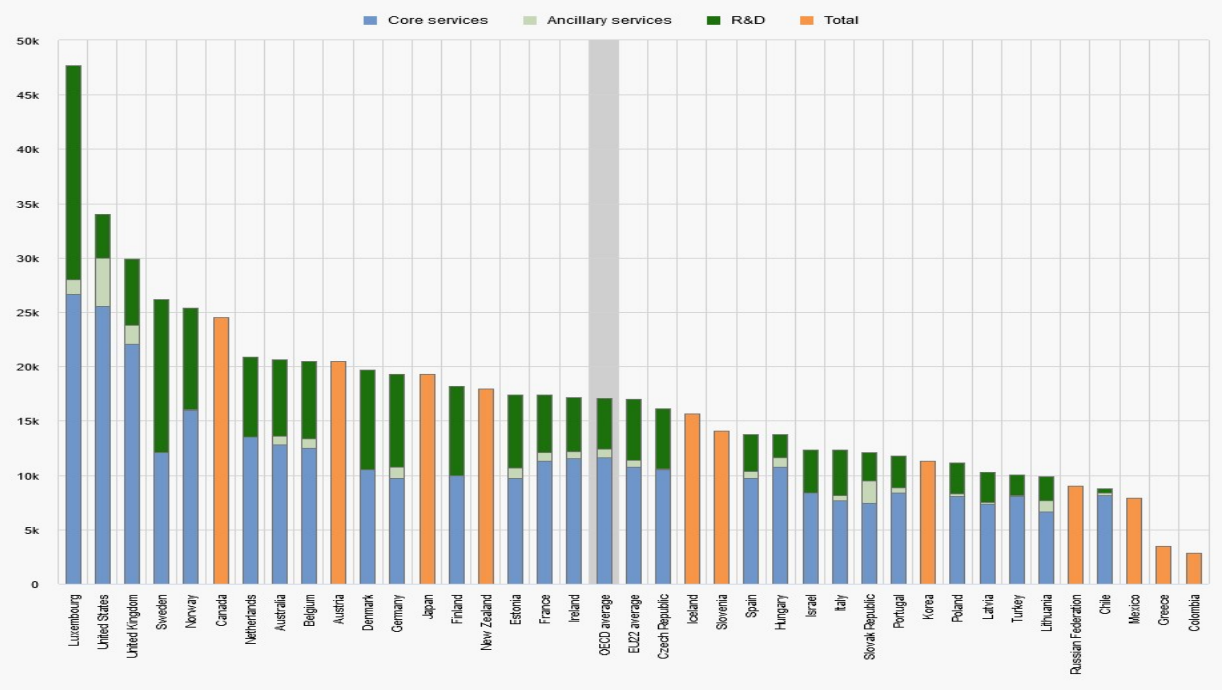
Figure 3 - Total expenditure on educational institutions per full-time equivalent student, by type of service in year 2018 in primary, secondary, and post-secondary non-tertiary education, in equivalent USD converted using PPPs.



Source: OECD, Education at a Glance (2021).

Graph number four shows the expenditure per student spent on tertiary education. From a comparison of individual countries at this level, the Czech Republic is just below the average of OECD countries and 22 EU member states, Poland lags in this comparison and shows a total expenditure per student that is about a quarter lower than the Czech Republic.

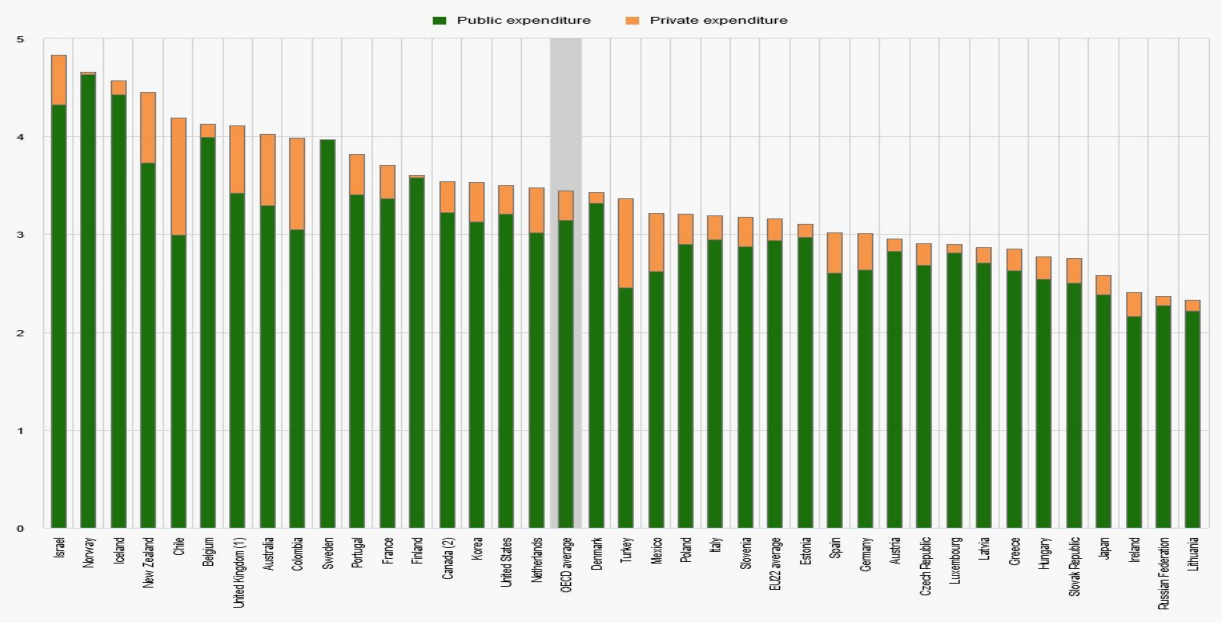
Figure 4 - Total expenditure on educational institutions per full-time equivalent student, by type of service in year 2018 in tertiary education, in equivalent USD converted using PPPs.



Source: OECD, Education at a Glance (2021).

Figure number five shows us the share of public and private resources in the total expenditure of individual OECD countries in the field of regional education as a percentage of GDP.

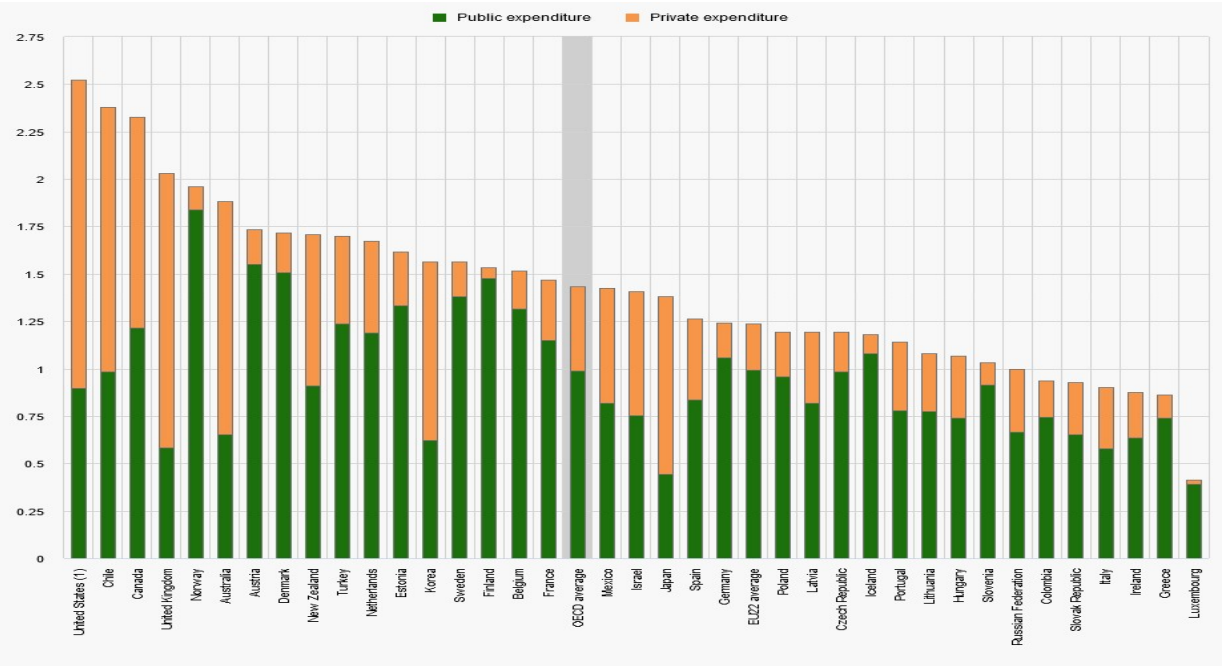
Figure 5 - Total expenditure on educational institutions in primary, secondary and post-secondary non-tertiary education in year 2018 after transfers in per cent of GDP.



Source: OECD, Education at a Glance (2021).

Figure number five shows that the share of private spending on regional education is minimal in most OECD countries and constitutes a maximum of 20% of total spending on this category of education. Non-EU countries and, as a rule, Anglo-Saxon countries that are not even members of the OECD, such as New Zealand or Iceland, or Turkey, show a higher share of private spending. A higher share of private resources is then recorded in several countries in the field of tertiary education, as shown in graph number six.

Figure 6 - Total expenditure on educational institutions in tertiary education in year 2018 after transfers in per cent of GDP.



Source: OECD, Education at a Glance (2021).

From graph number six, in the framework of tertiary education, the percentage share of private expenditure to GDP increased in most countries in 2018, but public expenditure still prevails in most countries. This is usually due to the larger number of publicly established colleges and universities in the EU member states. The exception is the Anglo-Saxon countries, led by the United States of America, Great Britain, and Australia, followed by Japan, New Zealand, and South Korea, where the financing of tertiary education from private sources prevails. In the EU member states, as well as in the Czech Republic and Poland, financing from public expenditures prevails, which only supplement private expenditures, but their role gradually grows over time, and in 2018 in both countries they accounted for less than 20 % of the total expenditure on tertiary education.

4 Discussion and Conclusion

Šebková, Kohoutek and Šturzová (2005) state that the field of education has been mentioned as one of the basic priorities in many OECD countries for several decades. In the long term, at least in some countries, further development of educational systems can be expected, especially in quality. Varadzin and Bečica (2016) state that the quality of public goods in the country also depends on the amount of available financial resources. Their different amount was also confirmed by this post. From the comparison of the Czech Republic and Poland with the OECD countries, it is evident that there are several times the differences between the countries with the largest amount of funds spent as a % of GDP and the countries with the smallest amount of funds as a % of GDP. From the values converted per student in the above graphs, even here individual countries differ from each other, which is due to different approaches to the education financing system, both in terms of the share of public and private resources on education, and also according to individual educational stages. Compared to the average of EU and OECD countries, the values per student according to individual stages of education are the lowest in the Czech Republic for the primary level of education, and in Poland for upper secondary education. Compared to other OECD countries, both the Czech Republic and Poland generally spend less money per student than the average of 22 EU and OECD countries, apart from the short cycle of tertiary education. For both mentioned countries, the % volume of funds for this stage of education as a share of GDP is almost zero.

The biggest difference in the values reported per student is in the higher tertiary level in Poland, the Czech Republic does not differ fundamentally from the average values of EU and OECD countries at this stage of education. The largest difference in % of volume to GDP was recorded for the primary level of education in the Czech Republic, which reaches only less than 60% of the established average of EU and OECD countries and is half the values reported in Poland.

In addition to enough financial resources, the development of the education system of individual countries also contributes to the discussion of experts on various topics related to the education system in each country. As a rule, the expert discussion is conducted not only at the national level, but also with international authorities. These also process different assessments between individual states, which they publish publicly. The number of international organizations operating in the field of education is relatively large. This is evidenced, for example, by published quality rankings with the ranking of individual regional or higher education institutions at the local, national, and international level. The listed rankings differ from each other by several different criteria, which are taken with different weights as possible evaluation criteria. For tertiary education, for example, the QS rating can be mentioned; ARWU or THE. Among other organizations monitoring the "quality" of higher education, at the international level, the organization INQAAHE (International Network for Quality Assurance Agencies in Higher Education, founded in 1991) or the European Network for Quality Assurance in Higher Education ENQA (European Network for Quality Assurance in Higher Education) can be included. or the European Association for Quality Assurance in Higher Education EAQAHE (European Association for Quality Assurance in Higher Education, 2005).

In the long term, the authors of the article are inclined to measure the quality of teaching in a general way according to De Weert (1990), who was inspired by other disciplines and defined three aspects of quality monitoring: 1) the quality of inputs, which includes, in addition to finances, the qualification structure of the teaching staff, spatial and technical equipment of schools, administrative processes and the quality of students admitted; 2) the quality of processes, where management procedures can be included to achieve the set goals and 3) the quality of outputs, which measures the compliance of sub-goals with long-term and strategic goals.

From the researchers whose aim was to find out what is the cause of the pedagogue's success in teaching, the so-called personality paradigm (research on teacher personality) was investigated using psychometrics, i.e., which personality characteristics of the pedagogue have a positive effect on pupils and students and their performance. Research has shown that a teacher who is warm and open motivates students to learn and perform better

than a teacher who does not have these characteristics. For example, according to Martensson et al (2014), good teaching is teaching that leads to excellent learning results on the part of the learner (pupil, student).

According to the authors, to improve teaching from the point of view of students' perception, it is necessary to strengthen and ensure their greater involvement in teaching, to innovate forms of teaching and to actively support all forms of discussion and linking theory with practice. Furthermore, it is important to support and consistently create an atmosphere of mutual trust between all components of the evaluated institution (students, teachers, management) and to implement various types of evaluations and evaluate them in an adequate manner. According to the authors of the contribution, it is possible to consider smaller study groups as a suitable climate for teaching and discussion, but this reflects the insufficient number of financial resources spent on individual stages of education both in the Czech Republic and in Poland. This applies both in terms of the total % volume to GDP and in terms of per student within the individual stages of education.

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Effect of the Drive Concept on the Consumption of an Electric Vehicle

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Abstract

This thesis focuses on investigating the effect of the drive concept on the consumption of an electric vehicle. A two-axle experimental electric vehicle with programmable active differentials was used for the experiment. The power requirement data for the steady state speed of the vehicle was measured while driving with front-wheel drive and All-wheel drive. From the experimental results, it is evident that at lower speeds there is less power consumption for the front axle only driven concept. This mode is therefore more suitable for city driving. At higher speeds, the differences in consumption almost disappear. All-wheel drive is therefore preferable for better driving dynamics and vehicle stability.

Keywords: *electric car, electricity consumption, driving modes*

JEL Classification: *R400, R00, R410*

1 Introduction

Electric vehicles are one of the promising solutions to reduce greenhouse gas emissions and dependence on fossil fuels in the automotive sector (Mahmoudzadeh Andwari et al., 2017) [1]. Due to the fact that fossil energy is the largest source of carbon dioxide emissions, non-fossil energy is gradually gaining more and more attention from people. In the Czech-Polish border area of the Moravian-Silesian region and the Silesian Voivodeship, efforts are being made to reduce emissions from fossil fuel combustion by industrial enterprises. Electromobility, which reduces local emissions, can contribute to reducing emissions. In the case of this article, we focus not only on the reduction of emissions in the form of electromobility, but also on the reduction of emissions from the electric vehicle itself. The powertrains of electric vehicles (EVs) can operate at efficiencies of over 80%, showing that they have great potential in reducing the energy consumption of transportation (Sweeting et al., 2011) [2]. However, EVs, due to technological limitations, have a short range (Feng Wei et al., 2013) [3], and during operation, planning longer routes through charging stations to replenish energy is necessary (Zhang et al., 2018) [5]. The general acceptance of electric mobility and its wide range of adopters is closely related to concerns about EV range. An acceptable range value is therefore a key parameter to increase the confidence of potential buyers for these vehicles (Petersen et al., 2021) [4].

To increase the confidence of EVs, it is essential to have an accurate estimate of the consumption with respect to the planned route. Previous studies regarding the identification of relevant parameters with respect to their influence on energy consumption have mainly focused on the investigation of driving modes, mostly targeting vehicles with internal combustion engines (Fontaras et al., 2017) [6]. In the literature, it is reported that driving patterns generally describe the speed profile of vehicles and can also be distinguished by the style or behaviour of the driver (Marina Martinez et al., 2018) [7]. A statistical study was also carried out as part of the European ARTEMIS project, where the aim was to identify characteristic driving patterns. These were used to develop standardised driving cycles for testing emissions and fuel consumption of ICEVs in a laboratory environment (Boulter et al., 2007) [8].

Braun and Rid investigated whether driving modes are relevant to the energy consumption of ICEVs. The study provides an in-depth analysis of 45 driving modes as well as a correlation with energy consumption. Their results show that acceleration and deceleration intensity have the most significant correlation with energy consumption. The results can be used to assess the energy consumption factors of vehicles. The influence of driving mode factors on specific energy consumption is a valuable aspect for the development of standardised driving cycles and for efficiency evaluation. Energy consumption factors are used in various fields, e.g., life cycle analysis, environmental planning applications, driver behavior analysis, and electric fleet management (Braun et al., 2018) [9].

Zhou and Yirong developed a model to determine consumption based on data and driver specific parameters. Using correlation analysis, they selected appropriate parameters for their model to accurately estimate future energy consumption (Zhou et al., 2022) [10]. All of the above studies cite driving patterns as a major influence on energy consumption. As a result, this implies that the nature of the driver has a non-negligible influence on consumption, i.e. it depends on how aggressive they are with the throttle.

If we ignore the human factor, then another very important aspect that can have a major impact on energy consumption, and thus range, is the drive concept.

This paper focuses on investigating the effect of the drive concept on the consumption of an electric vehicle. A two-axle experimental electric vehicle is used for the measurements. Each axle has two independently controllable motors, whereby the active differentials can be programmed and at the same time the drive mode can be set to drive only the front wheels or all four wheels.

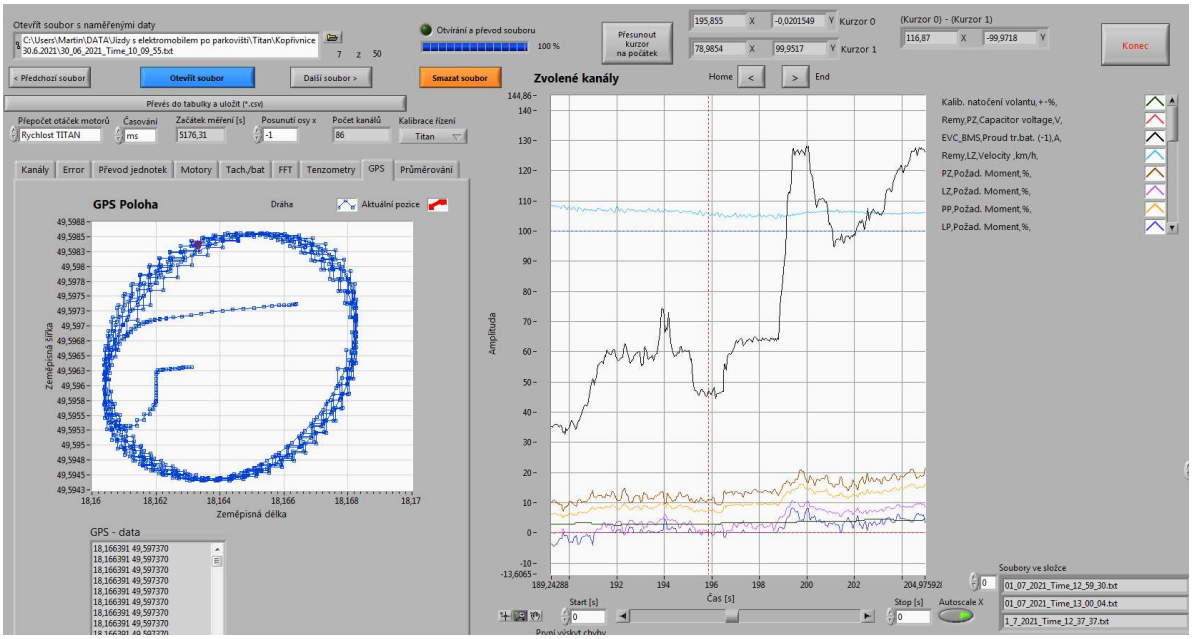
This measurement task was generated and made available to the students during the tutorials. Students gained knowledge and competence of the dependence of driving mode control on the consumption of an electric vehicle.

2 Measurement Procedure

Realistic measurement of the power consumption or power required to maintain a particular speed is very problematic. Because any unevenness of the road, whether it is a slight rise or fall, will be reflected in the measurement. Another parameter that is difficult to influence is weather conditions, for example consumption increases in strong headwinds or when driving on wet roads.

Testing is carried out on a large oval polygon in Koprivnice, the trajectory of which can be seen from the GPS module in the left part of Fig. 1. The testing consists of measuring the fuel consumption at steady state speeds ranging from 40 km/h to 130 km/h in 10 km/h increments. Two sets of testing are performed to determine the effect of the drive concept. The first set is for front-wheel drive only and the second set is for All-wheel drive. Part of the consumption record can be seen in the right part of Fig. 1.

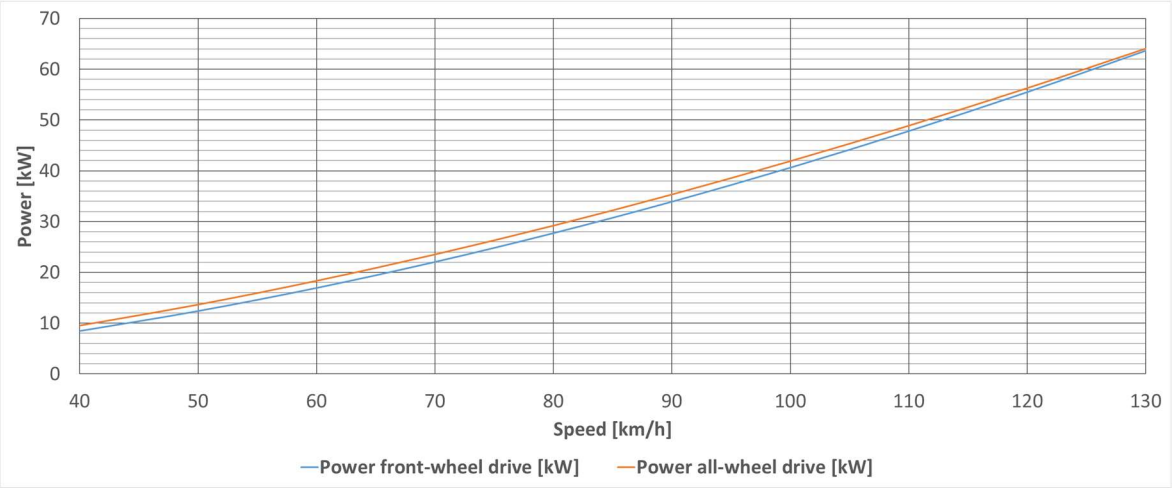
Figure 1 – Consumption measurements at steady speed on large oval on the Tatra polygon



3 Measured Data

The measured power requirement data for the steady state speed of the car when driving with front-wheel drive and all All-wheel drive can be seen in the power requirement vs. steady state speed graph in Fig. 2. From the graph, it can be seen that for each steady state speed, the power requirement for All-wheel drive is higher than for front-wheel drive. At a speed of 40 km/h the difference in power requirement is 1 kW and increases up to a speed of 70 km/h where the difference reaches up to 1.5 kW. From 80 km/h onwards, the difference in power requirement decreases to 0.4 kW at 130 km/h.

Figure 2 – Comparison of the power required for steady speed when driving on the front and all four motors



For better clarity, the specific values of the required power for the given speeds are given in Table 1.

Table 1 – Power values at given speeds.

Speed [km/h]	Front-wheel drive power[kW]	All-wheel drive power [kW]	Power difference [kW]
40,0	8,5	9,5	1,0
50,0	12,4	13,6	1,2
60,0	17,0	18,3	1,4
70,0	22,1	23,5	1,5
80,0	27,7	29,2	1,5
90,0	33,9	35,3	1,4
100,0	40,6	41,9	1,3
110,0	47,8	48,9	1,1
120,0	55,5	56,3	0,8
130,0	63,6	64,1	0,4

The range is calculated from the battery capacity, the steady speed, the measured power requirement and the maximum driving time for a given speed. This calculation is made for both All-wheel drive and front-wheel drive. A graph of range versus speed is shown in Fig. 3. The graph shows that at lower speeds the front-wheel drive has a greater range than the All-wheel drive. As the speed increases, the range difference decreases, from a range difference of 57 km at 40 km/h to a range difference of 2 km at 130 km/h.

Figure 3 – Dependence of range on speed

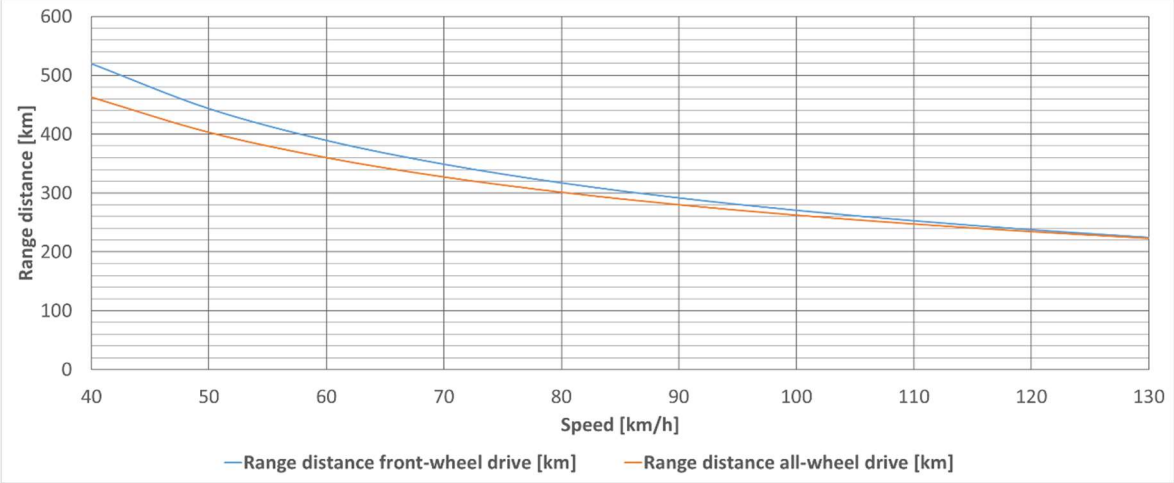
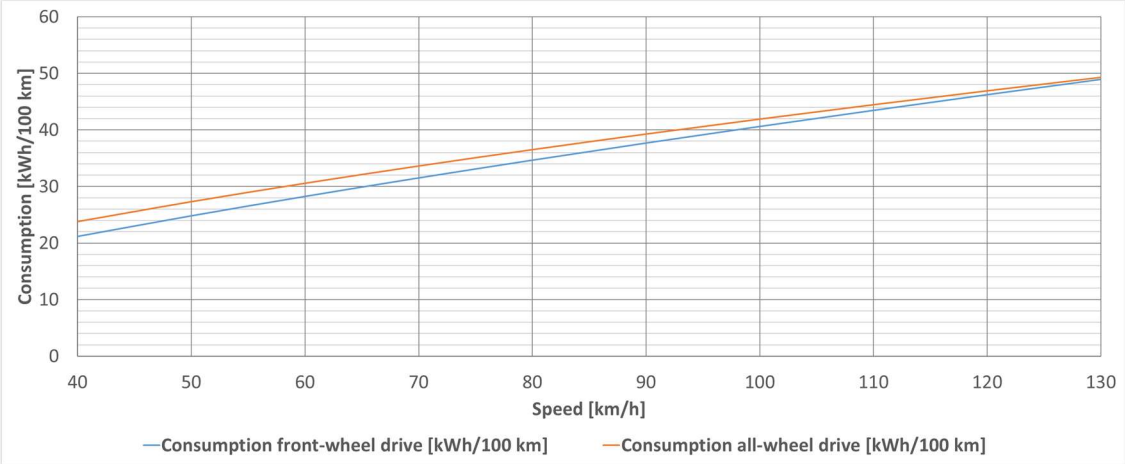


Table 2 – Power values at given speeds.

Speed [km/h]	Front-wheel drive range [km]	All-wheel drive range [km]	Range difference [km]
40	519	463	57
50	443	403	40
60	389	360	29
70	349	327	22
80	317	301	16
90	292	280	12
100	271	263	8
110	253	248	6
120	238	235	3
130	225	223	2

Consumption is calculated from the battery capacity and range for a given steady speed. This calculation is made for both front-wheel drive and All-wheel drive. A graph of consumption versus speed can be seen in Fig. 4. The graph shows that two motors have less power consumption than four motors at lower speeds. As the speed increases, the difference in consumption decreases, from a difference in consumption of 2.6 kWh at 40 km/h to a difference in consumption of 0.3 kWh at 130 km/h.

Figure 4 – Dependence of consumption on speed.



The consumption values for front-wheel drive, All-wheel drive and the difference in consumption with the front-wheel drive having the lower consumption are given in Table 3.

Table 3 – Consumption values for given speeds.

Speed [km/h]	Front-wheel drive consumption[kWh/100 km]	All-wheel drive consumption[kWh/100 km]	Difference[kWh/100km]
40	21,2	23,8	2,6
50	24,8	27,3	2,5
60	28,3	30,6	2,3
70	31,5	33,6	2,1
80	34,7	36,5	1,8
90	37,7	39,3	1,6
100	40,6	41,9	1,3
110	43,5	44,4	1,0
120	46,2	46,9	0,7
130	48,9	49,3	0,3

4 Summary

This paper deals with the measurement of the consumption and range of an experimental electric vehicle depending on the drive concept. The experimental vehicle is a two-axle vehicle with independent four-wheel drive. To investigate the effect of the drive concept, the drive was divided into two modes, namely front-wheel drive only and four-wheel drive. Testing was carried out by driving on the oval track of the Koprivnice polygon. Two sets of tests for each concept were carried out, one for each concept, measuring the required engine power for driving at a steady speed from 40 km/h to 130 km/h in 10 km/h increments. Subsequently, the fuel consumption, hence range, was calculated for the given speeds.

From the measured values, it was found that the driving range with front-wheel drive only is significantly higher at lower speeds and the difference between front-wheel drive and all-wheel drive gradually decreases with increasing speed. At a speed of 130 km/h, the calculated range difference for front-wheel drive is only 2 km higher, which is negligible in relation to the total range of 225 km.

The use of the observed range difference at lower speeds could be used, for example, to set two driving modes. The first would be city driving, where the average speed in city traffic is 40 km/h. For this mode, only front-wheel drive would be used, which would increase the range by 57 km (an increase of about 12%) and reduce consumption and therefore energy consumption. The second mode would be motorway driving, where four-wheel drive would be used. The vehicles then gain better dynamics and become more controllable and thus safer thanks to the separate control of all engines.

To increase the efficiency of the electric motors, we can further measure the ideal temperature to further increase their efficiency.

5 Conclusion

Several conclusions were drawn from the measured data:

- For lower speeds, such as city driving, front-wheel drive is preferable. This will increase the range.
- For higher speeds, such as motorway driving, it is more advantageous to use four-wheel drive. This results in better vehicle dynamics and, with all-wheel steering, greater stability and thus greater safety, without significantly reducing the range.

Acknowledgements

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The Ecological Games in Environmental Education - a Bibliometric Analysis

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Abstract

This paper delivers up-to-date bibliometric research dealing with raising ecological awareness in computer games through the design approach, called gamification. This paper aims to explore the most popular scientific databases, the Web of Science and Scopus, and to perform the Structured Literature Review (SLR). The engagement of players in ecological games in the design approach is the main subject of this paper. In this paper, the bibliometric analysis with customized queries was performed to explore scientific databases. The queries were based on the following items: selected keywords, title words, and abstract content. The queries for each database allowed quantitative results analysis. These results were then used in the VOSviewer program to generate bibliometric maps. Therefore, this paper delivers up-to-date bibliometric research.

Keywords: *education, design approach, serious games*

JEL Classification: *C91, I25, Q01, Q56*

1 Introduction

Nowadays, there is a growing usage of games in education-related activities and scientific research, especially if games are seen as an experimental environment (Garay, 2019). The are many reasons for the games' popularity, but the most important reason is their lightness and the possibility to convey more serious information between game elements (Biercewicz et al., 2022; Machnev et al., 2018). In this context, the modern challenges related to Sustainable Development (SD), environmental protection, and ecology can be explained to the players and achieve their bigger attention and engagement (Abraham, 2022). Players can as well work out their solutions and propositions if the game allows such creativity (Futornyi et al., 2019). Society needs to be not only informed about the practical solutions to achieve the SD goals but need to be educated (Zhang, Chang, 2019). Only through the awareness of the problem, built upon ecological education, it is possible to involve younger generations in desired green and sustainable economic models (Raessens, 2018). On the other hand, the games can be used in the training of professionals to change their attitudes and to teach them to find the best solution from multiple options (Piwowar-Sulej, Kołodziej, 2022; Sulich, 2016).

This paper aims to explore the most popular scientific databases, the Web of Science (WoS) and Scopus to perform the Structured Literature Review (SLR). The possible outcome of such research can be useful to define a research gap for future analysis. The adopted SLR method is based on the queries formulated for each database separately, gathered in the comparative tables. The obtained quantitative results were then used in the

bibliographic analysis in the VOSviewer program and a qualitative description of the research results was performed.

This paper is structured as follows. After this introduction, there is a theoretical background that provides a broader context of the performed research. First the advantages and disadvantages of game usage in educational processes.

2 Theoretical Background

Computer games are popular leisure activities, with over two billion users worldwide (Newzoo, 2017). This number is growing every year, expanding the games market. Consequently, this rapidly changing situation makes, the games useful not only for entertainment (what is primary games function) but also for educational purposes, as so-called serious games (Wouters et al., 2013). Games or their elements are nowadays more often used in the learning context. Game-based learning has many positive features listing just a few: fun, play, goals, presentation of the result obtained, fast information about the game outcome (victory or defeat), competition with other people, challenges, and problem-solving (Prensky, 2003). These games' features also can increase students' learning motivation (Biercewicz et al., 2022). Besides, games play an important role in building students' self-confidence (Boyle, 2011). As an educational tool, games are constructive because they smarten teaching methods, that are considered by students as boring. Usually, students like a game-based learning system because it allows them gaining of knowledge through "learning by doing" and they get personalized learning. Table 1 consists comparison of the advantages and disadvantages of games employed as the teaching method.

Table 1 - Advantages and disadvantages of using games in educational processes.

Advantages	**Disadvantages**
Engaging students - using a game for educational purposes plays an important role in engaging students by encouraging hands-on work.	Lack of control - providing students with a platform to play corrective games becomes a challenge when teachers or instructors cannot control such an environment. Students may have access to other platforms that are harmful.
Helping to remember content - games can help to remember content by encouraging active student participation. Learning should not mean memorizing quickly, but students can use games to remember key points that they can use on exams and in real-life situations.	Separation of individuals - students who rely on games are often cut off from real-world interactions.
Computer skills - modern world is a world where basic computer literacy is required, which ultimately translates into preparation for professional life.	Addictions - using computers and other electronic devices can cause health risks such as eye strain and other psychophysiological problems.
Problem-solving - game activities are rule-based, and students are expected to follow the rules to achieve a high score and move on to the next stage. Students can easily apply this knowledge to real-world situations as they are encouraged to think outside the box.	Growing prices of equipment - the technology necessary for full participation can be quite expensive, which can create a gap between students who have access to it and those who do not.
Beneficial for Students with Attention Deficit Disorder - the use of games can help capture the attention of students because it is considered a fun way to learn. Studies conducted have shown that games can help children with attention problems.	
Other skills development - games can also be used to teach other skills such as critical thinking, sportsmanship, peer interaction, and cooperation.	

Source: Authors' elaboration.

The advantages of using games in educational process include also increasing the interest in a given topic of the young generation (Y and Z). The disadvantages include also game access limitations indicating social exclusion (e.g. computer, mobile tools, software Internet access). However, there are more advantages than disadvantages

related to using games in the educational process (Table 1). The enthusiasm of players can be counterbalanced by the limitation of the game sessions. Educational games can be used to educate people about organizational sustainability or SD goals. This is a very important issue because nowadays, there is a growing discussion about climate change (Cook et al., 2013). The influence of humans on the natural environment is inevitable and causes some negative changes, e.g. in ocean life (Lejeusne et al., 2010), the emergence of new plant diseases (Garrett et al., 2006), or losses in biodiversity (Redpath et al., 2018). It is necessary to adequately educate society consequently (Varela-Candamio et al., 2018). Therefore, innovative and creative methodologies (Klöckner, 2015) for teaching about environmental issues are required. One way to convey information about environmental issues is through video games, which can raise awareness as well as educational outcomes (Eisenack, Reckien, 2013).

Educational games are a promising tool for acquiring certain ecological habits among players (Abraham, 2022). This causes sustainability games to be used to increase the relevance of environmental issues, although the learning effects of these games vary. One of the positive aspects, that has been empirically explored is the relationship between experiencing enjoyment and gaining knowledge while playing an ecological game (Schaal et al., 2018). The researched game was about biodiversity, and the experiment proved that among players subsequent increased positive attitudes toward the environment (Schaal et al., 2018). Fjællingsdal and Klöckner (2017) confirmed in their study that the enjoyment of playing an environmental game has a positive impact on learning outcomes. Also, Torres and Macedo (2000) showed that games can be used to promote environmental awareness and explore attitudes toward environmental protection. On the other hand, Hansmann, Scholz, Francke, and Weymann (2005) showed that a game can effectively improve players' environmental knowledge, attitudes, and behaviors when professionals are trained. Besides, some studies focused on investigating whether games ecologically increase awareness of a sustainable ecosystem, whether they change conservation and recycling behavior, and whether they shape self-awareness of energy conservation (Harker-Schuch et al., 2020 Wu, Huang, 2015 Yang et al., 2012). This leads to the idea that implementing the right context in ecological games can provide systems thinking (Fabricatore, Lopez, 2012; Liarakou et al., 2011; Nordby et al., 2016).

However, to make the player think in a holistic way about environmental problems the game should be designed with an engaging and educational approach. There are other various approaches to game design, but all of them need to allow the player to acquire a new playing habit. Although there are multiple publications dedicated to the games, and game engagement but subject of the ecological game is scarce. To explore the most popular scientific databases, the Web of Science and Scopus, the Structured Literature Review (SLR) was performed. The research question was about the possible directions of the ecological game design approach. To find the answer to this question, a bibliometric analysis with customized queries was performed.

3 Material and Methods

In this article, bibliometrics is understood as a set of statistical and mathematical methods used to analyze scientific literature. The bibliometrics was used for two databases WoS and Scopus. It was decided to look at the extent to which the challenge of designing ecological game elements is described from the methodological perspective in the publications of numerous authors (Biercewicz et al., 2022). Detailed information about the quantitative content of the indicated databases is presented in Table 2. The reason that Google Scholar was excluded from the further analysis is provided in Table 2.

Table 2 - The content of scientific databases

	Number of indexed publications
Web of Science	Over 171 million records
Scopus	Over 46 million records
Google Scholar	There is no possibility to estimate the number of indexed papers due to the constant upload of content

Source: Authors' elaboration based (Słupińska et al., 2021).

Table 3 contains detailed query elements together with their results from two explored databases (WoS and Scopus). The queries listed in Table 3 were used to explore repositories in the SLR method. Queries were used to analyze indexed papers' keywords, titles, and abstract content. Then, after entering each query into the respective databases the results were obtained and exported .txt and .csv format files. This allowed the files to be imported into the VOSviewer program, where the final qualitative analysis was performed. The queries were applied to

the two scientific databases without an indicated period, where search fields were article title, abstract, and keywords.

Table 3 - Quantitative results of the SLR.

No.	Query	Scopus	WoS
1	“game patterns” AND ecological	2	2
2	“game patterns” AND eco	0	0
3	“game patterns” AND environmental	1	3
4	“design game” AND ecological	0	1
5	“design game” AND eco	0	0
6	“design game” AND environmental	0	0
7	“design game” AND “natural environment”	0	0
8	“design game” AND education	99	54
9	“game patterns” AND education	9	5
10	“environmental” AND kahoot	7	5

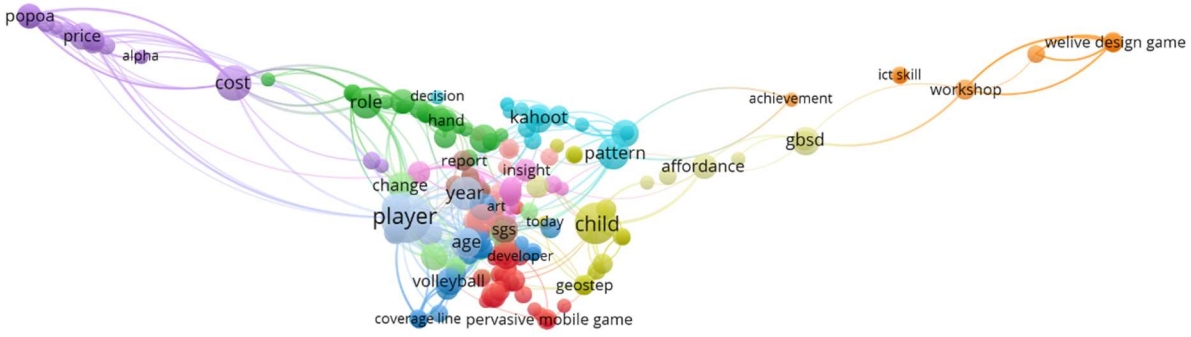
Source: Authors’ elaboration.

After each query the results were added to the previous query results. This additive approach was continued for each database separately. Total number of Scopus results were 118 and there were 69 results from WoS.

4 Results and Discussion

Imported in previous steps files were opened in the VOSviewer program, separately for Scopus and WoS. In the case of the WoS database, the title and abstract fields were selected as the field from which data will be extracted and the full counting method was chosen. The next step was to specify the number of occurrences of a term (keyword). The minimum 2 keyword value occurrence was applied and resulted in 1861 terms and 439 occurrences meeting the threshold. However, the number of terms to be selected was 263, due to the elimination of the keyword’s duplicates. The WoS results presented 262 items, which form 2247 connections and can be divided into 11 groups. The graphical representation of this result is presented in Figure 1. The which can be identified as games (red color), education and progress (green), game types (light blue), game analysis and framework (yellow), game design (violet), e-learning platform (turquoise), teaching (orange), working methods (brown), research questions (light pink), society (dark pink), player type (dark blue).

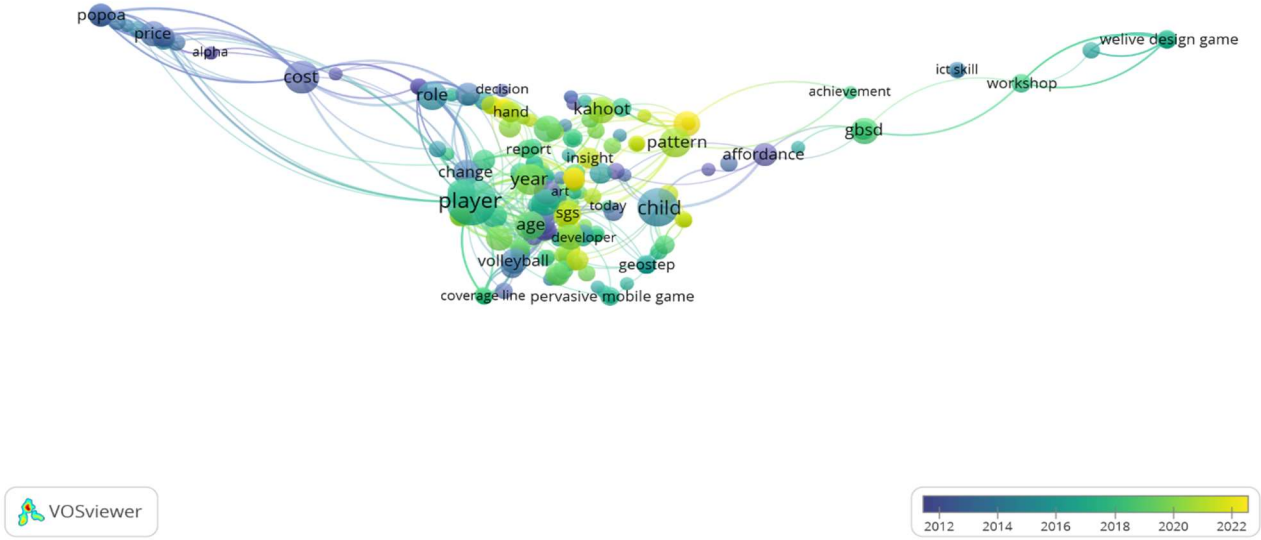
Figure 1 – Network visualization from WoS



Source: Authors elaboration

On the other hand, this analysis allow to explore how publications are shaped by the time horizon in Figure 2. Publications related to game preference and empowerment are from 2022 (yellow color in Figure 2). On the other hand, the largest number of topics is related to players and falls in the 2018 period.

Figure 2 – The dynamics of the paper topics and keywords in the years 2012-2022.



Source: Authors elaboration.

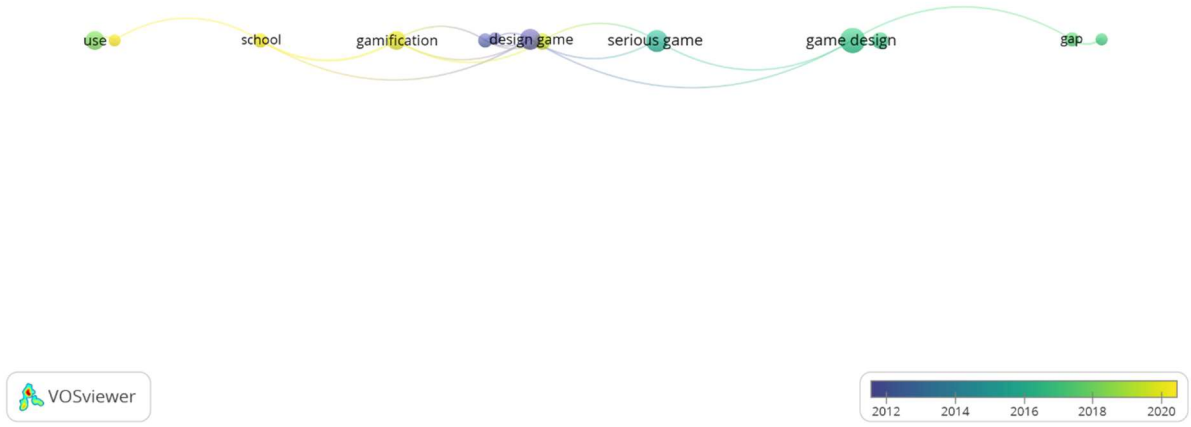
In the case of Scopus analysis, after the format files were uploaded, the title field was selected as the field from which data will be extracted and the full counting method was chosen. The next step was to specify the number of occurrences of a term. The minimum 2 keyword value occurrence was applied and 363 terms and 36 meet the threshold. However, the number of terms to be selected was 22. Figure 3 presents the results from Scopus's unique 13 items that form 18 connections and can be divided into 4 groups marked with colors, respectively: environmental education and education (red), game design (green and yellow), science (blue), and serious games (violet).

Figure 3 – Network visualization from Scopus.

Source: Authors elaboration.

In Figure 4, the time horizon and shift in chosen subject interests are visible. The majority of publications related to gamification and education as environmental education are from 2020. While the topic related to game design began in 2012, the connections are to the serious game, gamification, and school. There is a lack of fresh publications after 2020 in the Scopus database related to the ecological games.

Figure 4 – The dynamics of the paper topics and keywords in the years 2012-2020.



Source: Authors elaboration

The differences between obtained bibliometric maps are caused also by the limitations of the VOSviewer. For the Scopus, only title filed analysis was possible when for WoS title field and abstracts were analyzed.

The results obtained show that there are very few publications about the game design approach, and yet publications related to game design and ecology are scarce. There is a research gap, for future research in the field of ecological game design to engage players. The possible solution can be set recommendations, and one of them is design standardization for this type of game.

5 Conclusion

Ecological games recently gained in popularity and became an interesting topic mainly in education, used less in professional training. The query results gathered in Table 3, proved that there is a research gap in the research covering the subject of the design approach in ecological games. One of the possible explanations for such a small number of publications is that environmental problems are too serious to combine with leisure games. The proof of the small number of publications lies in no specified explored period of the database research. On the other hand, games are one of the commutation channels to educate younger generations and the education system has to evolve in this direction, which was rapidly proved in the coronavirus pandemic in 2019-2022. Surprisingly, during this period there were not many publications related to computer games in education generally when all education activities were held on the internet. The games as educational tools have to be accepted and played first by the trainers and teachers because they return to their favorite games.

The advantage of the SLR method is the conversion of quantitative results into bibliometric maps generated in VOSviewer. The queries in each explored database in the additive approach allow expanding the research keyword co-occurrence to the not obvious areas. This method allowed to omit new query construction with keywords presented in bibliometric maps.

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Multiregional Open Innovation in the Concept of Sustainability in an Environment of SMEs

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Abstract

The current volatile, dynamically changing, sustainability-focused business environment requires market participants to think outside the box and adapt to the situation. Innovative principles have become a way to stand out from the competition. This is particularly true for small and medium-sized enterprises, which are structured to adapt flexibly to the current market requirements and have moved towards the starting pinpoint of open innovation within the concept of sustainability, which offers firms a specific clue to lead innovation, to consider the sustainability of innovation in the future. The aim of the paper is to evaluate the current attitude of innovative small and medium-sized enterprises towards multiregional open innovation, in Poland and the Czech Republic in border areas, picked from database of authors. It proposes a suitable model suitable in the context of linking open innovation and the concept of sustainability, using the AHP methodology. In the case of sustainability, SMEs in both countries are beginning to realize the importance of sustainability. Using decomposition, it was possible to find the key factor of the model: suppliers and universities, which can provide small and medium-sized companies with a research base they cannot afford to pay for due to their limited financial resources.

Keywords: *AHP, innovative SMEs, open innovation, sustainability*

JEL Classification: *M10, O31, O36*

1 Introduction

The current economy can be described as interrelated, where innovation stands for an essential competitive advantage for companies. Within this environment, companies are daily pushed to react to a rapidly transforming environment, acclimating to the background while tracking and fulfilling the needs of markets and customers. The innovation strategy is a demanding assignment, demanding responsible and strategy-based management. Accordingly, the capacity to learn, improve business competencies, continually formulate new skills, and transform into an innovation evolves the driving power of the organization. Specifically in small and medium-sized enterprises, organizational layout and flexibility allow for a quick response to adjust. On the other hand, SMEs' fixed and narrow financial capacity (versus large enterprises) must also be considered in terms of the impossibility of financing their R&D department.

At the same time, companies must consider the very meaning of innovation. It should not be an innovation in itself, but rather an innovation that brings something not only to the company itself, to the customers, but also society and the environment. Therefore, one requirement is sustainability, which has come to the forefront of the markets' concerns in recent years. Behnam et al. (2017) claim that innovations choosing sustainable evolution are essential for improving sustainability as a whole in companies. This principle is not easy to apply for resource-constrained SMEs. Therefore, managers and owners of these enterprises try to step outside their comfort zone, think outside the innovation box and seek new resources for their innovations. Searching within

their organization is no longer enough, so they are increasingly turning to partners from the environment. Over the last few years, they have shifted their thinking from the concept of closed innovation to that of open innovation. OI concept is comprehended as the periodic design, purchase, preservation, and usage of learning inside and outside the organization due to innovative processes enforced in cooperation with various traditional and non-traditional players (Chesbrough et al., 2008). Although studies on the link between sustainability and the concept of open innovation exist (Rauter et al., 2019), research has not yet focused on SMEs in border areas. These enterprises, operating on two sides of a border but often in a region perceived as a whole, can support each other, transfer experiences, and network with different partners from both countries, thus extending their network to foreign partners.

Therefore, the paper aims to assess the current attitude of innovative SMEs towards multiregional open innovation in Poland and the Czech Republic in border areas. It offers a model suitable for innovative SMEs in the context of linking open innovation and the concept of sustainability (focusing on selecting partners suitable for implementing sustainable innovation). Using the AHP methodology allows decomposing the complicated sustainability problem into subcriteria and will define the model's critical points. The researchers were interested in innovative SMEs; according to the Oslo Manual (OECD and Eurostat, 2018), they execute one or more innovations during observation. Innovative activity may be maintained, suspended, completed, or abandoned. SMEs are a determinant part of most countries' national economies due to their ability to form a wholesome business environment and provide growth support to the national economy and in cities and separate regions. Their prestige is also evidenced by SMEs representing 99% of all companies in the European Union. This paper comprehends SMEs according to the EU Recommendation 2003/361 ("SME definition," 2017); see Table 1.

Table 1 –Typology of SMEs

Company category	Staff	Turnover	Balance Sheet Total
Medium-sized	<250	≤ € 50 m	≤ € 43 m
Small	< 50	≤ € 10 m	≤ € 10 m

Source: EU Recommendation 2003/361

2 Theoretical Foundation

The author of the concept (Chesbrough and Bogers, 2014) described open innovation as a strategic procedure with knowledge pouring to and from an entity to accelerate inner innovation or grow to other markets via outward exploitation. The traditional closed innovation model has been linked with the premise that the innovation process occurs within a single company while hypothesizing the importance of guarding the resulting innovation through various apparatuses, particularly intellectual property rights (IPR). Visions that did not match the company's market strategy were not used. However, in the case of open innovation, corporations actively pursue knowledge and innovation from external performers, simultaneously transmitting them of their own to other external players. The main motivations for the companies to escape the tradition of closed innovation are globalization, the growth of intellectual property protection, enhancing mobility in the labour market, or the outcome of new technologies (Hilmersson et al., 2022). Other powerful aspects are the evolution of new forms of business organization and cooperation, the shortening of the life cycle of innovations, the raised costs of R&D activities, and the demand to integrate different technologies to execute an intended project (Baldwin and von Hippel, 2011).

Of course, there are also research perspectives critical of the concept of open innovation. They emphasize, in particular, the fluidity of the concept of open innovation itself, the possibility of data leakage and the entire know-how and the lack of transparency within the increasing complexity of the organizational structure, and last but not least, the loss of control over the entire innovation process and the excessive influence of partner organizations on the functioning of the company (Baldwin and von Hippel, 2011; Hossain, 2013; West and Bogers, 2014).

When defining sustainable innovation, it is necessary to start from the basic concept of innovation (Baldwin and von Hippel, 2011). At its core, it speaks of new products, production methods, resources, markets, ways of operating organizations, and combinations of existing elements. However, when it comes to sustainability, it is necessary to reconstruct the perception of the word 'newness,' and particularly the results of this newness. Sustainable innovation can be comprehended as the product of conceptions, methods, or practices contributing to sustainable development and the well-being of markets needs with respect to natural resources and renewal capabilities (Ferlito and Faraci, 2022; Gunarathne, 2019), these are long-term benefits for society and the environment but in conjunction with economic benefits for the company.

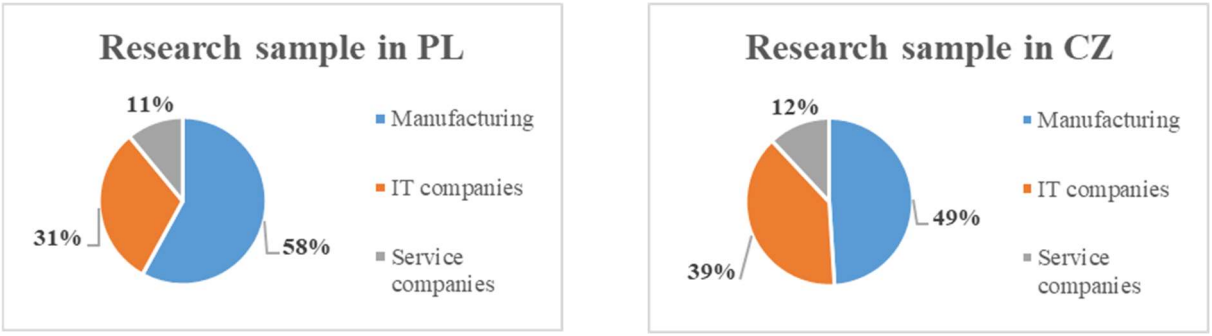
In this light, collaboration with external partners can play an essential role if innovation's ethical, social and societal aspects are considered. Research has already confirmed the correlation between open innovation and the implementation of sustainable innovation (Rauter et al., 2019). Connecting with partners will help businesses develop sustainable innovations. Working with the community, local partners, and non-profit organizations can make it easier for the market to adopt innovative solutions (or products). Therefore, in the case of sustainable innovation, the definitive list of partners for implementing the concept of open innovation has expanded (Boons and Lüdeke-Freund, 2013; Seebode et al., 2012). Universities, research organizations, suppliers/customers have been joined by customers, competitors, other companies with non-competitive goods, think tanks, the wider community, PR companies, public institutions, or non-profit organizations.

3 Material and Methods

As this is ongoing research by the authors, attention was again (for the sake of comparability of results) focused on a specific area. These are the area of Cieszyn Silesia with the Beskydy region on the Czech and Polish sides as one of the Euroregions with multinational cooperation structures between Poland and the Czech Republic. This specific area extends to twelve municipalities of Cieszyn County, two municipalities in Bielsko County, one municipality in Wodzisław County, and Jastrzębie Zdrój in Poland; sixteen municipalities of the Karviná District, and 27 municipalities in the eastern part of the Frýdek-Místek District in the Czech Republic. One of the locality of the historical area of Cieszyn Silesia, namely Bielsko-Biała, Czechowice-Dziedzice and Frýdek-Místek fall under the Beskydy region.

The monitored SMEs were picked from a database of innovative enterprises formed during previous research (Czerná and Štverková, 2021). Eighty companies on each border were contacted; 76 companies from Poland and 72 from the Czech Republic responded. Therefore, the sample was unified into 140 companies (70 from each side of the selected region), all domestically owned. The specific distribution of the research sample is shown in Figure 1.

Figure 1 – Research sample.



Source: own research

Managers and owners of the surveyed firms were asked to complete a questionnaire consisting of 3 parts. In the first identification part (10 questions), attention was paid to the surveyed companies' characteristics in addition to essential elements of innovation activities. The second part was formed of ten closed questions regarding different choice questions connected to the level of awareness and uptake of open innovation practices in individual organizations (with a particular focus on partnerships from a sustainability perspective).

The last part of the questionnaire (sent after the processed results of the first two parts) was pairwise comparisons to perform the decomposition within the AHP methodology to create a critical element model of the applicability of sustainability innovation within individual open innovation practices.

According to author (Ramík, 1999), the AHP methodology presents a basic framework usable for preparing effective decisions in a situation of complex decision-making. It helps to simplify the decision-making process itself. In addition, AHP analysis is one of the best methodologies for prioritizing various indicators. It is a linear decomposition method that provides an objective mathematical procedure for determining individuals or groups' inevitably subjective and personal preferences in decision-making (Saaty and Vargas, 2001). It allows to break down complex problems into several smaller units, assign them to individual criteria, and in this way, classify them into hierarchies. At the same time, this method can operate with criteria described in both quantitative and qualitative ways. The method decomposes a complex unstructured situation into individual criteria that will be used in the next step into a hierarchical structure. At each level of the hierarchical structure, Saaty's pairwise comparison method is applied by taking each criterion and is compared with the other criteria (a scale from 1 to

9, creating the Saaty matrix of pairwise comparison). The pairwise comparison result is the weights of each data criterion (Van den Honert, 2001).

$$s_{ij} \approx \frac{w_i}{w_j}; i, j = 1,2, \dots, k. \quad (1)$$

The most common method of determining weights is to use the weighted geometric mean of the rows. This solution method is based on the calculation of the geometric averages of the individual rows of the decision matrix (multiplying the elements of each row of this matrix and determining the kth root of these sums). By normalizing these row geometric means (dividing them by the sum of these geometric means), the weights of the criteria are obtained:

$$v_i = \frac{\left[\prod_{j=1}^{k} s_{ij}\right]^{1/2}}{\sum_{i=1}^{k}\left[\prod_{j=1}^{k} s_{ij}\right]^{1/2}} \; for \; i = 1, \dots, k \quad (2)$$

The methodology includes a consistency check pairwise comparison matrix. The consistency check should be performed before the actual calculation of the weights, the aim being to see if the matrix is sufficiently consistent. The consistency measure has been discussed in detail by Escobar and Moreno-Jiménez (2007), and they present their calculation of the geometric consistency index GCI (Geometric Consistency Index). Calculation of the GCI is as follows:

$$GCI = \frac{2}{(n-1)(n-2)} \sum_{j \geq i} \left(log(s_{ij}) - log \frac{v_i}{v_j} \right)^2, \quad (3)$$

where n is the number of criteria, vi /vj is the ratio of approximated weights. Approximate thresholds for consistency evaluation were determined (Escobar et al., 2004) as follows GCImax for n = 1,2 is 0.31; for n = 3 is 0.3147; for n = 4 is 0.3526 and for the number of criteria n > 4 is 0.37.

4 Results and Discussion

For a more precise presentation of the results, the authors have divided this chapter into two parts.

4.1 The Issue of Open Innovation and Sustainability

The first part of the research focused on a cross-area (within two regions in two countries) comparison of questions related not only to the open innovation concept but also to the awareness of the sustainability concept; detailed results are provided in Table 2.

Table 2 – Aspects of OI and SI in monitored company.

Aspects	**Region in CZ**	**Region in PL**
Cross-border cooperation	67 %	72 %
Implementation of OI	72 %	59 %
Idea generation phase	35 %	12 %
Concept phase	10 %	76 %
Product phase	12 %	41 %
Market phase	89 %	20 %
OI as a part of the strategy	IN PART	YES
Sustainable Innovation - awareness	46 %	57 %

Sustainable Innovation - implementation	24 %	41 %
SI as a part of the strategy	NO	NO
Sustainability as a part of the strategy	NO	YES

Source: own research

First, it is essential to mention that up to 67% of the surveyed enterprises in CZ and 72% of the surveyed enterprises in PL focused on multi-regional cross-border cooperation. It is also noticeable that the surveyed enterprises on both sides of the border for implementing innovation projects are looking for collaborators in their surroundings, thus implementing the concept of open innovation. However, this trend is more noticeable in the case of Czech firms than in the case of Polish firms. However, the most significant differences were observed during the research in the specific innovation phases when the concept of openness was applied. In the case of the Czech companies surveyed, attention is paid mainly to the phase of product assimilation on the market (89%), followed by the phase of idea generation (35%). On the other hand, the Polish companies surveyed trust partners outside the organization mainly in the phase of conceptualization of the innovation (76%), followed by the phase of product development (41%). In the case of commercialization of the innovation, only and only 20% of the companies surveyed cooperate with external partners.

It is also interesting to note that although the Polish enterprises surveyed have implemented open innovation in their strategy, the Czech enterprises lag slightly behind in this respect, as they have only partially implemented open innovation in their strategy, in particular only the list of collaborating partners (not the way of selecting them or the rules of collaboration).

The differences between the areas are also evident in the case of issues related to sustainability. Although 46% of CZ and 57% of PL firms have an awareness of sustainable innovation (i.e., awareness of what the term sustainability means and what the main priorities are), only 24% of CZ and 41% of PL firms stated that they implement solutions corresponding to sustainable innovation within their organization. The surveyed companies in both countries have not yet introduced SI principles in their strategy. However, it should be underlined that the Polish surveyed companies have included sub-concepts related to sustainability in their innovation strategy.

4.2 The Model Applicable in the SME Sector for Implementing Sustainable Innovations

This model was based on research that confirmed the link between the open and sustainable innovation concepts. However, the different levels were adapted to the SME situation based on interviews with managers of the 50 enterprises studied (25 CZ and 25 CZ), who were asked to write down essential elements of sustainable innovation from their point of view. Based on the analysis of the responses, the three most important factors were selected as the most frequently occurring in both countries surveyed. Based on the literature study, these elements were matched to the lower category's characteristics, and again at this stage, managers were interviewed to select the essential elements. Based on this analysis, the basic framework of the model was developed, see Table 3.

Table 3 – Model structure

Level 0	**Level 1**	**Level 2**
SI	Partners for creation	universities
		research
		suppliers
		competitors
		non-competitive companies
		groups of experts
	Partners for commercialization	non-profit
		PR
		community
	Sources of evaluation	customers
		social organizations
		public institusions

Source: own research

The authors assume that cooperation with external partners at multiple levels is essential to successfully implement sustainable innovations. First and foremost, this is a partnership in the creation of the innovation (here thought of as the process of creation, i.e., from idea generation, through conceptualization, to the actual creation of the innovation). This is followed by commercialization partnerships, i.e., innovation dissemination, helping the new solutions/products to be accepted by the broader market. Last but not least, the evaluation sources appear in the structure, as sustainability is seen in the returns it brings to the company and the environment (i.e., the environment). For the creation partnership, the most suitable items for SMEs were selected based on interviews with managers and owners, i.e., universities, research organizations, suppliers, competitors, non-competitors (i.e., companies that do not operate in a competitive sector), and expert groups (these are not only academic experts but, e.g., experts in advertising, specific technologies, etc.).

In the case of commercialization cooperation, attention was paid to non-profit organizations, PR agencies, and the community in general. Finally, the source of evaluation element was decomposed into customers, social organizations, and public institutions.

The next step was to determine the weights and importance of each criterion. The following decision matrices were created based on aggregating the individual ratings (by the company). The final weights (with global priorities) are shown in Table 4.

Table 4 – Decision hierarchy

Level 0	Level 1	Level 2	Glb Prio.
SI	Partners for creation 0.371	competitors 0.069	2.5%
		research 0.046	1.7%
		universities 0.261	9.7%
		non-competitive companies 0.158	5.9%
		suppliers 0.425	15.7%
		groups of experts 0.042	1.5%
	Partners for commercialization 0.070	non-profit 0.125	0.9%
		PR 0.150	1.1%
		community 0.725	5.1%
	Sources of evaluation 0.559	customers 0.634	35.4%
		social organizations 0.174	9.7%
		public institusions 0.192	10.7%

Source. Own research

The geometric consistency index GCI was measured, and it was found that all the pairwise comparison matrixes were consistent. The local priorities shown in green represent the relative weights of nodes within a group relative to its parent group and capture the importance of individual factors within their group. The local priorities of each group of criteria and their sub-criteria add up to 1.000. The global priorities, shown in the last column, are obtained by multiplying the local priorities by the global priority of the parent group. The global priorities of all sub-criteria in a given level are added up to 1.000.

It was found that to implement sustainable innovations in the environment of SMEs, it is first of all necessary to perceive the needs of the environment, which are then incorporated into the innovations created. In innovation partnerships, SMEs should focus on collaboration with suppliers and then universities. The community is suitable as partner for commercialization. Last but not least, it is best to listen to customers and other organizations for evaluation.

5 Conclusion

The current business environment forces businesses to face constant change. The additional requirements for sustainability force listening to all market participants (in its broader sense) and prevent consideration not only for the economic benefit of the company itself but above all for the well-being of the environment. Innovation is the starting point for maintaining market position and competitiveness. However, SMEs that lack resources have to look for opportunities outside their organization, thus moving away from closed and open innovation. The latter also provides some starting points for the strategic implementation of sustainable innovations.

The aim of this paper was therefore to evaluate the current attitude of innovative SMEs towards multiregional open innovation, in Poland and the Czech Republic in border areas. The research focused on innovative SMEs operating in border areas (on the border of the Czech Republic and Poland). Although operating in different countries, these enterprises operate within the Euroregion, which is perceived as a single entity. Therefore, multi-regional (in this case also transnational) innovation offers itself and is more accessible in terms of establishing cooperation. Although the regions are similar in economic and sociological development, the researchers noted some differences. Businesses in the Czech Republic are increasingly emphasizing the protection of know-how and data, as they do not allow external collaborators in the conceptualization and product phases. This corresponds with the finding that OI was only partially included in the strategy. Therefore, an additional definition of open innovation and a more detailed description of the principles for collaboration with partners could solve these difficulties and make Czech SMEs more open to further collaboration in other phases of the innovation process. On the contrary, the Polish surveyed enterprises have OI in their strategy, i.e., they allow external partners to join other phases. Only the idea generation phase is lagging.

In the case of sustainability, SMEs in both countries are beginning to realize the importance of sustainability. However, only Polish enterprises (and only a limited number) could incorporate the concept of sustainability into the enterprise's overall strategy.

Another objective of this paper was also to develop some framework for implementing sustainable innovations in connection with open innovation, suitable for use in the SME environment. For SMEs, it is advisable to turn to their suppliers (with whom they already have a functional, long-established relationship) and, simultaneously, to universities. The latter can provide SMEs with a research base they cannot afford to pay for due to their limited financial resources.

However, responding to the environment, its requirements, and its benefits is the basis for successfully implementing an appropriate sustainable innovation. Therefore, feedback from the environment is perceived as the most critical part of the model. The authors' research was limited by the number of innovative SMEs operating in the selected area and the sensitive nature of the data required. This model can guide SMEs operating not only in other border areas but also in other locations that are considering introducing sustainable innovations. The next step should therefore be to test the model's functionality on other SMEs. Then the model can be adapted to large enterprises with very different characteristics..

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Social Protection Systems in the Conditions of the Visegrad Group

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Abstract

Social protection is a policy that is implemented in each country for the purpose of development, activation of the individuals and their protection against risks. Social protection of the population is ensured through the social security system. The aim of this article is to compare the system of social protection of the Visegrad Group countries. The comparison is made in relation to the content structure of systems and financial indicators in the V4 countries. The analysis is performed for the defined reference period 2010-2019. Evaluation of the overall development is carried out according to the average absolute increment. For the purpose of analysing the relationship between the main monitored parameters, the Pearson correlation coefficient and Bootstrap method were used. Contributions paid by employers represent a significant source of revenue for social protection, especially in the Czech Republic, as well as in Poland and Slovakia. The development of social protection expenditures was growing in all monitored countries, with Poland and the Czech Republic spending the highest share in recent years (18-21% of GDP). The structure of expenditure by social protection function in each country showed that the largest part of total social protection expenditure was spent on the "Old Age" function.

Keywords: *indicators, social benefits, social protection, systems, Visegrad Group*

JEL Classification: *H53, H55, I38*

1 Introduction

Social policy is the main and most important field in the implementation of the basic functions of the state. Social protection is a policy that is implemented in each country for the purpose of development, activation of the individuals and their protection against risks. The emphasis is focused primarily on the fields of unemployment, parental responsibility, sickness and health care, disability, loss of breadwinner or spouse, old age, housing and social exclusion (The World Bank, 2012; 2022). As Devereux, Roelen and Ulrichs (2015) note, new social protection programmes are being developed at the national level, with many countries adopting national social protection policies or national social protection strategies.

Social protection can be provided through the universal social benefits or through means-tested social benefits, depending on the social security model set up. Generally, social protection means that the population of a country is guaranteed a certain minimum income or level of consumption and access to basic services. Targeted social protection is a process in which public resources are focused on a target population that has been identified based on certain criteria, such as income level or vulnerability (Miežiené and Krutuliené, 2019).

In terms of historical development, social protection has been one of the youngest but fastest growing areas of international development. The approach to social protection has been conceived by some stakeholders from a range of different pragmatic and ideological perspectives, from seeing social protection as a macroeconomic stabilizer to humanitarian responses, from risk management to achieving social justice (Craig and Porter, 2005). The global financial crisis of 2008-2009 or the COVID-19 pandemic has demonstrated the need to promote social protection as a tool of national public policies to provide protection for the most vulnerable groups from economic shocks and instability (Stiglitz, 2013; Gerard, Imbert, and Orkin, 2020). As stated by Suptelo et al.

(2020), the problem of support for socially vulnerable groups of the population is a national challenge that concerns society as a whole. In the need for specific actions by social protection authorities in direct contact with the population, the importance of the regional level of the government increases.

The social protection system is also an integral part of the European Union's member states. The European Commission's work complements and supports national policies on social inclusion and social protection. The key policy framework for social protection within the European Union is the Europe 2020 strategy and the Open Method of Coordination for Social Protection and Social Inclusion (Social OMC). The main objective of the Europe 2020 Strategy and the OMC is to promote social cohesion and equality on the basis of adequate, accessible and financially sustainable system of social protection and policies promoting social inclusion. At least 20 million people in poverty and social exclusion should be lifted out of poverty by the end of the decade and employment rates for men and women aged 20-64 should rise to 75% (European Commission, 2010).

Social protection is provided through the social security system. The structure and scope of the social security system is not identical in all countries. There are also different national policies regarding the provision of social assistance to citizens. The methods used depend mainly on the social security policy of each country. The European Union member states have adopted the Social Security (Minimum Standards) Convention, No. 102, the primary international social security instrument, as the basis for implementing and maintaining social protection systems, the range of risks involved in schemes and system financing techniques, but each country defines its own rules at the national level.

The aim of this article is to compare the systems of social protection of the Visegrad Group countries (V4 countries), including the Czech Republic, Poland, Slovakia and Hungary. The comparison is made in relation to the content structure of systems and financial indicators in the V4 countries between the years 2010-2019.

1.1 The Main Characteristics of the Social Protection System in the Czech Republic, Poland, Slovakia and Hungary

Every citizen of the Czech Republic has a subjective right to social security, which is declared in the Charter of Fundamental Rights and Freedoms as part of the country's constitutional system and in ratified international conventions and treaties (Act No. 2/1993 Coll. as amended by Act No. 162/1998 Coll.). The Czech social security system has undergone many reforms since the 1880s, when it was part of the Bismarckian model of social security with a strong emphasis on social insurance. Since the establishment of an independent state in 1993, significant changes were implemented in 1995, when a unified system of family benefits (state social support) was introduced. A social assistance reform was adopted in 2006 and a system of health services and benefits for persons with disabilities was adopted in 2011. The social security system in the Czech Republic includes the system of pension, sickness and health insurance (financed by health insurance funds), the system of state employment policy and the systems of non-contributory social benefits - state social support (financed from the state budget) and social assistance (financed from taxes) (Melzochová, Špecián, 2015).

Social security according to the law from September 4, 1997, includes in Poland social insurance and social security, old-age pension funds, social assistance, government social assistance programs, social benefits, employment, social and work rehabilitation of disabled persons, support of combatants and persecuted persons, coordination of social security systems and public benefit activities. The social security system provides benefits for unemployment, health care, pensions, family benefits and social assistance. The Polish social protection system is financed through social insurance contributions, which finance more than 2/3 of social benefits, and through transfers and taxes. Taxes finance family benefits and social assistance (the amount is based on the level of income or the household situation), while social insurance contributions finance unemployment benefits, pensions, sick leave, maternity leave, and health benefits (benefits depend on contribution payments) (Garbiec, 2019; Glogosz, 2021). This is a conservative-corporatist model of the social state regime with a gradual shift towards a liberal regime due to the reforms introduced. As reported by Magda, Kielczewska and Brandt (2018), in the social protection system in the area of family benefits, a new benefit "Family 500+" was adopted in 2016. The aim was to increase the birth rate and reduce child poverty. This new benefit had the effect on the increase in family benefit spendings by more than 1% of GDP, but in particular, it reduced the risk of poverty among families with children and reduced the labour market participation of young women. The allowance significantly increases incomes, which reduces incentives to enter the labour market through the income effect. The study found that the effect of the allowance was evident mainly among women with the lowest educational attainment, and especially if they could rely on an income. Poland ranks among the countries with the highest spending in the EU when it comes to cash support for families with children.

Slovakia has faced several major challenges in the economic sphere and the transformation of the socialist social welfare system into a modern social security system. The concept of social policy and the population groups in

need of social assistance and protection was developed. The transformation of social policy aimed to create a fair social security system that was based on the participation of the population, social solidarity and state guarantee (Bednárik, 2015; Botek, 2019). As stated by Macková (2017), major changes in the social protection system were implemented under protection of the World Bank and the IMF, and in 2004 as part of the adoption of several major reform laws - the Law no. 95/2002 on the system of insurance, the Law no. 461/2003 on social insurance and the Law no. 580/2004 on health insurance. Currently, the Slovak social protection system consists of social insurance and health insurance, state social assistance benefits and assistance in material need. The given subsystems have their own defined underlying principles, types of coverage of specific risks and procedures for their financing. Social insurance benefits depend on the duration and the amount of social security contributions. It pays benefits for sickness, maternity, paternity, unemployment, disability, old-age, survivors, occupational injuries and occupational diseases. Benefits from state social assistance include child benefit and supplement, parental benefit, childcare benefit and childbirth benefit (Piterová, 2018). This is similar to the social protection system in the Czech Republic.

The social protection system in Hungary is divided into five main sectors, namely pensions and health care services under social insurance (central pillar), unemployment insurance, the system of family benefits and the social assistance system. Protection is thus provided for sickness, maternity, old age, disability, occupational diseases, occupational injuries, survivors, child rearing and unemployment. Self-employed persons and persons equivalent to them (for example, job seekers, etc.) are protected against these risks. The administration, organisation and management of the Hungarian social security system are centralised, but the provision of social benefits is decentralised. Contributions from employers and employees finance both systems on the basis of ongoing funding, and their secondary deficits are financed from the central budget. Cash benefits are income-related. Hungary does not provide a general system of guaranteed minimum wages. Instead, a fragmented system of social assistance was developed, which provides limited assistance to some groups of people (for example, the elderly, the unemployed). The social security system in Hungary has undergone considerable change since 2000 through several reforms, which have been particularly negative since 2010. There have been reductions in unemployment benefits and in social assistance, the abolition of early pensions or the neglect of equal opportunity policies (Scharle, Szikra, 2015; Darvas, Szikra, 2017).

2 Material and Methods

The analysis presented further uses the data taken from the Eurostat, the statistical office of the European Union, specifically from the area of Social protection. The first part focuses on the basic financial indicators of the social protection system that is total revenues and expenditures in the area of social protection. The scope of total expenditures for social benefits is then defined. Finally, yet importantly, the individual social benefits paid out from the social protection system are analysed in detail. The dataset is based on the European System of integrated Social Protection Statistics (ESSPROS), which is a tool for comparable statistical monitoring of social protection in the Member States of the European Union.

ESSPROS defines social protection as a set of interventions by public or private institutions. The aim of these institutions is to relieve households and individuals of the burden arising from defined risks and needs (sickness/health care, disability, old age, survivors, family/children, unemployment, housing, social exclusion not elsewhere classified).

The comparison of financial indicators and the trend of their development are carried out within the countries of the Visegrad Group, including the Czech Republic, Poland, Slovakia and Hungary. The comparison of the trend is done for the period of years 2010-2019. The year 2010 represents the initial year of the Strategy Europe 2020, and the year 2019 is the last year with available statistical data for all financial indicators.

Evaluation of the overall development is carried out according to a simple measure of time series dynamics - the average absolute increment ($\bar{d}$) between 2010 and 2019. For the purpose of analysing the relationship between the monitored parameters, the Pearson correlation coefficient was used. Correlation analysis expresses the degree of statistical dependence between two quantities. For the purpose of measuring the correlation dependence, a number of coefficients are used, which differ according to the types of variables. According to Abu-Bader (2021), Pearson's correlation coefficient ranks among one of the most common parametric techniques of statistics. The Bootstrap method was used to determine the reliability of the resulting values of correlation coefficients. The Bootstrap method is one of the most intensive computational methods for statistical data analysis. This method makes it possible to estimate the precision of any estimate of any parameter. The principle of the method is based on the idea of multiple iterations of a simple algorithm, where an M-tuple of random samples (with returns), each of the same size n, is generated from a sample of size n.

3 Results and Discussion

Revenues to the social protection system consist of social security contributions, government contributions and other revenues. Employer's social contributions represent the costs incurred by employers to cover the entitlement to social benefits for current or former employees and their family members. Table 1 shows social protection revenues as a percentage of GDP in terms of social contributions paid by employers, contributions paid by insured persons and government contributions.

In all EU countries, employers contribute to their employees' social security contributions. Employer contributions represent a significant source of revenue, particularly in the Czech Republic, and in Poland and Slovakia, where their share of GDP is clearly increasing. In contrast, Hungary has shown a declining trend since 2010. In terms of EU member states, the countries are below the average - 10.2-10.6% of GDP (only in 2018 and 2019 the Czech Republic was at the level of the average). In terms of social contributions paid by insured persons, an increasing trend can be observed for the countries surveyed, which was most significant in Hungary (more than 5% of GDP since 2016); the average for the EU (28) was about 5.8% of GDP. Revenues through government contributions were highest in Hungary and Slovakia in the period under review, while the lowest government revenues were in Poland, except in 2019, when they jumped by 2.5% to 6.0% of GDP. In general, a prevailing downward trend since 2010 is evident for the countries. As for other revenues, their level was very low (less than 1% of GDP), only in Poland ranging between 2.3% and 3.7% of GDP.

Table 1 – Social protection revenues, by type (percentage of GDP)

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Social contributions paid by employers										
Czech R.	9.6	9.6	9.7	9.7	9.5	9.4	9.6	9.7	10.2	10.3
Poland	7.9	7.9	7.7	8.6	8.4	8.7	9.9	9.6	9.5	8.7
Slovakia	7.9	8.0	7.9	8.3	8.5	8.6	9.0	9.4	8.7	9.6
Hungary	8.5	8.0	7.8	7.8	7.9	7.7	7.8	6.6	6.3	5.9
Social contributions paid by protected persons										
Czech R.	4.5	4.6	4.7	4.8	4.7	4.6	4.7	4.7	4.8	4.9
Poland	3.1	3.4	3.3	4.0	3.9	4.2	4.2	4.4	4.4	4.4
Slovakia	3.6	3.7	3.6	3.9	4.0	4.0	4.2	4.3	4.2	4.4
Hungary	5.1	4.3	4.7	4.9	4.7	4.9	5.1	5.3	5.3	5.3
General government contributions										
Czech R.	5.6	5.5	5.6	5.9	5.8	5.3	4.8	4.6	4.6	4.7
Poland	4.1	3.9	4.0	4.1	4.2	4.0	3.9	3.7	3.5	6.0
Slovakia	5.6	7.2	7.3	6.2	6.2	5.4	5.6	5.0	4.8	4.5
Hungary	9.6	8.6	7.7	8.1	7.3	6.5	5.7	6.0	5.7	4.9

Source: Authors according to Eurostat (2022).

Trends in development of the total social protection expenditure for the Visegrad countries and EU Member States (28) are documented for the period of years 2010-2019 in Table 2. Expenditure includes social benefits that are provided to individuals and households, as well as administrative costs (operational costs for the administration and management of the social programme) and other expenditure. The trend in social protection expenditures has been upward in all countries surveyed (more than 1 billion CZK in annual terms, about 20% of which are administrative costs). However, in terms of their share of gross domestic product, a fluctuating trend can be observed. Since 2016, social protection expenditures as a percentage of GDP have been highest in Poland (21-20%), followed by the Czech Republic and Slovakia (18%) by a small margin. The increase in Poland was due to the adoption of a new social benefit for raising children (Family 500+). In the case of Hungary, the highest percentage of GDP is evident in 2010, however, as mentioned in the theoretical section, reforms have been adopted since 2010 that have led to a decrease in social protection expenditure (unemployment benefits, social assistance, etc.), which is confirmed in the year-on-year decline in GDP since 2011. Compared to the Union (28 countries), it is evident that the countries are far below the average. The time series dynamics indicator confirms the downward trend between 2010 and 2019, with only Poland showing a positive increase.

Table 2 – Total social protection expenditure (% of GDP)

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	x̄	$\bar{d}$
Czech R.	19.9	19.9	20.3	20.0	19.5	18.8	18.8	18.3	18.5	18.8	19.3	-0,1
Poland	19.7	18.7	18.9	19.7	19.4	19.4	21.0	20.2	19.7	21.3	19.8	0.2
Slovakia	18.1	17.7	17.8	18.2	18.4	18.0	18.4	18.2	18.0	17.9	18.1	-0.02
Hungary	22.4	21.5	21.2	20.7	19.7	19.0	18.8	18.2	17.6	16.7	19.6	-0,6
EU (28)	28.6	28.3	28.7	28.9	28.6	28.3	28.0	27.8	27.5	*x*	28.3	-0,1

Note: *x* data not available

Source: Authors according to Eurostat (2022).

Social protection expenditure is also analysed on a per capita basis in euros, see Table 3. It is evident that the Czech Republic spends the most of all V4 countries, namely more than 3,000 EUR, which is about 42% of the average expenditure in the European Union (28). In terms of temporal evolution, this was the most dynamic positive evolution of expenditure between 2010 and 2019, see $\bar{d} =$ 383,9. In contrast, the lowest per capita expenditure on social protection was initially spent in Poland, but there has been a gradual increase year on year, as confirmed by the result of the average absolute increase ($\bar{d}$). Only in Hungary we can observe a relatively constant level of per capita expenditure, which is roughly less than a third of the overall European average.

Table 3 – Total expenditure on social protection per capita (in EUR)

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	x̄	$\bar{d}$
Czech R.	2 987,7	2 980,1	3 004,8	2 969,5	3 015,9	3 077,6	3 152,1	3 195,9	3 292,9	3 456,8	3 113,3	383,9
Poland	1 874,4	1 836,7	1 864,3	1 958,5	2 009,9	2 129,9	2 391,6	2 413,5	2 459,0	2 797,7	2 173,6	102,6
Slovakia	2 285,6	2 248,0	2 256,5	2 305,6	2 385,4	2 436,3	2 527,3	2 562,9	2 614,8	2 665,9	2 428,8	42,3
Hungary	2 225,8	2 169,9	2 082,1	2 109,8	2 126,5	2 159,9	2 190,2	2 217,6	2 285,1	2 267,7	2 183,5	4,7
EU (28)	7 289,8	7 283,7	7 306,2	7 372,2	7 433,0	7 567,6	7 671,8	7 791,8	7 845,8	*x*	7 506,9	61,8

Note: *x* – data not available

Source: Authors according to Eurostat (2022).

The relationship between basic financial indicators – total social protection expenditure and social protection revenues – by type (PCC1 – Social contributions paid by employers; PCC2 – Social contributions paid by protected persons; PCC3 – General government contributions) – is monitored using the Pearson correlation coefficient to express the degree of intensity of dependence between the indicators, see Table 4.

Table 4 – Correlation between basic financial indicators of V4 countries, panel data for the period 2010-2019

Country	PCC1	PCC2	PCC3
Czech R.	-0.348	-0.322	0.878
Poland	0.648	0.624	0.550
Slovakia	0.295	0.354	-0.296
Hungary	0.890	-0.661	0.971
EU (28)	0.789	-0.315	0.606

Note: The results for the EU (28) are for the period 2010-2018. PCC – Pearson correlation coefficient.
** Correlation is significant at the 0.01 level.

Source: Authors according to Eurostat (2022). Own calculations (SPSS).

Pearson correlation coefficient values confirmed a moderate to very strong relationship between expenditure and revenue by type for social protection in Poland. A predominant negative relationship was evident within the Czech Republic between total expenditure and revenue – social contributions paid by employers and social contributions paid by protected persons, while a very strong positive relationship was evident for general government contributions. In the case of Hungary, a very strong relationship was confirmed between total expenditure and revenue – social contributions paid by employers and general government contributions. Verification of the reliability of the resulting values of Pearson's correlation coefficient was performed by using Bootstrap method, see Table 5. The values in statistical dependence are also confirmed by the lower and upper confidence intervals of the correlation coefficient according to the Bootstrap method. Rising total social protection expenditures and slightly rising revenues, by type, mainly influenced the resulting values of the correlation coefficients.

Table 5 – Verification of the reliability of the resulting values of the Pearson correlation coefficient

Bootstrap CI 95 %	PCC1	PCC2	PCC3
Czech Republic			
Lower	-0.801	-0.735	0.709
Upper	0.644	0.242	0.981
Poland			
Lower	0.227	0.280	-0.584
Upper	0.950	0.902	0.929
Slovakia			
Lower	-0.428	-0.408	-0.816
Upper	0.792	0.812	0.788
Hungary			
Lower	0.678	-0.953	0.919
Upper	0.997	-0.182	0.998
EU (28)			
Lower	0.491	-0.925	-0.027
Upper	0.965	0.615	0.986

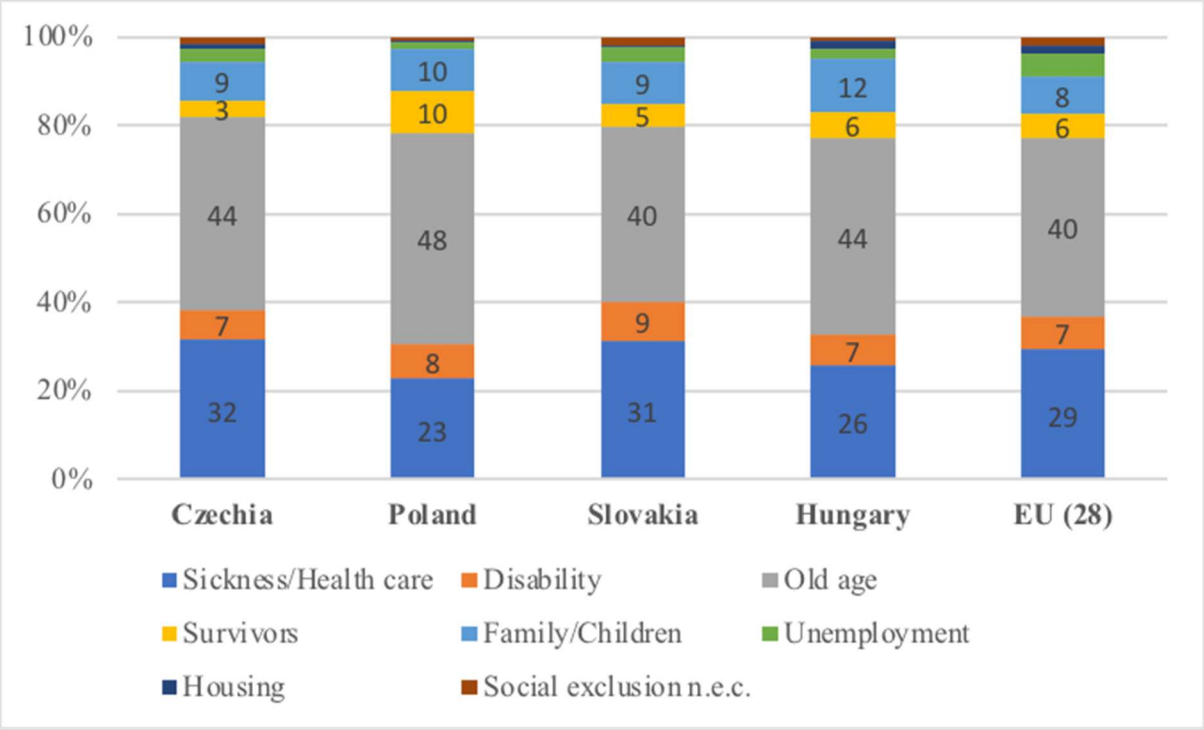
Note: The results for the EU Member States (28) are for the period 2010-2018.

Source: Own calculations (SPSS).

Of the total social protection expenditure, the vast majority was localised to social benefits. Specifically, in the period under review, the Czech Republic, Poland and Slovakia accounted for 96-97% of total expenditure, while Hungary accounted for about 98% of total social protection expenditure. The remainder is accounted for by administrative costs (about 1.1-3.3%) and other expenditure (less than 0.1%).

The average structure of expenditure by social protection function over the period 2010-2019 in the countries studied is shown in Figure 1. The largest share of total social protection expenditure by country was spent on the *Old Age* function each year (more than 40%), especially in Poland (48% on average). Next was the *Sickness/Health care* function, which accounted for about a third of expenditure in the Czech Republic and Slovakia, while in Poland it accounted for only 23% of total expenditure on average.

Figure 1 – Social benefits, by function (in % of total benefits), average for the period 2010-2019



Note: The average for the EU Member States (28) is for the period 2010-2018.

Source: Authors according to Eurostat (2022). Own calculations.

In the case of Poland, it is possible to notice the highest total expenditure on *Survivors* (10%) and *Family/Children* (10%) compared to the other V4 countries (only Hungary had a slightly higher expenditure on *Family/Children*, 12%). *Disability* (7-9%) and *Social exclusion n.e.c.* (1-2%) accounted for a similar percentage of total expenditure in all countries. Expenditure (more than 1%) on the *Housing* function was found only in the Czech Republic and Hungary. The lowest share of expenditure (1%) on the *Unemployment* function was in Poland, while a high share (4%) was in Slovakia. The countries surveyed were average to above-average European countries with regard to the structure of expenditure on *Disability*, *Old age*, *Survivors* and *Family/Children*. Only the Czech Republic and Slovakia were above average for *Sickness/Health care*, while Poland and Hungary were below the European average. In the other functions, countries tended to be below average compared to the EU average (28).

4 Conclusion

The issue of social protection is a frequent topic of scientific discussions. Setting and development are related to the study of fiscal factors (social contributions), the determination of the main vectors of social protection and the link between social protection policies and the resulting socio-economic indicators. Social protection is a component of public policy that aims at preventing loss of livelihood due to adverse social events or old age, as well as at raising incomes and restoring labour productivity and capacity.

The presented paper was aimed to compare the system of social protection of the Visegrad Group countries (V4 countries), including the Czech Republic, Poland, Slovakia and Hungary. The comparison was made in relation to the content structure of systems and financial indicators in the V4 countries between the years 2010-2019.

Social protection systems in the V4 countries are designed on a similar basis - they provide benefits in the same areas of unemployment, health care, pensions, family benefits and social assistance. Differences lie, among other things, in the method of financing, but in general these include taxes, funds, the state budget or social insurance contributions. In the Czech Republic, the sources of financing include taxes, funds and the state budget, while in Poland the predominant sources (by 2/3) are social insurance contributions.

In terms of social protection receipts, employers' contributions represent a significant source of revenue, particularly in the Czech Republic, and in Poland and Slovakia, where their share of GDP is clearly increasing. In contrast, Hungary has shown a declining trend since 2010. In the range of 3-6 % of GDP, social contributions paid by insured persons and government revenue are also among the revenues. The trend in social protection expenditure has been increasing in all countries surveyed, with Poland and the Czech Republic spending the highest share (in percentage of GDP) in recent years (18-21 % of GDP). The countries also achieved the highest values for total expenditure on social protection per capita (in EUR). The structure of expenditure by social protection function in each country showed that the largest share of total social protection expenditure was spent on the *"Old age"* function (more than 40 %), with Poland in particular dominating (48 % of total benefits). Next was the *"Sickness/Health care"* function, with the Czech Republic and Slovakia spending about a third of the total. The lowest share of expenditure was recorded for the functions *"Housing, Social exclusion n.e.c., Unemployment"*.

The importance and necessity of a well-designed social protection system has been undoubtedly confirmed in recent years by the outbreak of COVID-19, which has restricted movement and economic activity in many countries, threatening the livelihoods of economically vulnerable individuals and households. As stated by Gerard, Imbert, and Orkin (2020), social protection systems could include expanding social insurance schemes, building on existing social assistance programs, greater involvement of local governments and non-state institutions from identification to provision of assistance to vulnerable groups or individuals.

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Competitive Potential of Czech-Polish SME Border Companies in 2021. Results of Research

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Abstract

Polish and Czech SME enterprises in the Polish-Czech border region in 2021. Competitive potential is an important and topical research topic for modern enterprises. It is the key (critical) success factors that create a company's competitive advantage in the market today and may determine its ability to succeed in the future. The methodology used in the research was a survey on the competitive potential of enterprises in the Polish-Czech border region in 2021 which was conducted between June 2021 and January 2022. Respondents were employees of 101 SME enterprises in a wide range of industries in the Silesian region in Poland and 149 SME enterprises of the Silesian-Moravian region in the Czech Republic. The results of the research shows significant differences between companies on both sides of the border relate to the areas of: how often conclusions are drawn after finishing successful projects, how a company collects knowledge in a company, a level of work experience of your key employees, a level of a moral (economic) consumption of fixed capital in a company.

Keywords: *company competitiveness, company competitiveness barometer, competitive potential*

JEL Classification: *M21*

1 Introduction

Competitive potential is an important and topical research topic for modern enterprises [3]. Although there are many approaches to this problem, it is difficult to find a single, dominant method of assessing the competitiveness of an enterprise in the literature. The concept of competitiveness is used to describe the ratio of an enterprise's characteristics to those of its competitors, resulting from a number of internal characteristics and the ability to cope with external conditions [2]. Competitive potential, on the other hand, is the key (critical)

success factors and relevant resources and skills that create a company's competitive advantage in the market today and may determine its ability to succeed in the future [6].

The purpose of this paper is to present the results of the research on the characteristics of competitive potential in Polish and Czech SME enterprises in the Polish-Czech border region in 2021. The research method used to collect data was the Company Competitiveness Barometer, available at www.konkurencyjniprzetrwaja.pl and sensorium24.com. The survey included 101 companies from Poland and 149 companies from the Czech Republic, the vast majority of which were micro and small companies (up to 49 employees).

Section 2 presents a broad review of the literature on enterprise competitiveness and competitive potential. Also described is the integrated model of enterprise competitiveness, created and revised several years ago by the authors of the article, and the research method. Section 3 contains research results in 12 areas of competitive potential and discussion of research results. Section 4 is a summary of the paper.

2 Material and Methods

2.1 Literature Review

A potential is defined as the resource of ability, capacity, efficiency, power or performance inherent in someone or something. This is, of course, a very general definition, but it lets start the review. If we relate it to a company, its potential refers to certain capabilities, built on its abilities, competencies, proficiencies derived from its resources, as well as on the skilful use of resources that are in the company's environment [10]. Competitive potential is treated as a set of resources at the disposal of an enterprise. It is a consciously structured set, and the resources included in it are used to perform specific functions, in accordance with the theory of the value chain. For example, the following division of resources into: financial, information, innovation, human, organizational, physical, technological [6].

Competitive potential can be understood as the ability to use one's resources, primarily intangible, to successfully compete and manage competitiveness. Competitive potential is the totality of tangible and intangible resources required to operate and compete in a given market. It is the primary determinant of the ability to obtain, sustain or strengthen a competitive advantage over rivals [1]. The ability to achieve direct financial benefits for the company, as well as generate indirect benefits, means the presence of key competencies in the business management system and structure, as well as having competitive advantages that constitute competitive potential [3]. Therefore, one of the most important conditions for the formation of competitive potential is to constantly track all changes occurring in the environment, their assessment and the development of an adequate strategy, especially in the event of unfavourable external circumstances external circumstances [2].

Competitive positions are the results achieved through competitive potential used in the process of a competitive struggle, carried out according to the concept determined by the company's competitive strategy, which takes into account the conditions of the environment [12]

Competitiveness of an enterprise consists of continuous, purposeful interaction managers (planning, building, utilizing, achieving, controlling and verifying the activities undertaken in the context of achieving the desired competitiveness) on the competitive potential of the enterprise, sources of competitive advantage, strategies and instruments of competition, and the competitive position of the enterprise in the market of supply and sales. It should take into account the existence of feedbacks between them, in accordance with the conditions of the internal and external, in order to create the ability of the enterprise to strengthen and improve its position in the market while achieving a higher level of efficiency than competitors and permanently shaping and effectively maintaining its growth [7].

Competitive potential is the basis for the accumulation of sources of competitive advantage, hence largely determines its main dimensions: type, size and sustainability. In view of this, the potential possessed determines the achievement of a specific competitive advantage, which in turn provides the basis for developing an offer and the use of specific competitive instruments that make it possible to achieve a specific competitive position [11]. Key (critical) success factors are vital resources and skills (the way resources are used, i.e., competitive strategy) that create a company's competitive advantage in the market today and may determine its ability to succeed in the future [5].

It can be said that an enterprise is competitive if it is able to build a competitive advantage that, on the one hand, reflects its potential (including resources, skills and abilities), and, on the other hand, is related to the ability to adapt to changes in the environment. It is a characteristic that defines the distinctive ability of an enterprise to take such actions that ensure stable and long-term development and contribute to building its market value market value. In this context, competitive potential is the totality of tangible and intangible resources of the

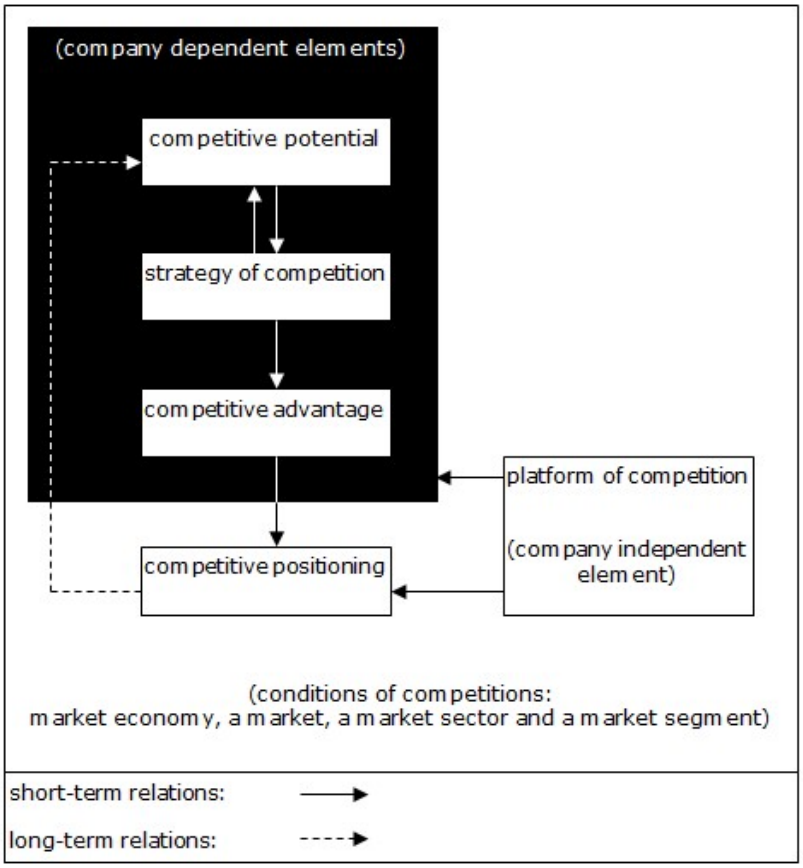
enterprise, key competencies and capabilities that make it possible to gain a sustainable and difficult to undermine competitive advantage over rivals [9].

Building the right competitive capacity by an enterprise to gain a competitive advantage in the market, has increasingly been considered in recent years as a condition for success and sometimes even survival in the market. There is a view that competitiveness, as a theoretical category theoretical, is difficult to apply to the study of real-life economic processes of the economy, as it requires comparison with the external environment, i.e. with competitors. From this it follows that an empirical study of competitiveness, should be preceded by the determination of measures and their weights, and the selection of research methods, adapted to the analysed entity [13].

2.2 Model of Enterprise Competitiveness

The authors of this paper attempted to systematize concepts, definitions and models related to the topic of enterprise competitiveness [6]. Their model of enterprise competitiveness has been improved and operationalized, and, thanks to the use of research tools, adapted for practical use in assessing the various aspects of enterprise competitiveness [4, 8]. The creation of an integrated model of enterprise competitiveness was aimed at generalizing the majority of enterprise cases and identifying the most important relationships between different aspects of competitiveness. The integrated model of enterprise competitiveness and the situational context that determines enterprise competition is shown in Figure 1.

Figure 1 – Integrated model of enterprise competitiveness



Source: [6]

Competitive potential, which is the subject of the study and this article presents the results of that study, is defined as the resources that an enterprise has or should have at its disposal in order to use them to build, maintain and strengthen its competitiveness. These are broadly defined as the capabilities of an enterprise arising from its tangible and intangible capital. At the same time, the competitive potential of an enterprise is a relative multidimensional concept [6].

2.3 Research Methods

At the same time, in order to disseminate the presented tools, the Company Competitiveness Barometer was implemented on website www.konkurencyjniprzetrwaja.pl and sensorium24.com, through which it is possible to access the constructed tools and conduct research within the framework of the enterprise competitiveness.

The Company Competitiveness Barometer used a survey method of 5 areas to study enterprise competitiveness. As shown in Figure 1, these areas are either dependent or independent of the enterprise. The enterprise influences the type and use of its competitive potential, makes choices about its competitive strategy and determines how it intends to achieve a competitive advantage and what type it should be. In addition, and importantly when conducting empirical research using the survey method, knowledge of the components of these areas of a company's competitiveness is fairly widespread among company employees, and most research questions do not require detailed financial, personnel or technical data.

The questionnaire used in the Company Competitiveness Barometer contains 48 questions. 45 of them deal with company characteristics that affect its competitiveness, and 3 questions are metric questions. The questions on competitive potential concern 12 areas: a relation between the level of free cash to the characteristics of a business, a level of the solvency of a company, if a company gains a profit from the primary (core) business operation, how a company collects knowledge in a company, an extend of how an employee is allowed to implement small improvements, how often conclusions are drawn after finishing successful projects, a level of the creativity of key employees in a company, how many projects, enterprises and processes are recorded in a company, a level of work experience of your key employees, a level of freedom in choosing own ways of completing employees' tasks, how employees get to know the strategy of a company, a level of a moral (economic) consumption of fixed capital in a company. .

The survey of the competitive potential of enterprises in the Polish-Czech border region in 2021 was conducted between June 2021 and January 2022. Respondents were employees of 101 SME enterprises in a wide range of industries in the Silesian region in Poland and 149 SME enterprises of the Silesian-Moravian region in the Czech Republic.

3 Results and Discussion

3.1 Results of Research

Table 1 shows the structure of the SME companies that took part in the survey in the Silesian region in Poland and the Silesian-Moravian region in the Czech Republic.

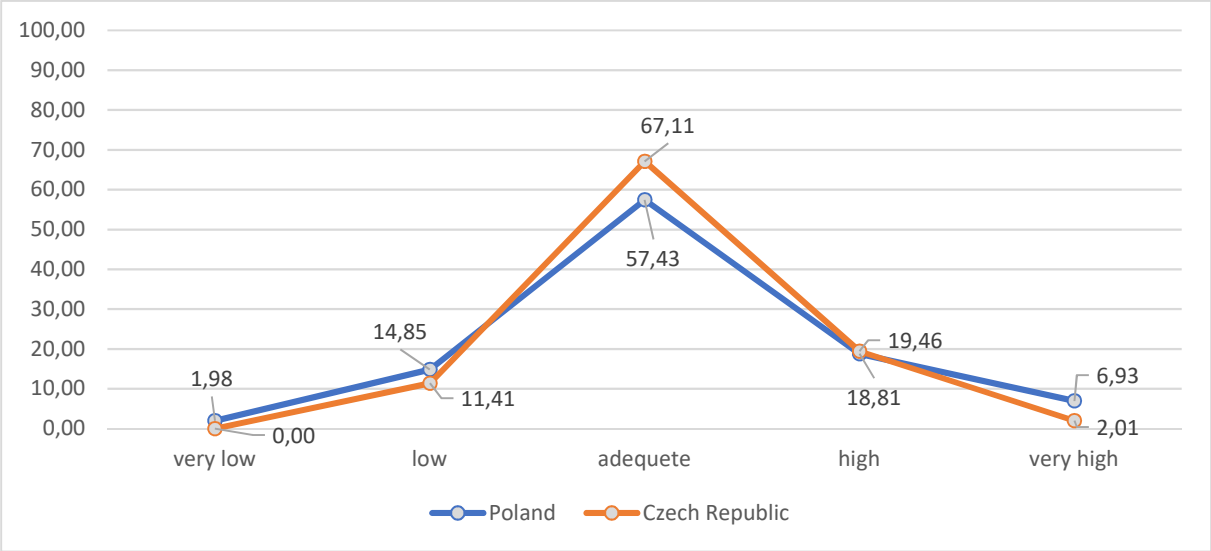
Table 1 – The title of the table.

	Micro companies (up to 9 employees)	**Small companies (10-49 employees)**	**Medium companies (50-249 employees)**	**Total**
Poland	54	40	7	101
Czech Republic	31	115	3	149

Source: Own elaboration

Below are the results of the competitive potential survey in the 12 areas presented in Section 2.3 The first area discussed is the relationship between the level of free cash to the characteristics of a business. As can be seen in Figure 2, this element of competitive potential developed very similarly in both countries, with as many as 67.11% of respondents in the Czech Republic indicating that this level was adequate compared to 57.43% in Poland. However, the situation related to this element of competitive potential can be assessed the same in Polish and Czech companies.

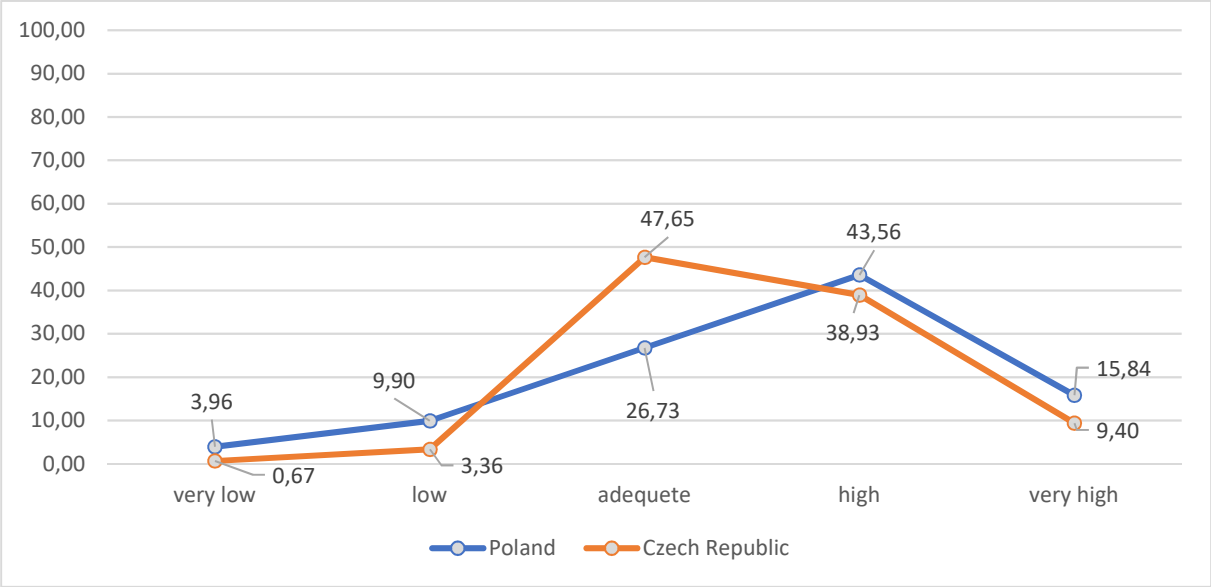
Figure 2 – Relation between the level of free cash to the characteristics of a business



Source: Own elaboration

Figure 3 shows the responses to the question on the level of the solvency of a company. This indicator of competitive potential showed the following pattern: as many as 47.65% of Czech respondents considered it adequete, while in Poland only 26.73%. However, by almost 5% of Polish respondents considered it high, and by more than 6% considered it very high. This leads to the conclusion that the level of the solvency of a company is higher in Polish companies.

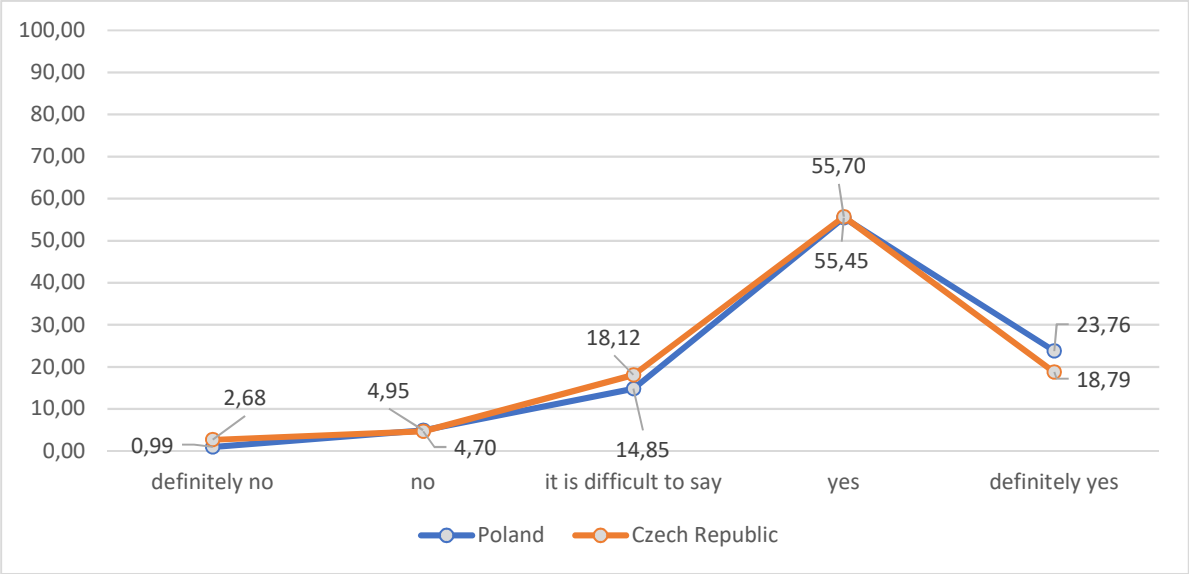
Figure 3 – Level of the solvency of a company



Source: Own elaboration

In terms of the element, if a company gains a profit from the primary (core) business operation, as seen in Figure 4, there are no major differences between Polish and Czech companies.

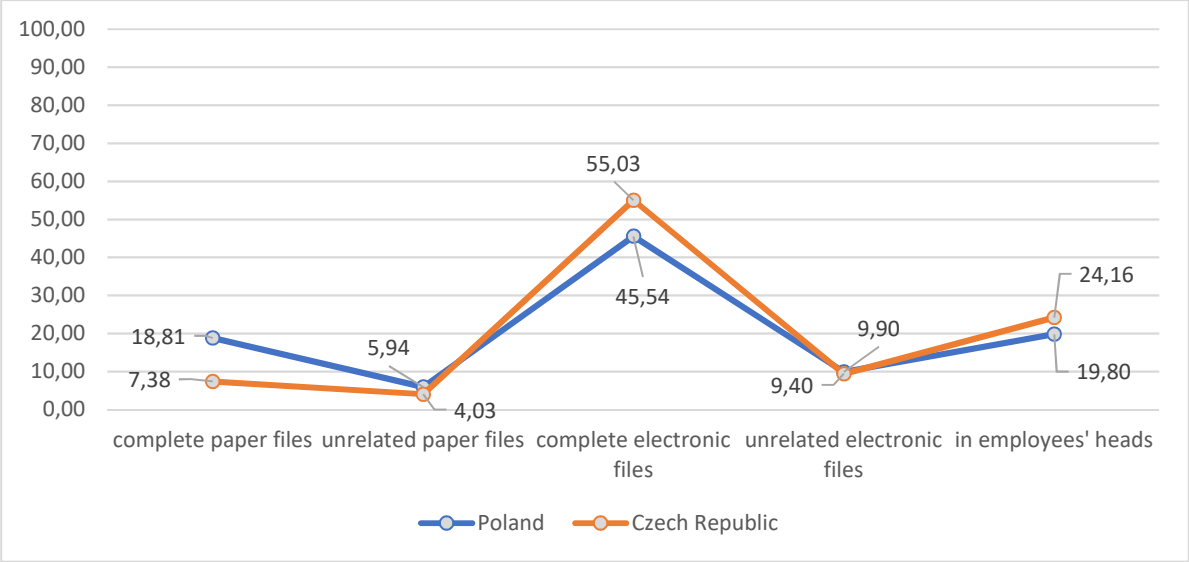
Figure 4 – If a company gains a profit from the primary (core) business operation



Source: Own elaboration

Figure 5 shows how a company collects knowledge in a company. As you can read, the main difference is that complete electronic files are used more often in the Czech Republic (55.03%) than in Poland (45.54%).

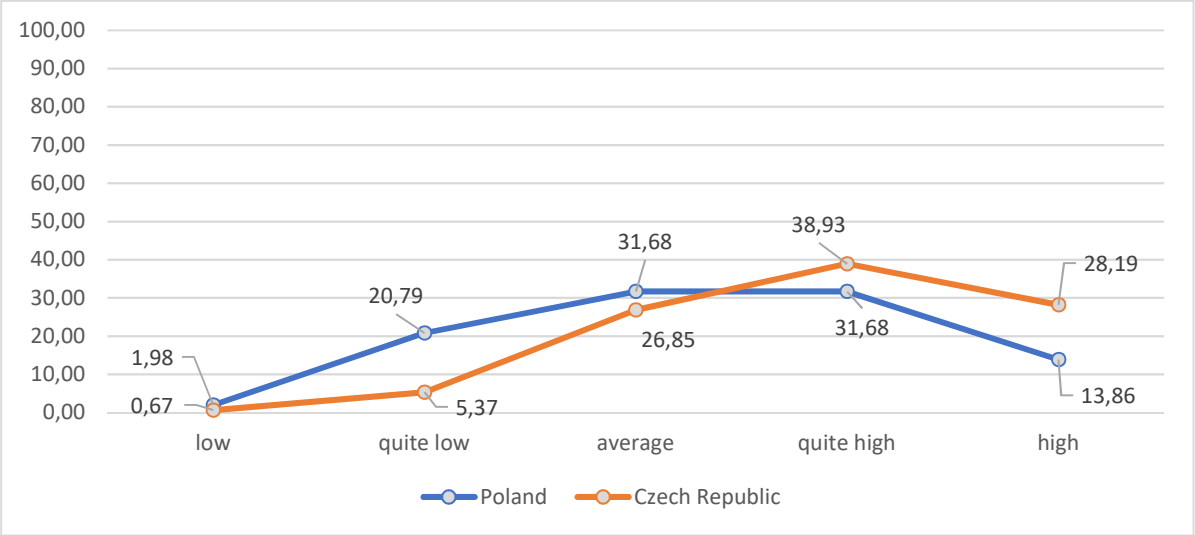
Figure 5 – How a company collects knowledge in a company



Source: Own elaboration

Larger differences between countries can be seen in terms of an extension of how an employee is allowed to implement small improvements. As can be seen in Figure 6, in the Czech Republic to a much greater extent employees are allowed to make improvements to their work than in Polish companies.

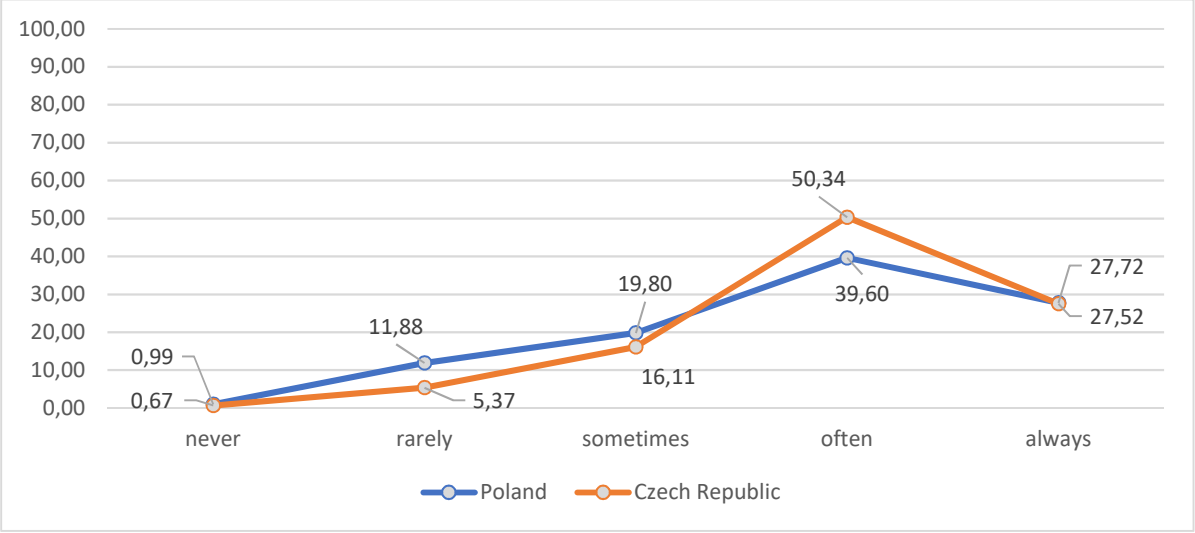
Figure 6 – Extend of how an employee is allowed to implement small improvements



Source: Own elaboration

The situation is very similar for the competitive potential element, which is conclusions which are drawn after finishing successful projects (Figure 7). In Czech companies, employees draw conclusions from completed projects much more often than in Polish companies (50.34% vs. 39.60%).

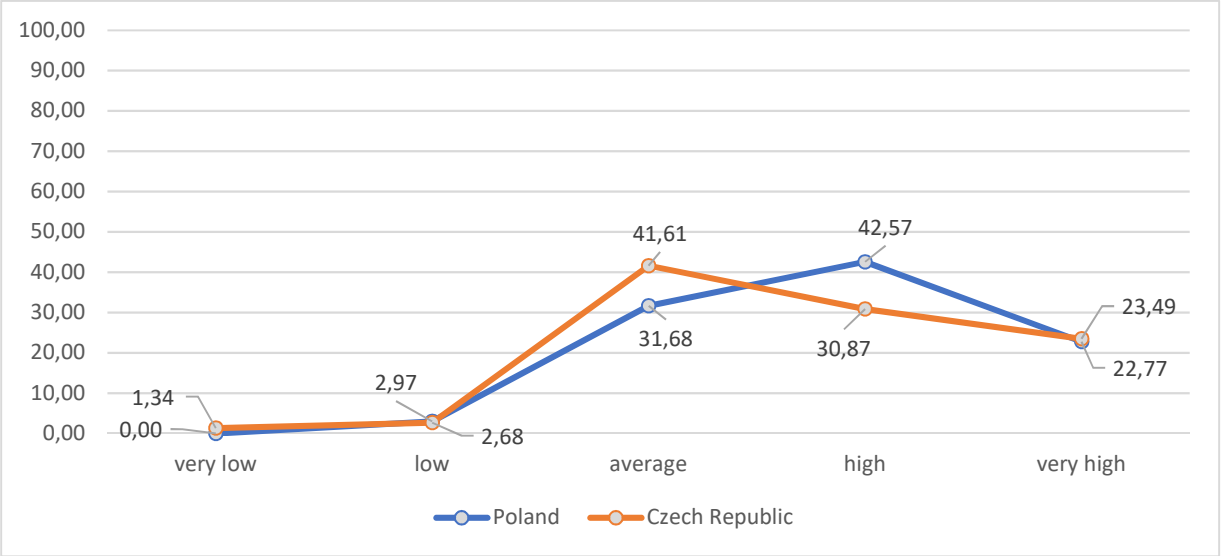
Figure 7 – How often conclusions are drawn after finishing successful projects



Source: Own elaboration

Interestingly (Figure 8), respondents from the Czech Republic rate their creativity lower than respondents from Poland. The differences are really big, with 41.61% of Czech respondents considering creativity to be average and 30.87% considering it to be high (compared to 42.57% of Polish respondents).

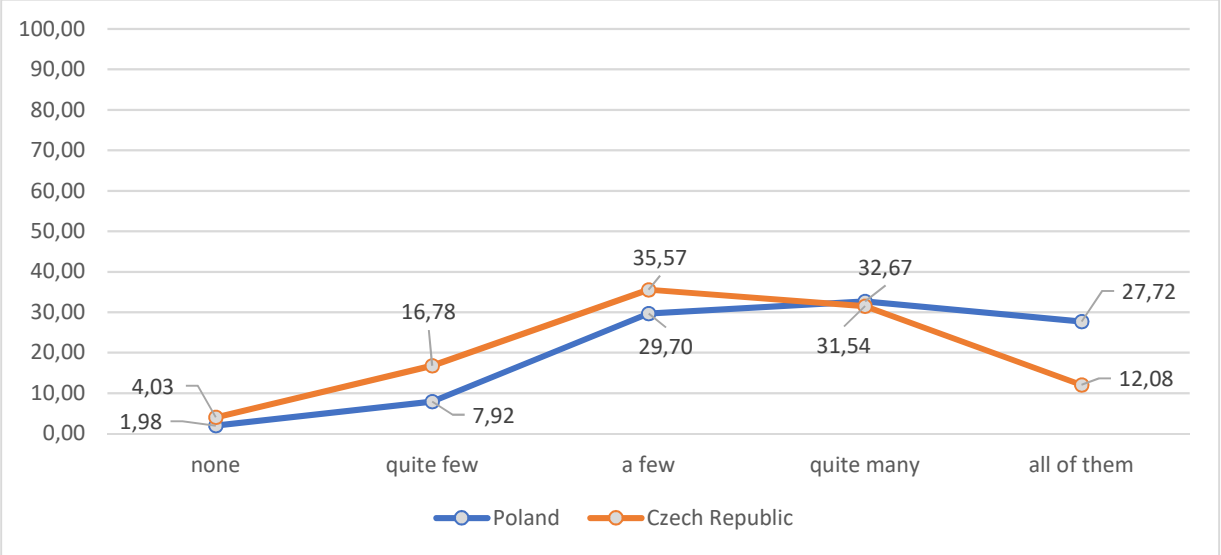
Figure 8 – Level of the creativity of key employees in a company



Source: Own elaboration

From figure 9, one can read that in significantly more companies in Poland than in the Czech Republic, all business processes or projects are registered (27.72% vs. 12.08%). This is an interesting phenomenon, since in the Czech Republic only 16.78% are registered to the extent of quite a few.

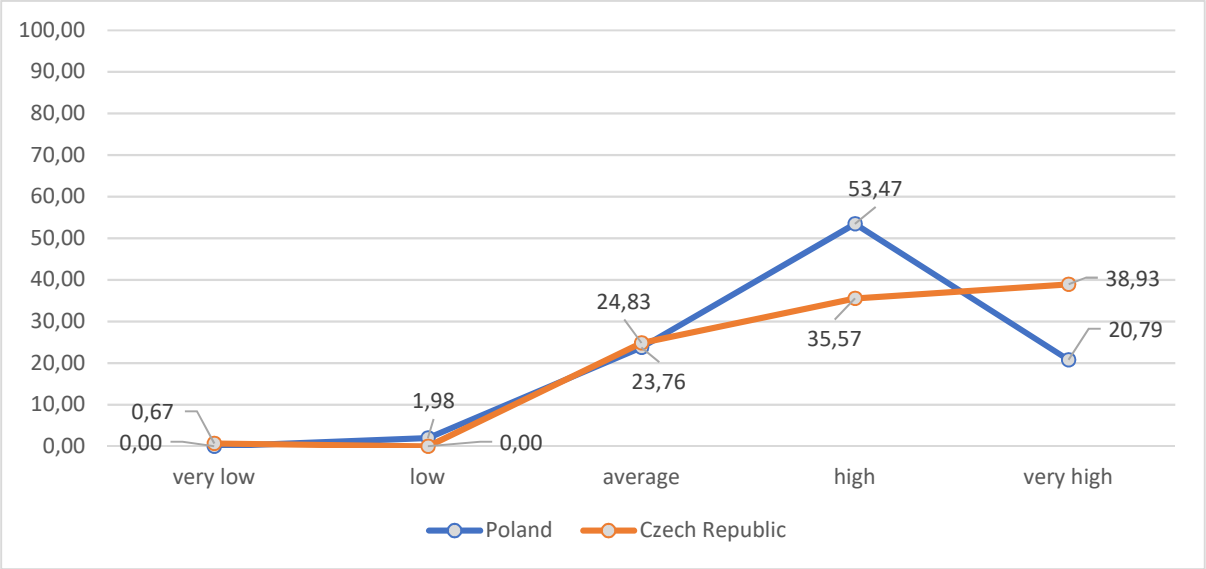
Figure 9 – How many projects, enterprises and processes are recorded in a company



Source: Own elaboration

In the case of a level of work experience of your key employees (Figure 10), Polish respondents indicated the answer high in 53.47% and Czech respondents 35.57%, while in the Czech Republic the answer very high was indicated as much as 17% more often.

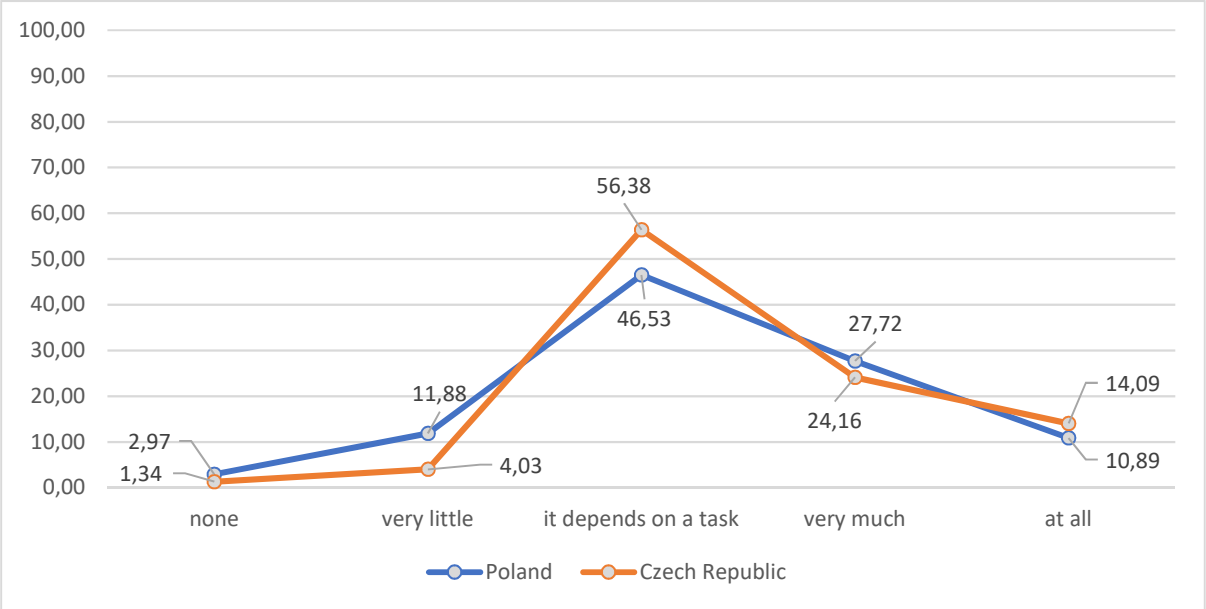
Figure 10 – Level of work experience of your key employees



Source: Own elaboration

In terms of a level of freedom in choosing their own ways of completing employees' tasks, as shown in Figure 11, Poles are somewhat more restricted in their choice of task completion methods than Czech employees.

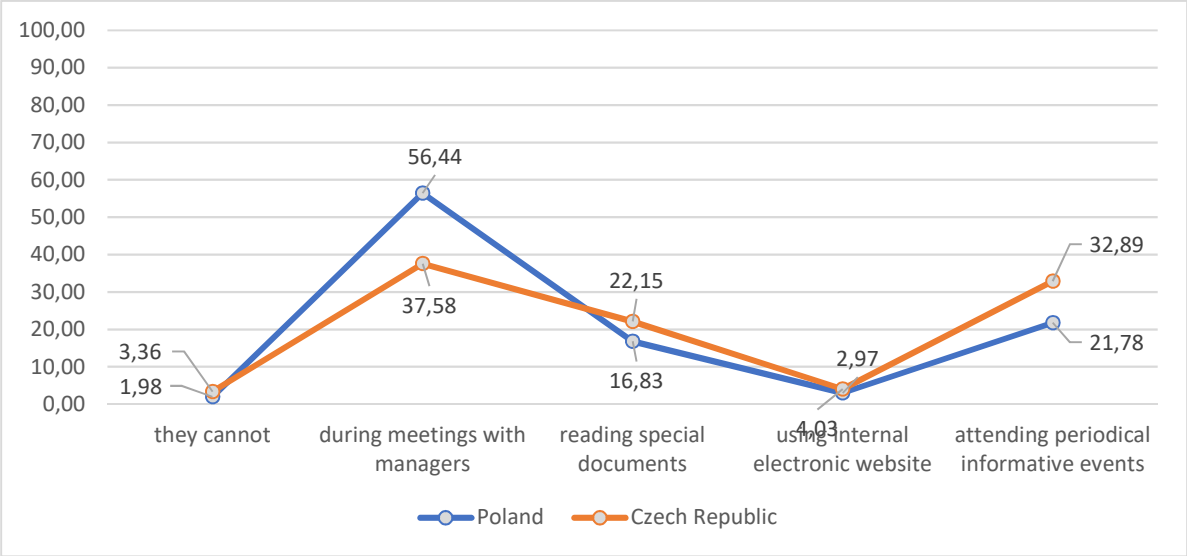
Figure 11 – Level of freedom in choosing own ways of completing employees' tasks



Source: Own elaboration

As can be seen in Figure 12, employees in Polish companies in 56.44% learn about corporate strategy during meetings with managers (in Czech companies - 37.58%), while Czech companies are more likely to use attending periodical informative events.

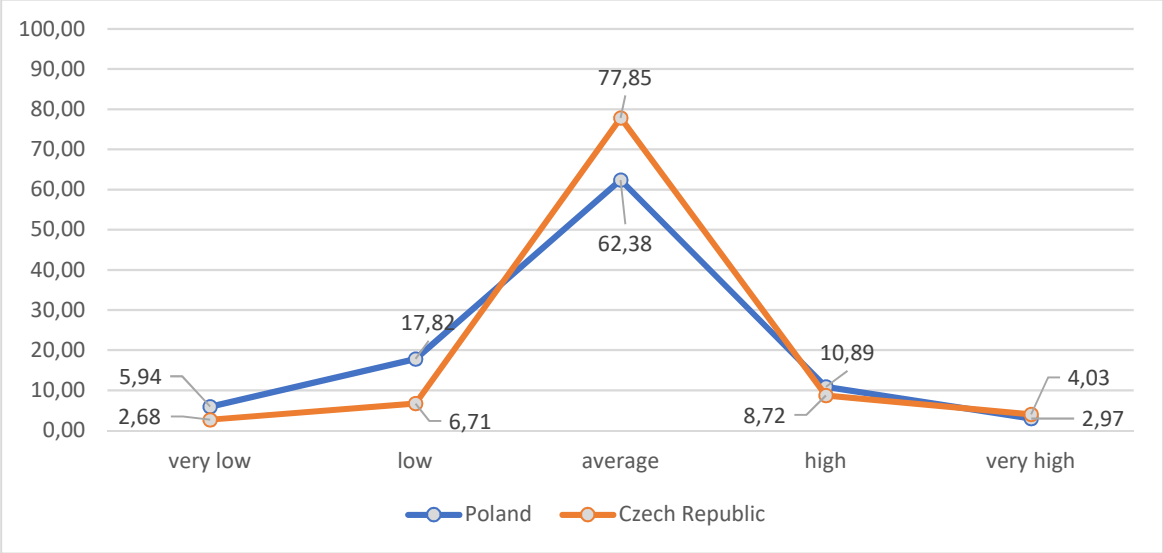
Figure 10 – How employees get to know the strategy of a company



Source: Own elaboration

Polish and Czech companies differ in terms of a level of a moral (economic) consumption of fixed capital in a company, as shown in Figure 13. 77.85% of Czech respondents considered it average, while Polish respondents considered it only 62.38%.

Figure 13 – Level of a moral (economic) consumption of fixed capital in a company



Source: Own elaboration

3.2 Discussion

The presented analysis of the empirical results does not indicate the existence of very large differences between companies from Poland and the Czech Republic. Certainly, the results of the study were influenced by the existing pandemic situation and the structure of the analyzed research sample in both countries. In this regard, above all, knowledge management systems and digitalization of operations will be important elements in the development of competitive potential in the future. It should be noted that the cyclically conducted research on the competitiveness of companies, in addition to scientific purposes, also has in mind the possibility of professionalizing management in the studied companies. The reflection of managers, for example, on the company's competitive potential, can inspire them to undertake improvement measures and international benchmarking in the future.

4 Conclusion

In this paper there are presented results of the research on the characteristics of competitive potential in Polish and Czech SME enterprises in the Polish-Czech border region in 2021. The research method used to collect data was the Company Competitiveness Barometer, available at www.konkurencyjniprzetrwaja.pl and sensorium24.com.

Section 3 describes 12 areas of competitive potential. As a result of the analysis, it can be concluded that the following areas of competitive potential in 2021 developed similarly in Polish and Czech SMEs: a relation between the level of free cash to the characteristics of a business, a profit from the primary (core) business operation and how a company collects knowledge in a company. Significant differences between companies on both sides of the border relate to the areas of: how often conclusions are drawn after finishing successful projects, how a company collects knowledge in a company, a level of work experience of your key employees, a level of a moral (economic) consumption of fixed capital in a company. As can be seen in the figures in Section 3, these differences were sometimes very large despite the short geographic distance of the companies studied.

Further research on competitive potential will address the reasons for the differences in the competitive potentials of Polish and Czech SMEs, and the sample size of the surveyed companies will be increased.

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Comparison of Value Added Incorporated in Czech Republic and Polish Exports with the Composition of Businesses and Foreign Trade in Particular Industrial Sectors

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Abstract
Developments in production technologies, transport, information, and communications technologies enable businesses to diversify their production processes to gain competitive advantage and participate in global value chains. This leads to strong interrelationships among national economies, as well as the composition of foreign trade exchanges and business sectors as well. In this paper we focus on comparison of changes of Value Added Incorporated the Czech Republic and Polis exports with the composition of businesses and foreign trade in selected industrial sectors. The comparison and subsequent analysis will cover years 2008 to 2018 regarding the availability of data from the OECD Trade in Value Added database. The selection of industries is based on their total exports share and will concern the manufacturing industry. Using regression analysis we try to investigate relationships between changes in value added structure and changes in particular industrial sectors and their exports. The results confirm the trend of increasing foreign and reimported value added in increasing volumes of exported manufacturing goods. On the other hand changes of the VA content in this period does not have clear linkage to structure of technological structure of manufacturing industry in both countries.

Keywords: *Czech Republic, foreign trade, industrial sectors, Poland, trade in value added*

JEL Classification: *F40, F60, M21*

1 Introduction

The analysis of trade relationships through global value chains (GVCs) lies in examining of the level of foreign trade. Conventional trade statistics can capture foreign trade flows only if products consist entirely of domestic value added and the production process take place within a single country (Cigna, Gunnella and Quaglietti, 2022). To get a better picture we need to employ a different approach to assess the domestic and foreign value-added creation (Fojtiková and Vahalik, 2016). GVCs can also be used to examine the sovereignty of production in specific sectors, i.e. information technology (SPCR, 2021).

Globalization goes hand in hand with fragmentation of production. Lower trade barriers, manufacturing innovations and advances in information and communication technologies have all contributed to make such fragmentation work. Coordination costs have decreased significantly and even enabled such phenomena as the so called "born global" firms (Knihght and Liesch, 2016). Inter-trading now accounts for more than half of world trade in goods and services (OECD, 2021a). Productive activities are often distributed across several countries and increasingly some production activities are outsourced and offshored (De Castro et al., 2015). Thus the country where the final assembly takes place may not have the highest value added in the value chain. Moreover, the technological advances that come with manufacturing contribute to the replacement of unskilled labour by automation (Rodrik, 2013; 2018). This further enables segmentation of production.

Abovementioned trends are also related in changes of structure of national economies. Czech Republic and Poland have since the fall of the iron curtain and furthermore since joining the EU significantly increased their participation in global value chains (SPCR, 2021; Franek, Stverkova and Chytilova, 2022). Besides the participation also the structure of value added in exports has changed. This phenomenon will be investigated in this paper.

The goal of this paper is to examine current data from OECD trade in value added statistics that were updated in 2022 and compare them with changes in industries and foreign trade trends occurring in the Czech Republic and Poland during the period from 2008 to 2018. The analysis will be focused on relationships using regression analysis and on sectoral changes with respect to domestic and foreign value added in gross exports. The results of this study can be used in retrospect evaluation of policies focused on foreign trade and industrial relations. It should also serve as a contribution to the debate on trade interdependencies in important industrial sectors. The paper is structured as follows: introduction, explanation of the role trade in value statistics, description of data and methodology, presentation of results, discussion, and conclusion.

2 Data and Methodology

In this section we will explain where our data are coming from and their nature. Then we will describe our methodological approach and applied statistical methods.

2.1 OECD TiVA Database

The Trade in Value Added Database (TiVA) is a joint initiative of the Organisation for Economic Co-operation and Development and the World Trade Organisation (WTO). The database was launched in 2013, with data updates in 2015, 2018 and 2022 (OECD, 2022b). The current version of the database covers 64 countries, including all OECD countries, EU and G20 member countries. Most countries in East and Southeast Asia, including China, and some countries in South America. The database also includes a model for the rest of the world (OECD, 2021a). Together, these countries cover more than 95% of world production and 90% of world trade (De Castro et al. 2015). The database includes 36 industrial sectors, including aggregates for total manufacturing and services. The database draws data from the Inter-Country Input-Output (ICIO) tables, which are a project of the OECD. The ICIO tables capture the flows of intermediate goods and services within countries and sectors and track the origin (country and sector) of goods that are consumed in a country. The data sources for the ICIO database are bilateral trade statistics in goods and services, national accounts, national input-output tables and supply and use tables (OECD, 2021a). The database production process has high data requirements and therefore the statistics are only available with a lag of several years. It can be said that data intensity and time delays are the main disadvantages of measuring trade in value added (Rojíček, 2015). Data are obtained from official sources, but there are significant discrepancies between the values of various sources. Countries' trade balance statistics routinely report different values of exports and imports than those of their foreign partners (Ahmad and Ribarsky, 2014). Therefore, data obtained from different sources are balanced and calculated using estimation techniques, as the resulting data of input-output tables must be absolutely symmetric. Rojíček (2015) states that the resulting data are thus more like model estimates. The construction of input-output tables makes several assumptions. According to De Backer and Miroudot (2013), despite the number of assumptions, the level of inaccuracy at the aggregate data level is low. However, when interpreting the data on individual economies and industries, increased caution is needed. Following TiVA indicators will be used in this paper (OECD, 2021c):

- EXGR_DDC: Direct domestic industry VA content of gross exports, USD million. It measures the direct VA contribution made by industry *i* in country *c* to the production of goods and services exported by industry *i* to the world:

$$EXGR\_DDC_c = \widehat{V}_c diagB_c EXGR_c. \quad (1)$$

- EXGR_IDC: Indirect domestic content of gross exports (originating from domestic intermediates), USD million. It corresponds to the VA originating from other, upstream, domestic industries (different from industry *i*) in country *c* that are incorporated into the exports of industry *i*:

$$EXGR\_IDC_c = \widehat{V}_c offdiagB_c EXGR_c. \quad (2)$$

- EXGR_RIM: Re-imported domestic VA content of gross exports, USD Million. Measures the content of domestic VA, from any industry in country *c*, which has been exported to produce intermediate goods or services abroad and subsequently embodied in imports used in the production of exports by industry *i* in country *c*:

$$EXGR\_RIM_c = EXGR\_DVA_c - EXGR\_DDC_c - EXGR\_IDC_c. \quad (3)$$

- EXGR_FVA: Foreign VA content of gross exports, by industry, USD million. It captures the value of intermediate goods and imported services that are incorporated in the exports of a domestic industry. VA can come from any foreign industry upstream in the production chain.

$$EXGR\_FVA_{c,i} = \hat{V}B_{c,i}EXGR_c. \quad (4)$$

The following Table 1 shows the composition of value added in gross exports from the manufacturing industry only.

Table 1 – Structure of value added in gross exports from manufacturing industry for the Czech Republic (CZE) and Poland (POL).

Time	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
CZE_DDC	0.303	0.322	0.300	0.293	0.293	0.295	0.299	0.300	0.305	0.300	0.292
CZE_IDC	0.238	0.241	0.220	0.214	0.204	0.218	0.208	0.208	0.208	0.208	0.211
CZE_RIM	0.003	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
CZE_FVA	0.457	0.435	0.477	0.490	0.500	0.484	0.490	0.489	0.483	0.488	0.493
POL_DDC	0.307	0.336	0.308	0.301	0.306	0.299	0.313	0.326	0.331	0.315	0.313
POL_IDC	0.308	0.310	0.305	0.301	0.304	0.313	0.301	0.301	0.290	0.289	0.284
POL_RIM	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003
POL_FVA	0.383	0.352	0.386	0.396	0.388	0.386	0.384	0.371	0.376	0.393	0.400

Source: own calculation based on the TiVA database (OECD, 2021a).

2.2 National Industrial and Foreign Trade Statistics

Data sources for the Czech and Polish foreign trade statistics are not coming from a common database but rather from specific yearbooks that summarize changes that have occurred during a particular year. The data are already processed and aggregated by governmental institutions namely the Ministry of Industry and Trade in case of the Czech Republic and the Central Statistical Office in the case of Poland. Thus it is unfortunately impossible to make direct comparison of the developments observed in the Czech Republic and Poland. However, we tried to focus on similar industry sector to make some comparison possible.

2.2.1 Description of Datasets

Data for the Czech Republic were obtained from the annual Analysis of the Czech economy and sectors under the MIT's jurisdiction from 2009 to 2018. Specifically, the observed indicators were following:

- sales from direct exports (b.c.) in the C industrial sector (based on NACE),
- turnover from direct exports (b.c.) in manufacturing industry,
- new orders from abroad (in b.c.) for manufacturing industry,
- turnover from direct exports as a share of sales in manufacturing industry,
- revenues of HIGH to LOW tech companies and their share within manufacturing industry.

The main question is how abovementioned indicators have changed over the given period and if there are some linkages towards the value-added structure of exports in particular industry. Following Table 2 includes raw values of selected indicators.

Table 2 – Selected indicators representing changes in direct exports and manufacturing industry output.

Time	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Sales from direct exports (b.c.)	-	-15,9	15,2	17,5	4,2	4,2	17,2	5,8	3,7	6,5	3,1
Turnover from direct exports (b.c.)	-	-15,6	14,8	3,0	3,4	4,7	16,8	5,5	3,6	6,6	3,1
New orders from abroad (in b.c.)	-	-15,3	16,7	12,1	6,1	5,8	13,4	8,2	7,1	5,3	3,9
Turnover from direct exports as a share of sales in whole industry	-	46,8	49,0	52,9	53,8	55,3	58,6	60,6	61,6	61,4	60,3
High Tech Sales (in b.c.)	-	-5,80	20,4	-14,3	-3,7	-3,7	15,0	2,9	2,1	4,8	11,8
Medium High-Tech Sales (in b.c.)	-	-12,5	15,1	15,6	5,3	3,6	14,2	6,7	4,4	7,5	1,9
Medium Low-Tech Sales (in b.c.)	-	-22,9	13,6	13,3	1,2	-0,1	9,1	-1,4	-3,3	9,8	5,7
Low-Tech Sales (in b.c.)	-	-4,3	-0,6	5,7	1,8	2,6	6,9	1,1	1,1	3,4	1,9
High Tech Share of Sales in %	10,4	11,8	12,6	9,9	9,3	10,1	10,4	10,2	9,9	9,5	10,3
Medium High-Tech Share of Sales in %	43,2	44,5	45,6	48,3	49,5	49,2	50,3	52,0	52,4	52,8	52,0

Medium Low-Tech Share of Sales in %	29,9	25,9	26,1	26,8	26,2	25,6	25,1	23,7	23,9	24,3	24,6
Low-Tech Share of Sales in %	16,4	17,8	15,7	15,1	15,1	15,1	14,4	14,1	13,8	13,4	13,1

Source: analytical materials and reports from the MIT (MPO, 2022).

For a further analysis we calculated indices where the year 2008 represents the beginning of the time series marked as 1 and the following indices were calculated on annual bases.

In case of Poland, abovementioned indicators were not obtained so we focused on foreign trade relations only. Following indicators were used based on The Yearbook of Foreign Trade Statistics for period 2008 to 2018:

- imports and exports by manufacturing sectors according to SITC in constant prices, see Table 3;
- composition of imports and exports by manufacturing sectors according to SITC nomenclature in constant prices (2000), see Table 4.

Table 3 – Selected indicators representing changes in imports and exports of the manufacturing industry output.

Time	Imports			Exports		
	Manufactured goods classified chiefly by material	Machinery and transport equipment	Miscellaneous manufactured articles	Manufactured goods classified chiefly by material	Machinery and transport equipment	Miscellaneous manufactured articles
2008	100,9	114,6	117,6	100,2	111,9	106,4
2009	78,6	80,0	92,5	85,2	91,8	90,7
2010	118,4	115,6	113,0	114,0	110,5	115,6
2011	108,1	106,7	104,4	108,2	107,9	109,9
2012	97,4	99,5	89,3	104,4	98,4	100,2
2013	103,9	103,7	102,9	105,5	103,9	106,7
2014	112,0	110,6	122,8	105,8	103,9	114,1
2015	103,7	106,6	108,1	104,0	107,1	112,1
2016	110,1	100,7	109,5	105,6	104,2	113,0
2017	108,2	110,3	118,2	108,2	106,7	114,3
2018	105,1	108,8	111,5	104,0	107,0	109,1

Source: Yearbooks of foreign trade statistics of Poland, (Central Statistical Office of Poland, 2022).

The following Table 4 includes the manufacturing industrial sectors only and the shares are calculated based on the whole exports.

Table 4 – Selected indicators representing changes in structure of imports and exports of the manufacturing industry.

Time	Imports in %			Exports in %		
	Manufactured goods classified chiefly by material	Machinery and transport equipment	Miscellaneous manufactured articles	Manufactured goods classified chiefly by material	Machinery and transport equipment	Miscellaneous manufactured articles
2008	19,8	39,5	10,3	17,4	50,2	12,7
2009	18,3	37,1	11,2	16	50	12,5
2010	18,9	37,6	11,1	16,2	49	12,8
2011	19,2	37,8	10,9	16,2	48,9	13,1
2012	19,1	38,2	9,9	16,5	46,8	12,7
2013	19,1	38,2	9,8	16,4	45,9	12,8
2014	19,0	38,2	11,0	16,3	44,8	13,7
2015	18,7	38,7	11,2	15,7	44,6	14,3
2016	19,3	36,8	11,6	15,5	43,4	15,2
2017	19,0	36,7	12,4	15,6	42,9	16
2018	18,6	37,3	12,9	15,3	43,1	16,5

Source: Yearbooks of foreign trade statistics of Poland, (Central Statistical Office of Poland, 2022).

For a further analysis we calculated indices where the year 2008 represents the beginning of the time series marked as 1 and the following indices were calculated on annual bases similarly as in case of the Czech Republic. As Kozun-Cieslak and Siek (2020) found out the most important Polish-Czech intra-industry trade actually applies to two of ten SITC sections i.e. namely, manufactured goods classified chiefly by material" and

"machinery and transport equipment". These two sectors show high indicators, confirming revealed comparative advantages as well as high intensity of intra-industry trade indicators.

2.2.2 Correlation analysis

Correlation expresses the relative degree of dependence in the mutual development of two time series, e.g. y_t and x_t and is given by the following equation:

$$s_{xy} = \frac{\sum_{t=1}^{n}(x_t - \bar{x}) \cdot (y_t - \bar{y})}{s_x \cdot s_y} \epsilon \langle -1; 1 \rangle. \tag{5}$$

Correlation values approaching the threshold value -1 express that the two observed time series have completely opposite direction in their time evolution. Correlation values of s_{xy} close to 1 reveal that the time series x_t and y_t evolve almost identically in terms of the same directions of movements and show the same relative degree in their mutual evolution. This type of correlation follows the Pearson definition. However, it is important to emphasize that the Pearson correlation coefficient only characterizes a linear relationship, in other words, it only reflects the variability around a linear trend. It is completely inappropriate for quantifying non-linear dependencies. The basic characteristic of the Pearson correlation coefficient is that it takes only values from the interval, with the value being positive when higher values of the random variable are related to higher values of the random variable, and conversely negative when lower values are related to higher values of the random variable. Values of 1 and -1, respectively, are obtained only when the points shown in the dot plot lie on a line with a positive and negative directive, respectively. An extension towards the evaluation of certain forms of non-linear dependence is the so-called Spearman rank-correlation coefficient. This is a non-parametric correlation coefficient that is robust to outliers and deviations from normality in general, since, like many other non-parametric methods, it works only with orders of observed values. Unlike the Pearson correlation coefficient, which describes a linear relationship of the quantities *x* and *y*, the Spearman correlation coefficient describes how well the relationship of the quantities *x* and *y* corresponds to a monotonic function, which of course may be nonlinear (Moore and Notz, 2020).

All correlations can be also tested based on a test of the hypothesis of zero correlation of two random variables. Even in the case of a small sample size, it is logical to ask whether or not the correlation between the two variables is zero. This situation leads to testing the following hypotheses: $H_0 : r = 0$ and alternatively $H_1 : r \neq 0$. Testing is based on a statistic:

$$T = r \cdot \sqrt{\frac{n-2}{1-r}} \ . \tag{6}$$

To investigate the possible interrelationships, we can employ cross-correlation analysis where we can analyse how the correlation coefficients change if the other timeseries are lagging. Lagging means the creation of a time series that is delayed or ahead of the time series, but otherwise identical to it. It is actually moving the time series "forward" or "backward" from the original time series. However, the newly created variables have as many missing values at the beginning or at the end as the number of steps by which the shift was performed (Moore and Notz, 2020).

3 Results and Discussion

The following section is focused on description of results obtained through correlation analysis of selected indicator for both cases: the Czech Republic and Poland. Then the results are critically evaluated and discussed. This analysis is more or less investigative. We have no prior knowledge about possible relationships among selected indicators. However, some indication can be linked to the changes in value added structure and scale of exports in the manufacturing industry. We will focus on how changes in the structure can relate to changes in the scale as well as the output of the manufacturing industry (especially in case of the Czech Republic). In the Poland case we will focus on possible linkage to different type of manufacturing industry exports.

So, the question is if there is some relation between domestic, indirect domestic, reimported or foreign value added in exports and selected industrial indicators and if we can explain them in some economic sense.

3.1 Case of the Czech Republic

Firstly, we will concentrate on simple relation between value added structure and scale of direct exports. If we assume linear relationship based on Pearson correlation coefficient, then the relationship between value-added components, sales from direct exports turnover from direct exports and new orders from abroad are quite strong and statistically significant, see Table 6. Values flagged with and asterisk are considered significant. If we

assume non-linear relationship, we can calculate the Spearman's rho, see Table 6. From the Table 6 we can assume that there might be a significant relationship between the reimported and foreign value added and the volume of exports based on sales and new orders. Based on Pearson coefficient we can assume a relationship also with the turnover of direct exports for all industrial sectors. It also important to note that there might be and inverse relationship with the domestic value-added components (DDC and IDC). All these relationships can be expected as the value-added statistic is closely related to volume of exports. It is also not surprising that the foreign value-added components are strongly positively related to the volume of exports in the manufacturing industry. The inverse relation of domestic value added to volume of exports mean that the decreasing domestic VA corresponds with increasing volume of exports. This also mirrors the fact that increasing globalization (increasing foreign VA) corresponds with increasing volume of exports. But we must be also aware that this is not the only factor.

If we assume possible lagging among the indicators and value-added components. Some changes in the correlations can be observed in case of the indirect domestic VA. The lagging is in region of -4 observations, thus given the total number of observations (11) this result is not significant. Looking at the relationship between VA components and volume of sales based on technological sectors of the manufacturing industry we can get a more interesting insight.

Table 6 – Correlation analysis of value-added components in gross exports and volume of export in manufacturing industry of the Czech Republic.

Pearson correlation		**CZE_DDC**	**CZE_IDC**	**CZE_RIM**	**CZE_FVA**
SALES_DIR_EX	Correlation Coeff.	-,687*	-0.536	,831**	,704*
	Sig. (2-tailed)	0.020	0.089	0.002	0.016
TURNOVER_DIR_EX	Correlation Coeff.	-,649*	-0.494	,756**	,675*
	Sig. (2-tailed)	0.031	0.123	0.007	0.023
NEW_ORDERS	Correlation Coeff.	-,736**	-0.520	,897**	,737**
	Sig. (2-tailed)	0.010	0.101	0.000	0.010
Spearman's rho		**CZE_DDC**	**CZE_IDC**	**CZE_RIM**	**CZE_FVA**
SALES_DIR_EX	Correlation Coeff.	-0.369	-0.569	,747**	,715*
	Sig. (2-tailed)	0.264	0.067	0.008	0.013
TURNOVER_DIR_EX	Correlation Coeff.	-0.127	-0.327	0.482	0.355
	Sig. (2-tailed)	0.709	0.326	0.133	0.285
NEW_ORDERS	Correlation Coeff.	-0.227	-,645*	,864**	,627*
	Sig. (2-tailed)	0.502	0.032	0.001	0.039

Source: own calculation using IBM SPSS 27.

The Table 7 summarizes correlation coefficients and their significance. However, given the number of observed indicators we will concentrate only on the significant relationships. As you can see in Table 7. Relationships between changes in VA components of gross exports from manufacturing industry have no significant relation to volume or share of sales of high-tech manufacturing sector, low-tech volume of sales and medium high-tech share of manufacturing industry. Some significant correlations can be found in other sectors especially medium low-tech sector.

Table 7 – Correlation analysis of value-added components in gross exports and volume of sales and their share in manufacturing industry of the Czech Republic.

Pearson Correlation		**CZE_DDC**	**CZE_IDC**	**CZE_RIM**	**CZE_FVA**
MEDHIGH-TECH_SALES	Correlation Coeff.	-,706*	-0.580	,851**	,741**
	Sig. (2-tailed)	0.015	0.061	0.001	0.009
MEDLOW-TECH_SALES	Correlation Coeff.	-,848**	-0.476	,681*	,767**
	Sig. (2-tailed)	0.001	0.139	0.021	0.006
MEDLOW-TECH_SHARE	Correlation Coeff.	-,748**	-0.237	0.535	0.571
	Sig. (2-tailed)	0.008	0.483	0.090	0.067
LOW-TECH_SHARE	Correlation Coeff.	,874**	,613*	-,738**	-,889**
	Sig. (2-tailed)	0.000	0.045	0.009	0.000
Spearman's rho		**CZE_DDC**	**CZE_IDC**	**CZE_RIM**	**CZE_FVA**
MEDHIGH-TECH_SALES	Correlation Coeff.	-0.427	-,655*	,745**	,782**
	Sig. (2-tailed)	0.190	0.029	0.008	0.004
MEDLOW-TECH_SALES	Correlation Coeff.	-,773**	-0.582	0.436	,909**
	Sig. (2-tailed)	0.005	0.060	0.180	0.000
MEDLOW-TECH_SHARE	Correlation Coeff.	-,618*	-0.127	0.045	0.545

	Sig. (2-tailed)	0.043	0.709	0.894	0.083
LOW-TECH_SHARE	Correlation Coeff.	0.560	0.477	-0.486	-,734*
	Sig. (2-tailed)	0.073	0.138	0.129	0.010

Source: own calculation using IBM SPSS 27.

Assuming linear relationships we can see significant correlations between domestic VA and technological sectors. But the nature of the relationship is different. Whereas the medium low-tech output is inversely related (similarly the change in medium high-tech output) the low-tech has a positive relation. What does this imply? The lower is domestic value added the higher is the output in these manufacturing sectors. On the other hand the decreasing domestic VA corresponds with decreasing share of low-tech manufacturing output. The development low-tech share of sales is also follows and inversely related trend. It seems that increase of foreign value added corresponds with the increase of medium high-tech and medium low-tech manufacturing companies' output. If we look at possible lagging no considerable time shifts can be found that would suggest lagging of the time series.

3.2 Case of Poland

In the case of Poland we will focus on export statistics and value-added components in manufacturing industry. The only detail we can investigate are the different SITC manufacturing industry sectors. At first we will look at the correlations between value added components of the gross exports and exports of manufacturing sectors. In the Table 8 we can observe the results. Again the significant correlations are flagged by the asterisks.

Table 8 – Correlation analysis of value-added components in gross exports and volume of export in manufacturing industry of Poland.

Change in volume of exports		**POL_DDC**	**POL_IDC**	**POL_RIM**	**POL_FVA**
MANU_GOODS_MAT	Pearson Correlation	-,753**	-0,261	,681*	,826**
	Sig. (2-tailed)	0,008	0,439	0,021	0,002
MACHINE_TRANSPORT	Pearson Correlation	-,801**	-0,18	,821**	,819**
	Sig. (2-tailed)	0,003	0,597	0,002	0,002
MANU_MISC	Pearson Correlation	-,695*	-0,286	,718*	,776**
	Sig. (2-tailed)	0,018	0,394	0,013	0,005
Change in share of exports					
MANU_GOODS_MAT	Pearson Correlation	-,741**	-0,139	0,57	,724*
	Sig. (2-tailed)	0,009	0,683	0,067	0,012
MACHINE_TRANSPORT	Pearson Correlation	0,041	0,042	-0,065	-0,074
	Sig. (2-tailed)	0,904	0,902	0,85	0,828
MANU_MISC	Pearson Correlation	-0,139	-,723*	0,508	0,374
	Sig. (2-tailed)	0,684	0,012	0,11	0,258

Source: own calculation using IBM SPSS 27.

Looking at the results we can see that the change in volume of exports from manufacturing industry sectors has some linkage to the components of the VA in gross exports. The domestic value-added components are decreasing but the exports are increasing thus this linkage is inverse. Positive linkage can be seen between the foreign VA content of gross exports. This result is not very surprising. Again in the observed period the exports increased as well as the foreign VA content. On the other hand lower linkage can be observed when we look at the structure of exports (how important role the manufacturing exports play in the overall exports). Significant correlation can be found in relation between domestic VA, foreign VA and the manufactured goods classified chiefly by material. On the other hand the machinery and transport equipment share does not follow the same development as any VA component. Thus we can suggest that there is no relation between the changes in VA and share of the exports of this sector. Also if we look at the lagging, there is no strong suggestion to assume that some of the indicators are lagging behind changes in the VA structure.

If we look at this analysis with assumption of non-linear relationship using Spearman's rho, see Table 9, then the situation is quite different. In the Table 9 we show only significant correlations.

Table 9 – Correlation analysis of value-added components in gross exports and volume of sales and their share in manufacturing industry of Poland

Change in volume of exports		**POL_DDC**	**POL_IDC**	**POL_RIM**	**POL_FVA**
MANU_GOODS_MAT	Correlation Coeff.	-0,555	-0,327	,700*	0,518
	Sig. (2-tailed)	0,077	0,326	0,016	0,102
MACHINE_TRANSPORT	Correlation Coeff.	-,647*	-0,087	,679*	0,437
	Sig. (2-tailed)	0,031	0,800	0,022	0,179
MANU_MISC	Correlation Coeff.	-0,482	-0,445	,645*	0,464
	Sig. (2-tailed)	0,133	0,170	0,032	0,151

Source: own calculation using IBM SPSS 27.

There are some significant correlations but mainly between the reimported VA content and the changes in volume of manufacturing sectors' exports. This relation is positive so we can suggest that the reimported VA can play some role in the increase of the manufacturing exports (it follows a similar development). There were no significant correlations between the changes in share of manufacturing sector exports and VA content, hence they are not presented.

3.3 Summary of Findings

Results of our correlation analysis of changes of industry exports, sales and share of exports with the value added content of gross exports have confirmed that the increasing exports of manufactured goods in the case of the Czech Republic as well as Poland show similar development to the increasing content of foreign value added and inversely the decreasing content of domestic value added. Thus, result is not unexpected and can be seen as some form of autocorrelation. On the other hand, some interesting results can be found in relation to volume of output or exports of different technologically intensive goods. In the case of the Czech Republic the output of high-tech manufacturing sector does not show any significant similarity with the VA content changes. The medium high-tech sales show similar development as the foreign VA (positive) and the low-tech sales show similar development to domestic VA (negative).

In the case of Poland, the volume of exports is following the similar pattern to decreasing domestic VA and increasing foreign VA. This is the same as in the case of CZ. Interestingly the changes in share of exports does not follow that pattern, thus it seems that the manufacturing industry share of exports is influenced more by the changes in other important export industries and thus the VA content is not related only to manufacturing industry. When we compare this with the CZ, we can see that the manufacturing industry exports in the case of the Czech Republic play bigger role than in Poland. Kozun-Cieslak and Siek (2020) also pointed out that in years 2004-2019 systematically progressed adaptation of exports supply to the foreign partner's demand structure. It is also worth noting that over the entire examined period, Poland revealed weak comparative advantages in the inter-industry competitiveness with the Czech Republic.

4 Conclusion

The goal of this paper was to examine current data from OECD trade in value added statistics that were updated in 2022 and compare them with changes in industries and foreign trade trends occurring in the Czech Republic and Poland during the period from 2008 to 2018. We applied correlation analysis with assumption of linear and no-linear relationships and also investigated possible influence of lagging. The results confirm the trend of increasing foreign and reimported value added in increasing volumes of exported manufacturing goods. On the other hand changes of the VA content in this period does not have clear linkage to structure of technological structure of manufacturing industry. There might be a relation towards the increasing automotive industry in both countries. But in case of Poland the share of manufacturing exports does not entirely follow the same development as the value-added content. This suggests that other industries might increasingly more important for Polish exports.

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The Role of a Crime Prevention Assistant for Security in Excluded Urban Areas in the Czech Republic

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Abstract

The paper describes a preventive activity which was preceded by an original Ostrava project supported by the Ministry of the Interior of the Czech Republic. A role in the philosophy of the activities of people in socially excluded localities is played by the Crime Prevention Assistant project of the same name, which has been implemented permanently and nationwide in the Czech Republic since 2009 (in Ostrava since 2003). It was a response of the government to a high rate of crime in these locations, or to a hotbed of crime in the vicinity of these socially excluded locations where the number of such locations has been continuously increasing. However, according to the Ministry of Labour and Social Affairs of the Czech Republic (MPSV) there are 297 municipalities with an identified socially excluded location in the Czech Republic, and in total, it is 606 localities in the given number of municipalities (a specific rate of occurrence of the locations forms part of the clear graphic overview herein). At that time, the authors of the paper were active participants when implementing the described project into practice from the position of members of the Police of the Czech Republic in the locality of the Ostrava City Directorate, which had and still has excluded localities with socially disadvantaged citizens. The crime prevention assistants, as described by the authors, have gone through the implementing difficulties in carrying out the required tasks, which have been overcome after years of practice. In addition to providing comprehensive information on the philosophy of crime prevention assistants, the authors present fundamental hypotheses and research questions, set the methodology of activities and propose solutions to problems in their paper. As examples from practice, they present practice from two district towns in the Czech Republic as proof of the functionality of the project. Before writing this paper, the authors searched domestic as well as foreign literature where they did not find a more detailed description of the specific practice pf crime prevention assistants in individual scientific or professional articles, which logically follows the purpose of the authors' paper to deal with something beneficial which has not been published in such a specific and detailed form before. As stated in the paper, the practice of crime prevention assistants in the described form is a purely Czech project which has been successfully implemented in the national practice. It has therefore no references in the foreign literature and Czech publication sources. It is briefly contained in a set of publications describing especially a framework of papers primarily dealing with excluded locations, crime prevention or methodology (Kupka et al., 2015) of crime prevention in socially excluded locations.

Keywords: *crime prevention, crime prevention assistant, public service at local level, socially excluded localities*

JEL Classification: *H0, H430, R0, R4*

1 Introduction

The authors of this paper decided to describe one of the ways of dealing with social coexistence and excluded localities within public services and help at the local level of cities and municipalities in the Czech Republic. In the paper, the authors will present a theoretical basis for the practical and specific project and philosophy increasing security in socially excluded localities, acting preventively against extremism and motivating local governments and citizens to seek positive solutions to problems, called **Crime Prevention Assistant** (CPA), which has been successfully implemented under the Ministry of the Interior since September 2009. The project was originally launched as part of a national competition announced by the Ministry (Best Practices), Department of Crime Prevention, Ministry of the Interior of the Czech Republic. The paper will compare the statistical evaluation of the described preventive activities, the reasons for their creation and the practical manifestations of the efforts of the incorporated entities in the prevention of crime and the promotion of civil coexistence. In order for the paper not to appear as a simple description of a successful project financed by public funds, but to address the philosophy, reasons and needs for the project, the authors present hypotheses and reflect on current practice and possible ways of solving problems associated with the activity of crime prevention assistants. In the paper, the authors set the following goals:

1) Determine and verify two hypotheses to answer the research questions
2) Define the characteristics of socially excluded localities
3) Locate the concentration of socially excluded localities in the Czech Republic and the Moravian-Silesian region
4) Explain the methodology of selection, preparation and activity of CPA, including selected practical examples from two Czech cities
5) Present conclusions and observations found

Present the reader with a brief but comprehensive view of the issues of crime prevention assistance in the Czech Republic in this way. As part of the hypothesis verification, the authors established the following hypotheses:

Hypothesis no. 1: Is the CPA project able to permanently fulfil the set goals and tasks for which it has been created and has still been operating with the support of cities in the Czech Republic?

Hypothesis no. 2: Does the activity of crime prevention assistants really have an effect on reducing crime in socially excluded locations in the Czech Republic or in the Moravian-Silesian Region?

2 Theory

At present, we can state that the Crime Prevention Assistant Project is the most successful and sought-after crime prevention project in socially excluded localities, which has demonstrably positive results and impacts on improving public order and safety in problem localities and employment of long-term and difficult to employ persons, including Romany. In order to be able to describe the concept of a socially excluded locality, it is necessary to define it and state its parameters. The practical anchoring of the authors of the paper to the described problem of CPA and socially excluded localities can be demonstrated with regard to their professional knowledge and participation in the creation and implementation of the CPA philosophy from the position of a implementing policewoman (Lieutenant Petra Vrtalová) and the then head of the district police department tasking implementing police officer supervising the activities of CPAs in the Ostrava municipal district with the occurrence of socially excluded localities (Lieutenant Martin Hrinko). According to the statistics of the Ministry of Labour and Social Affairs of the Czech Republic (MLSA), there are 297 municipalities in the Czech Republic with identified socially excluded localities, and in a more detailed view, there are a total of 606 localities in the mentioned sum of municipalities. This is an estimate of 95 – 115 thousand residents in these locations. Interesting parameters when examining socially excluded localities include, for example, the fact that the largest representation is the population aged 16 – 60 within the age structure of the population described, which are represented in 53%. Residents under 15 (43%) and over 60 (7%) have a significantly lower (but alarming) representation.

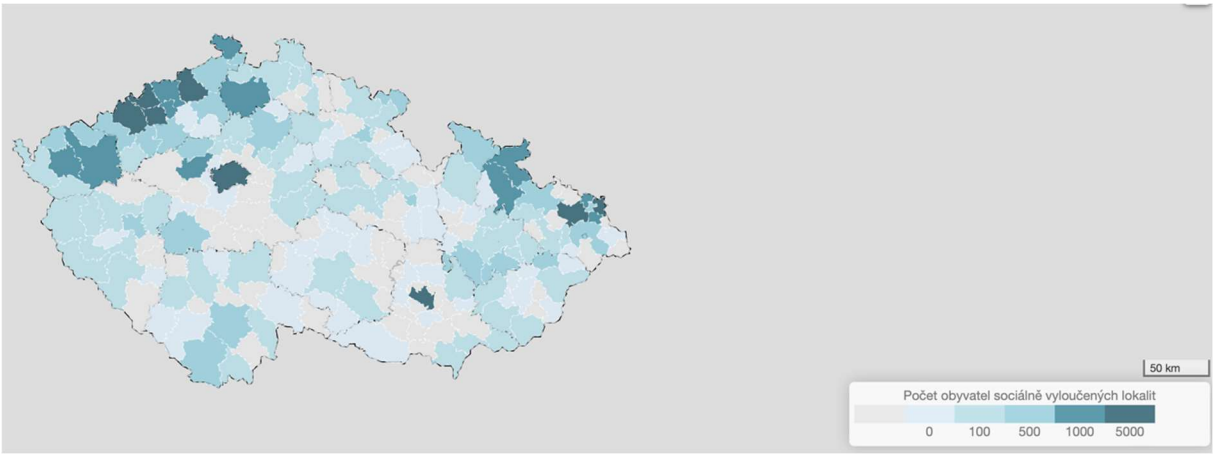
Table 1 – Concentration of socially excluded localities in the Czech Republic is as follows:

Region	Number of socially excluded localities	Population in socially excluded localities	Average population of a socially excluded locality
Prague	7	5400 – 7400	971
South Bohemian	38	2000 – 2600	58
South Moravian	28	8000 – 9500	61
Karlovy Vary	61	6000 – 8000	120
Hradec Králové	36	2500 – 3000	75
Liberec	48	3000 – 4000	77
Moravian-Silesian	72	19000 – 23000	317
Olomouc	62	3000 – 5000	63
Pardubice	24	1500 – 2000	79
Pilsen	42	2000 – 3000	60
Central Bohemian	64	4000 – 5500	98
Ústí nad Labem	89	36000 – 38500	471
Vysočina	13	600 – 1000	92
Zlín	22	2000 – 2500	86

Source: MPSV (2015)

This clearly and demonstrably shows that the most locations and the number of inhabitants in these locations are in the Ústí nad Labem and the Moravian-Silesian Regions. If we focus on the Moravian-Silesian region with regard to the location of the ongoing conference, the most numerous locations are in the Karviná, Krnov and Bruntál districts, and in the city of Ostrava (see the figure below, source: the Ministry of the Interior of the Czech Republic), where these towns and districts are characterised by a high rate of unemployment, which is the main cause (reason for) of the emergence of socially excluded localities.

Figure 1 – Map of the existence of socially excluded localities in the Czech Republic referred to a district scale.



Source: MPSV (2015)

As a socially excluded locality (MLSA CR, 2015), we refer to a space (house, street, and neighbourhood) with a high concentration of people in which signs associated with social exclusion can be identified. Such places are negatively symbolically referred to by the surrounding residents ("bad address", "problem place", etc.).

Social exclusion is defined as the gradual and escalating exclusion from full participation in social, material and symbolic resources produced, shared and consumed by the general society to ensure good living conditions, organisation of social life and participation in decision-making.

A basic characteristics of social exclusion is a combination of factors that significantly limit the possibilities for (1) access to the open labour market, (2) access to public services, including social services or education, (3) contact with the social surrounding, (4) solving personal crises (indebtedness, illnesses, etc.) and (5) political participation or limit the abilities and skills to use these opportunities. Ethnicity plays a specific role in social exclusion.

Social exclusion is often associated with and manifests in particular (without limitation) by:

- spatial exclusion,
- symbolic exclusion associated with the stigmatisation of individuals or groups,
- low level of education,
- difficult access to legal forms of better financially valued earning activity,
- income from social benefits, and the associated material poverty,
- low quality housing and poor hygiene conditions,
- closed economic system (usury and so-called quick loans),
- occurrence of risky forms of behaviour (e.g. alcoholism, drug addiction or gambling) and crime (increased risk of becoming a perpetrator, but also a victim of criminal activity),
- reduced socio-cultural competence (e.g. language barrier, inexperience or ignorance of one's own rights and obligations).

Which, according to the authors of the contribution, is a **list of practical manifestations** of the occurrence and duration of socially excluded localities in the Czech Republic. Possible **ways of solving the mentioned problem** are, first of all, employment and finding (providing) employment for residents of these localities and constant supervision of the state law enforcement units over manifestations of illegal behaviour by people in the vicinity of the localities (theft of metals, theft by burglary, use of drugs and alcohol, etc.)

Individual locations differ from each other not only in their size, but also in the type of residential housing (from a single house up to a residential district), position in the geographical area (village, town), type of ownership (a rented private apartment, a rented municipal apartment, a boarding house etc.), a manner and scope of formal social supervision (from none to high) as well as a type of inhabitants (especially with regard to nationalities or ethnic groups, but also other categories, such as health condition, social status etc.), see Walach and Kupka (2016). Nonetheless, the public perceive socially excluded locations, especially as a "safety risk for the majority", to quote one of the performed searches (Gabal, Čada and Snopek, 2008). The crime attributed to the residents of such locations became a pretence to numerous protests in 2011 – 2013 with the presence of the extreme right supporters, if not directly organised by the extreme right. With regard to the social tension strengthened by these marches, the Security Information Service evaluated the issues of socially excluded localities as "the highest risk factor for the democratic regime in the Czech Republic" (SIS, 2014).

After many initial problems with its introduction, the philosophy of CPAs' activities is already known and practically established, it is used by many cities in the Czech Republic. The standards of work, tasks, and goals has been set and the only big recent topic is the salaries of assistants. Given the current situation on the labour market and competitiveness, the Ministry of the Interior of the Czech Republic issued a recommendation that the contribution to the super-gross salary of crime prevention assistants operating in socially excluded localities should approach the amount of CZK 25,000. The application of this recommendation will then depend on the financial capabilities of the individual support providers.

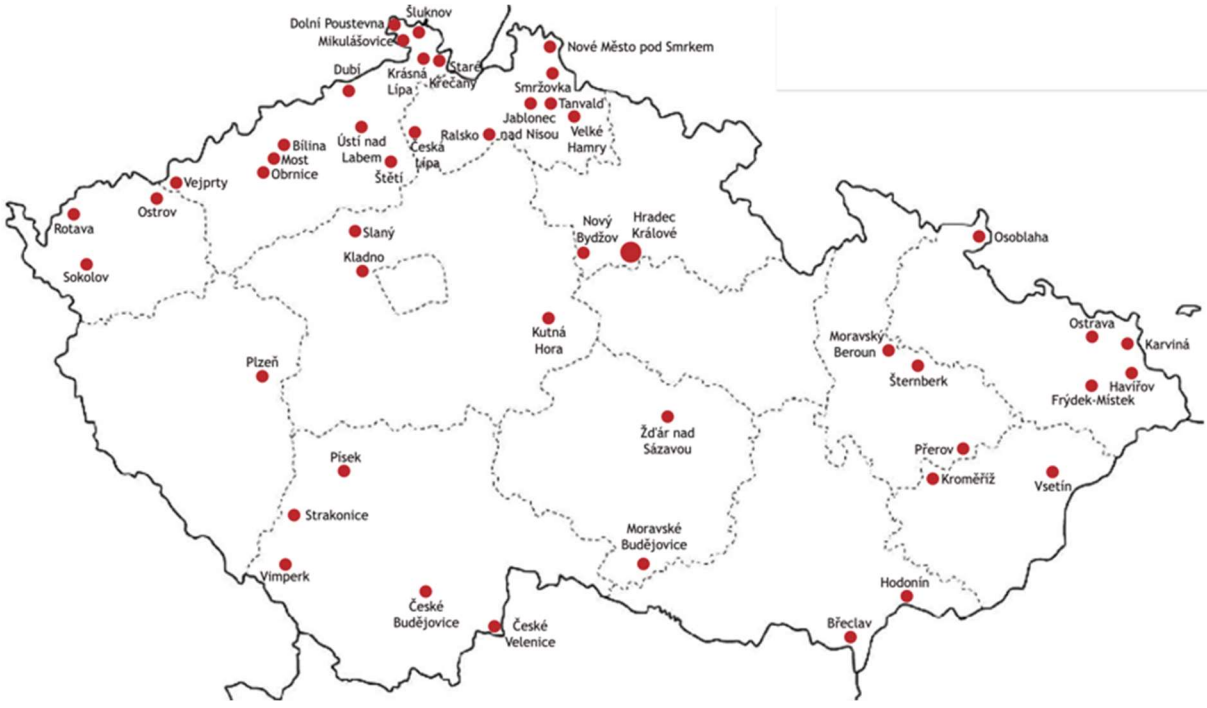
3 Methodology

Now let's describe the whole essence of the described philosophy and evaluation methods, including initial experience with the implementation of the said project from the point of view of the authors who, during their service with the Police of the Czech Republic, met with this project in person and were involved in its implementation in the early days of its successful development. **The CPA Project (philosophy), which aims to increase public order and safety in socially excluded localities, is based on a non-repressive approach, involving the inhabitants of socially excluded localities in improving their situation, in cooperation with the local government and the municipal and state police.** The project currently operates in 200 municipalities and involves over 500 crime prevention assistants. Its primary goal is to reduce the number of committed crimes and offences (generally illegal actions) in a socially excluded locality or a locality threatened by social exclusion, ensuring law enforcement, prevention of neighbourhood disputes, trivial and latent illegal activities, which the Czech Police and municipal police have problems to solve within the socially excluded localities, and to change a negative view of the majority society on socially excluded persons. After basic professional training, the selected assistant is employed by the municipal police and participates in increasing security, maintaining public order and enforcing basic security standards not only in socially excluded localities, but within the entire municipality.

It needs to be said **in the selection methodology, professional training and activities of CPAs** that the assistant is an employee of the self-government included in the municipal police in the sense of Act no. 553/1991 Coll., on the municipal police, as amended (he/she is not a police officer or a candidate). It participates in crime prevention in the municipality, contributes to the protection and safety of persons and property, prevents possible infringements by his/her presence and especially by his/her communication skills, acts as a mediator of possible neighbourhood disputes, monitors compliance with the cleanliness of public spaces, helps other citizens in a socially excluded locality. In his/her work, the assistant is managed by a specific police officer in the role of a mentor, with whom he/she works closely. The individual workplaces of the Police of the Czech Republic in the respective localities also contribute to the success of the project. Specific assistants are selected by an expert committee, which is composed of representatives of local government, municipal police, the Police of the Czech Republic and often also a coordinator (advisor) for Romany affairs (regions, municipalities) or representative of major non-profit organizations and representatives of the Ministry of the Interior of the Czech Republic. People willing to work in the excluded locality, reliable and with local and personal knowledge of the people and place of the locality are selected.

Following the pilot implementation of the project in 2009, there were already 38 assistants working in 10 municipalities in the Czech Republic in 2010 and in 2018 there were 86 crime prevention assistants in 33 municipalities throughout the country, supported from the budget of the Ministry of the Interior under the Crime Prevention Program in the amount of CZK 18,923,590. Other assistants then work within the Czech Republic from sources other than those provided by the Ministry of the Interior of the Czech Republic, e.g. from the support of labour offices on the basis of an agreement between the Ministry of the Interior and the General Directorate of the Labour Office. The assistants are also financed directly from the municipal budgets or from European projects under the Employment Operational Programme. Higher chances on the labour market for long-term unemployed applicants and greater security and public order – all this brought closer cooperation between the Ministry of the Interior of the Czech Republic and the Labour Office within the Memorandum of Mutual Cooperation, which was signed jointly on 14 March 2016.

Figure 2 – Map of the location of prevention assistants in the Czech Republic. Big circles mean more than five assistants.



Source: MVČR (2016)

The aim of the Memorandum is to increase employment, security and public order by supporting job creation in crime prevention assistant positions in municipalities and cities with a high proportion of crime and other anti-social activities, in areas with an increased number of excluded localities and a high proportion of unemployed persons. The memorandum follows up on a project implemented by local governments. All this in accordance with the main principles of the approved "Methodology of Selection, Preparation and Activities of the Crime Prevention Assistant" and the "National System of Occupations" and under the methodical guidance of the project coordinator. Through their regional workplaces and consultants, both parties select suitable locations and,

based on their knowledge of the specific region, draw up a list of requirements that the crime prevention assistant (CPA) should meet. Based on them, the Labour Office of the Czech Republic will then search the register for suitable candidates who will undergo a selection procedure for such a position. The crime prevention assistants, who are supported by the Labour Office of the Czech Republic, must adhere to the binding Methodology issued by the Ministry of the Interior in their positions as employees of municipal or city police and cities. A part of the jointly signed memorandum is a declaration that allows the use of the resources of the Labour Office of the Czech Republic to support assistants. In practice, this means expanding existing cooperation and introducing systematic support for this activity, moreover under methodological guidance and to a greater extent. Since 2014, a uniform "Methodology for Selection, Preparation and Activities of a Crime Prevention Assistant" has been applied, which is still the methodological basis for the activities of all assistants subsidized by any financial means. They lack any powers, yet the cities praise them greatly. Although they cannot fine anyone, their preventive measures contribute to reducing crime. In some cities, they help to solve the shortage of police officers or the complete absence of municipal police.

Figure 3 – Typical designation of a crime prevention assistant in the performance of tasks.

Source: City of Karviná (2012)

4 Examples from Practice

4.1 Crime Prevention Assistants in the District City of Karviná

Crime prevention assistants who are employees of the Karviná Municipal Police are, for example, authorized to deliver documents prepared by the administrative bodies of the municipality (Karviná Municipal Council) with reference to Section 19 (1) of Act no. 500/2004 Coll., the Administrative Procedure Code, as amended, and further, documents prepared by district courts in criminal matters pursuant to Section 62 (1) of Act no. 141/1961 Coll., the Criminal Procedure Code, as amended:

The types of documents delivered to one´s own hands are intended only for the addressees – natural persons:

- from the district courts into their own hands in accordance with the procedure laid down in Section 64, Section 64a of the Criminal Procedure Code and then, accordingly, in accordance with the Code of Civil Procedure
- from the Karviná Municipal Council into one´s own hands in accordance with the procedure set out in Section 19, Section 20 et seq. of Administrative Procedure Code.

General provisions applicable to deliver documents to one´s own hands:

- the deliverer (CPA) is entitled to find out the identity of the addressee and the persons who are entitled to receive the document on his/her behalf. These persons are obliged to present an identity card at the request of the deliverer. Identity card means a document which is a public document in which the name and surname, date of birth and place of permanent residence or residence outside the territory of the Czech Republic are stated, and from which the form or other data allowing to identify the person submitting the document as his/her authorized holder are also apparent.
- the document is delivered to own hands of the natural person to the address indicated by the sender on the envelope, to the address of permanent residence or also to the person authorized by the addressee to receive the document by a written power of attorney or the power of attorney must be granted before the delivering authority. The document can also be delivered wherever this person is found.

Obstacles in delivery:

- If the addressee was not found in the case of delivery and the document could not be delivered in another legal way, the document is stored – it is handed over via operating office of the Crime Prevention Manager to the director´s secretariat with a note, e.g. repeatedly not met on dates and at times, he/she has not lived there for a long time etc. The addressee will be informed in an appropriate manner where he/she can collect the document.
- The addressee will be asked to collect the deposited document within 10 days by inserting a notice of unsuccessful delivery of the document in the house box or in another suitable place (this may be by gluing on the apartment door, entrance door to the apartment, etc.); at the same time he/she will be told where, from when and at what time of day the document can be collected.
- At the same time as the notification, the addressee shall be informed in writing of the legal consequences that would be caused by his/her possible actions consisting of non-acceptance, impossibility of acceptance, failure to provide co-operation necessary for proper delivery or of the possibility of proceeding pursuant to Section 24 (2) of the Administrative Procedure Code. This instruction must also include the name of the administrative authority which sends the document and its address.
- The addressee – a natural person, or a natural person to whom the document is to be delivered, prevents the attempt to deliver it by refusing to take it over or by failing to provide the co-operation necessary for proper delivery; the information on the legal consequences resulting from his/her actions shall be handed over to him/her. If the person makes it impossible to deliver the instruction or if, despite the instruction, he/she does not allow delivery, the document shall be deemed to have been delivered on the day on which the unsuccessful attempt to deliver took place.

The actual filling in of the pre-print on the envelopes is part of the practical instruction during the CPA training.

4.2 Crime Prevention Assistants in the District City of Písek

The creation of four CPA jobs from a minority society is a step towards the partial elimination of inappropriate behaviour, improving communication between the non-adaptable community, contributing to the protection and safety of people in incriminated places, monitoring compliance with the city´s decrees on the security of local public order matters, environmental protection, cleanliness and safety in public spaces, and, in particular, establishing a communication path between non-adaptable citizens on the one hand and municipal police officers on the other. In the city of Písek, there is still an infringement and a certain tension between the majority and the minority society persists. The issues are solved in the presence of the police officers of the Písek Municipal Police and members of the Police of the Czech Republic. It becomes a rule that the police go to the same group of people and the same place several times a day. Despite the fact that the city and the police still address the issue, the public perceives these activities as insufficient. Citizens´ complaints, the experience of the management of the city of Písek, the municipal police and the Police of the Czech Republic have shown that they are most bothered by the behaviour, gathering and noise of a certain part of society of non-adaptable citizens in public spaces. Sitting on benches all day when the weather is good, standing in certain parts of the city, taking up space on the pavements and on the roads, disrespecting the movement of other pedestrians, shouting and polluting public spaces. This pattern of behaviour creates a sense of danger for citizens when moving around the city, and most do not feel well. Another fact that is criticized is the theft of metal objects for the purpose of subsequent sale or clutter around the buildings, which is the subject of great criticism by residents and visitors to the city. The creation of four CPA jobs from a minority society is a step towards the partial elimination of the above described way of behaviour, improving communication between the non-adaptable community, contributing to the protection and safety of people in incriminated places, monitoring compliance with the city´s decrees on the security of local public order matters, environmental protection, cleanliness and safety in public spaces, and, in particular, establishing a communication path between non-adaptable citizens on the one hand and municipal police officers, the Police of the Czech Republic and majority society on the other.
The crime prevention assistants cooperate together with police officers with the Department of Social Affairs and Health. Another additional benefit is the preparation of police officers and crime preventions assistants for ways of negotiating and communicating in tense situations in this community and better knowledge, understanding and managing specific manifestations of socially weak and difficult to manage individuals, in some cases actions of individuals under the influence of alcohol and drugs. The crime prevention assistants are employees of the city of Písek, or Písek Municipal Police for a definite period. A new office was set up due to greater efficiency and an increase in the number of crime prevention assistants. Here, crime prevention assistants have their own office, which consists of a study (office) and social facilities. Upon recruitment, crime prevention assistants underwent initial training together with police officers and their mentor. All were acquainted by the

lecturer with the specific content of their work, focusing on the main tasks, ensuring public order in the housing estate and other localities.

Since the beginning of 2019, the activities of crime prevention assistants can be evaluated very positively, both from the responses of the public and the police officers themselves. It should also be noted that a crime prevention assistant is contacted by the citizens themselves outside working hours with a request for advice or a request for help. The management of the city of Písek and the municipal police hope that thanks to the work of crime prevention assistants, cooperation, communication with troubled citizens, observance of public order, clean pavements and public spaces, a sense of security, etc. will become a permanent state and not just a matter of one act after notifying the crime prevention assistant or the police officer. Budget: CZK 3,954,000.00, subsidy amount: CZK 3,756,300.00. As in the case of the city of Karviná, this project is co-financed by the European Union – the European Social Fund under the Employment Operational Programme and the city of Písek (City of Písek, 2021).

5 Results

Within the framework of specifically established observations from the researched issue, it can therefore be stated in relation to the established hypotheses that:

Hypothesis no. 1: The project (philosophy of practical activities) of CPAs are able to permanently fulfil the set goals and tasks. It is used by at least 2/3 of the towns and municipalities throughout the Czech Republic, in which there are socially excluded localities, which is proof thereof. Towns actively, thanks to the support of the Ministry of the Interior of the Czech Republic, closely cooperate with their methodological body in the given issue and in solving the socially observed phenomenon. At the same time, they actively support the activity financially.

Hypothesis no. 2: The work of CPAs has a real effect on reducing crime in socially excluded locations in the Czech Republic. Prevention cannot be directly measured, as the classic says – "prevention is immeasurable", but Police statistics recorded a decrease in crimes committed by persons from socially excluded localities by up to half of the cases and thefts in the vicinity of socially excluded localities nationwide by one third (in the last two years, i.e. during the COVID-19 pandemic, the increased criminal rate for theft in connection with the declared state of emergency may also have been reflected in the decrease in the number of criminal acts).

6 Discussion

The crime prevention project has clearly proved its worth. It has been running in the Czech Republic since 2009 and in the city of Ostrava itself (the founders of the CPA assistant activity) since 2003. There are not many successfully introduced and implemented crime prevention projects. In addition to this project, we could also mention the project of the Ministry of the Interior of the Czech Republic called Housekeeper-preventist, which is often combined with the CPA project in cities where the projects have succeeded. Initial attempts to implement the CPA project were failing, and there was no problem in financing or the job offer, however, there was a problem in the applicants, i.e. citizens who applied for this job but did not last longer than 14 days. Initial enthusiasm faded and the assistants (from the interested Romany citizens) encountered a problem with their own Romany community, which considered them in the early days of introducing the project as a servant and informant of the Police. The community then imaginatively put a knife to their throat and they had to decide to either work as assistants or stay in the community. Over time, however, the tooth of sharp opinions on the work of assistants has become dull and both Romany and other citizens of the Czech Republic do this job.

7 Conclusion

The paper can be summarized as comprehensive information on established practices in Czech cities that have problems with excluded localities and less adapted citizens. The authors support the practice. They themselves have personal experience with it and recommend introducing this practice to the remaining municipalities and towns where it is not yet in place. It is known from practice that every European state faces similar issues within excluded localities, homeless settlements or so-called NO GO zones with refugees and non-adaptable immigrants. As for publication, the issue of CPAs has so far only been addressed by municipalities and towns announcing the establishment of the CPA service. Furthermore, it was part of the final theses at the university within the framework of the study and description of socially excluded localities, as one of the forms of crime prevention in these localities and their surroundings. The descriptive part of this ad hoc prepared paper is based on the practice of the authors, who were among the first pioneers of introducing CPAs in the city of Ostrava.

The paper comprehensively examines and evaluates the current state of crime prevention with the described means and the philosophy by CPAs, which were methodically determined in 2009 on the basis of the announced

procedure for the implementation of a preventive project by the state sector. Municipalities and towns on the territory of which there are socially excluded localities have gradually joined it. In this preventive project, public funds were found that have been successfully and beneficially invested in security in municipalities and towns. Secondarily, they motivate citizens, especially from excluded localities, to find employment. Both established and answered hypotheses are supported by statistical data and prove that this is a project worth following for expansion in the Czech Republic and that it is worth supporting the existing activities of CPAs in the most critical regions, among which, unfortunately, our Moravian-Silesian region still dominates.

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Refugee Migrations and Aid Mechanisms for Ukrainian Refugees in Poland and the Czech Republic

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Abstract

Nowadays, the presence and expansion of ethnic groups, but also the burning problem of refugees in the face of recent events in Ukraine or Afghanistan, are challenges of the twenty-first century. Which, in turn, significantly affects all aspects of economic and social development. Thus, it seems that ethnic groups should be a permanent element of regional development, as well as a key factor in achieving sustainable regional development.
Since February 2022, the whole world has been witnessing a full-scale military invasion of Ukraine. For the first time in the history of the European Union, the intensive armed conflict is now approaching the border of the EU. The consequences of war are the refugee crisis, humanitarian aid, and economic problems, which have affected EU countries both unexpectedly and directly. This situation has been followed by the massive increase in the number of Ukrainian refugees entering Poland and other European countries. Within the first few weeks of the war more than 4.6 million refugees have fled Ukraine, making this the fastest growing refugee crisis since the World War II. Therefore, EU officials, the governments of European countries, as well as society are showing support to refugees by providing them with shelter and basic needs and solidarity.
The aim of the article is to show humanitarian aid provided by Poland and Czech Republic, as well as attempt to indicate changes in the near future regarding refugee migration.

Keywords: *Czech Republic, harmonization, Poland, refugee migration, sustainable regional development, Ukraine*

JEL Classification: *F22, J00*

1 Introduction

Refugee migration issues and related research develop together with public interest and policy debates [Ambrosini, Schnyder von Wartensee, 2022]. Currently, one of the most moving topics is the war in Ukraine, resulting in the mass migration of women and children.

Migration, described by Jørgen Carling and Kerilyn Schewel [2018] as a result of aspiration to migration and the capacity for it, becomes refugee in the case of a foreign stay or political reasons, including as a result of war.

The previous typology of migration from Ukraine was divided into the period before and after 2014. [Filipek, Polkowska, 2020]. Economic emigrants were looking for a solution to improve their financial situation caused by, the negative effects of the socio-economic crisis, unfinished transformation and Russian aggression. [Jaroszewicz, Małynowska, 2018]. The change in the demographic situation of European countries - the decline in fertility and the ageing of the population - have contributed to the growing shortage of labour and indicated the need to attract foreigners to work. Ukrainian temporary migrations began to be replaced by long-term stays

[Biuro Informacji Publicznej, 2021]. Both cultural (including linguistic) similarities and geographical proximity became arguments for the fact that Ukrainians chose Poland as their destination for migration but also the Czech Republic, Slovakia, Lithuania and Hungary. In addition to gainful employment, these countries were also chosen as a place of further education – higher education [Filipek, Polkowska, 2020]. The above was also favored by social considerations – having relatives, family or friends in these countries [Długosz et al. 2022].

The armed conflicts in the Ukrainian Donetsk and Luhansk regions, which began in 2014, caused numerous population movements, mainly towards Russia, Belarus, and in third place - to Poland [Rimpiläinen, 2020]. However, the war started by Russia on 24 February 2022 made Poland the main host of Ukrainian refugees. The year 2022 is therefore the beginning of the third period of migration from Ukraine, this time not for the purpose of earning money or obtaining education, but to save lives. Citizens of Ukraine can now move freely between the Member States of the European Union for up to 90 days, and a directive on temporary protection has also been adopted [Marchese et al., 2022].

Within the first few weeks of the war more than 4.6 million refugees have fled Ukraine, making this the fastest growing refugee crisis since World War II. Within Ukraine, over 7.1 million people remain displaced by the war. That means that 11.7 million people have been forced to flee their homes in under seven weeks. For that time it was more than a quarter of the population of Ukraine [UNHCR. Ukraine Situation Flash Update #8, 2022].

However, at the moment, it is estimated that nearly one-third of Ukrainians have been forced from their homes. It is said to be the largest human displacement crisis in the world today. What is more, United Nations High Commissioner for Refugees (UNHCR) estimates there are over 5.2 million refugees present across Europe, and over 3.5 million refugees from Ukraine have registered for Temporary Protection or similar national protection schemes in Europe. More than 8 million refugee movements out of Ukraine have been recorded since 24 February, while more than 2.8 million movements back into the country have been recorded since 28 February [UNHCR. Ukraine Situation Flash Update #18, 2022].

With reference to the UNHCR, most of the Ukrainian refugees sought shelter in one of Ukraine's bordering countries, including Poland (over 3,5 million), Romania (972,203), the Hungary (654,664), Republic of Moldova (473,690) and Slovakia (446,755) [United Nations High Commissioner for Refugees. Operational data portal. Ukraine refugee situation. *Continually updated,* 2022].

The aim of this article is to compare aid mechanisms addressed to Ukrainian refugees in Poland and the Czech Republic. The method chosen for research is the analysis of the literature on the subject and existing research.

2 Ukraine Refugee Situation in Europe

According to the European Commission, the European Union responded rapidly and showed solidarity in action by helping people in need because of Russia's invasion of Ukraine. This included direct humanitarian aid, emergency civil protection assistance, support at the border, as well as granting protection to those fleeing the war and entering the EU.

For the first time in its history, the EU activated the Temporary Protection Directive setting the legal rules to help manage the mass arrival of people. In parallel, the European Commission quickly began to coordinate with EU countries to gather information about the situation on the ground and to prevent trafficking in human beings [European Commission, 2022].

As reported by the European Commissions since 24 February till 21 June 2022 there have been noted around 7.5 million entries into the EU from Ukraine and Moldava out of which 6 million entries of Ukrainian nationals. Worth mentioning is also the fact, that 441 623 Ukrainian children have already been integrated in Member States national school systems.

Since the Russian invasion of Ukraine, the European Commission introduced the Temporary Protection dedicated to Ukrainian refugees. People who are eligible have the right to temporary protection for a period of one year, with possibility of extension for two more years. Beneficiaries of Temporary Protection have the right to [European Commission, 2022]:

- residency,
- access to housing,
- social welfare assistance,
- medical care,
- legal guardianship and safe placement for unaccompanied children and teenagers,

- access to education for children and teenagers,
- access to the labour market (subject to EU countries' labour market policies),
- access to banking services, for instance opening a basic bank account,
- move to another EU country, before the issuance of a residence permit,
- move freely in EU countries (other than the Member State of residence) for 90 days within a 180-day period after a residence permit in the host EU country is issued.

Moreover, to ensure the implementation of the Temporary Protection the Solidarity Platform has been set up. It is responsible for monitoring the needs identified in EU countries and coordinating the operational response.

The main objectives of the Solidarity Platform is to provide a general forum for discussion to support the implementation of the plan for a stronger coordination on welcoming the people fleeing the war in Ukraine. Its task is also to collect relevant information on reception and accommodation capacity in EU countries. The Solidarity Platform coordinates matching offers from EU countries to accept people fleeing war in Ukraine who have already arrived in the EU. Moreover, it coordinates the transfer of people between EU countries, as well as facilitates and makes use of relevant EU instruments.

The Solidarity Platform brings together the EU countries, Schengen Associated States, EU Agencies (in particular, EU Agency for Asylum, Frontex and Europol), as well as UNHCR and other partners.

To help border guards of EU countries manage arrivals at the borders with Ukraine efficiently, while reducing the waiting time, but still maintaining a high level of security, on 2 March 2022 the Commission issued guidelines on external border. The guidelines include provisions on simplification of border controls at the EU's borders with Ukraine, and the flexibility regarding entry conditions. Moreover it allows crossings at temporary border crossing points, outside official border crossing points and enables an easy access for rescue services and humanitarian assistance.

Generally, since the beginning of the Russian aggression in Ukraine, the EU has organized around €4.1 billion to support Ukraine's overall economic, social and financial resilience. This amount took the form of macro-financial assistance, budget support, emergency aid, crisis response and humanitarian aid. The European Peace Facility has provided military support of up to €1.5 billion. These funds will be used to compensate Member States for the military support provided to Ukraine. A further tranche worth €500 million is being prepared [European Commission, 2022].

In addition, from March to May 2022 €1.2 billion has been disbursed to Ukraine as macro-financial assistance. The EU is also providing additional support of €120 million to help build statehood and resilience.

It is also worth emphasizing, that €348 million has been reserved for humanitarian aid projects for civilians affected by the war in Ukraine. EU humanitarian aid provides food, water, healthcare, shelter and helps to assure basic needs [European Commission, 2022].

3 From Ukraine to Poland

In the first quarter of 2022, 3.1 million foreigners entered Poland, mainly crossing the border with Ukraine (3,046,762 people), the air border crossing (122,848 people), the border with Belarus (7,395 people), the maritime border crossing (1,100 people) and the border with Russia (2,792 people) [Komenda Główna Straży Granicznej, 2022]. In May 2022, the number of children and young people of Ukrainian nationality accounted for 7% of the underage population of Polish [Żółciak, Osiecki, 2022]. Statistics of the Border Guard from June 2022, quoted by the portal 300gospodarka [300gospodarka, 2022] signal that a total of 4.29 million Ukrainian refugees have been sent to Poland. Data presenting the daily crossing of the Ukrainian-Polish border are presented in Figure 1.

Figure 1 - Number of people crossing the Ukrainian-Polish border between 24 February and 10 April 2022.

Source: Own elaboration based on [Konkrety24, 2022].

The study conducted by Piotr Długosz's team [2022] also indicates that some migrants chose Poland as their destination for refugees due to the type of provided assistance. Their decisions were also influenced by the Polish's membership in NATO – it is a security aspect. The social attitudes of Poles towards the refugees received are described as open and warm, providing support and solidarity [Opioła et al., 2022], as well as a great solidarity uprising through grassroots aid initiatives of groups and individuals [Podgórska, 2022]. Polish government has prepared a special law that allows Ukrainians to stay legally in Poland. They can, for example, take up a job, take advantage of free health care or continue their education and education. As part of the Act, a special Aid Fund was also created to support aid activities. Thanks to a special Polish Aid Fund, the government provides financing or co-financing of tasks related to aid to Ukraine, in particular to those affected by the effects of the war. This program may finance actions implemented within and outside the territory of Poland [Chancellery of the Prime Minister].

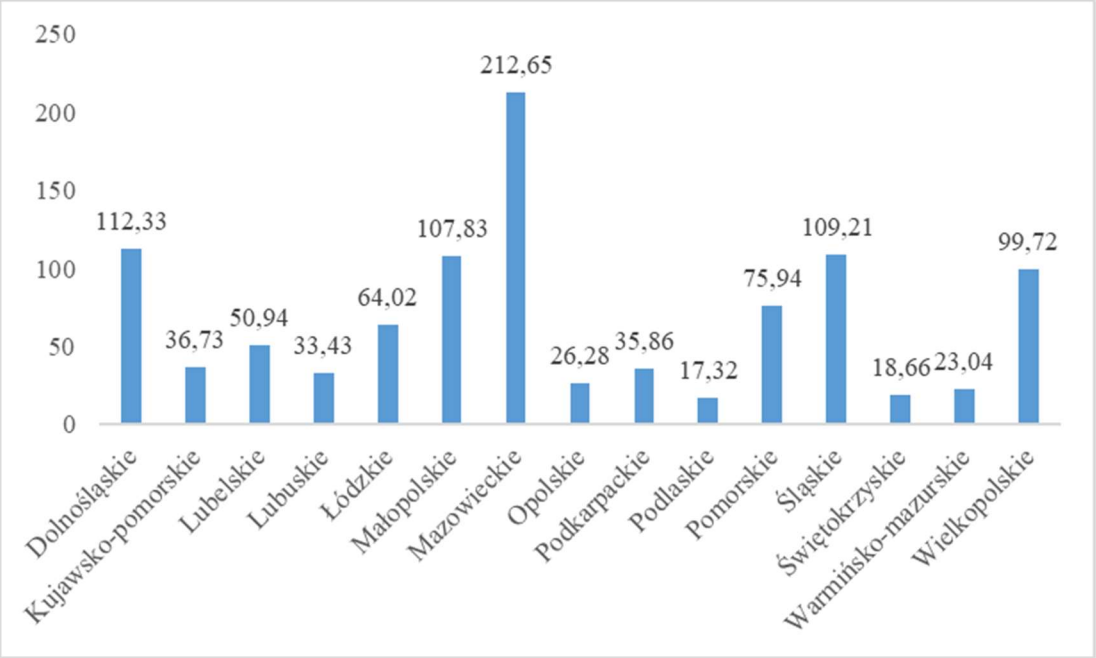
The Aid Fund finances tasks to help Ukraine, in particular Ukrainian citizens affected by the effects of armed conflict, including:

- payment of family, educational and social assistance benefits for refugees from Ukraine,
- medical care, such as purchase and dispensing of medicinal products
- providing service for reception points,
- ensuring the financing of public transport journeys,
- payment of cash benefits,
- support for local government units in the field of pre-school education, schools and institutions as well as transporting students.

Under the Special Act, war refugees from Ukraine who have reached Poland since 24 February 2022 may legally stay in Poland for a period of 18 months. They can also receive a PESEL number, i.e. a string of 11 digits identifying a given person and set up a Trusted Profile. During the first week, over 250,000 PESEL numbers were assigned.

However, as of May 2022, applications for a PESEL number for refugees from Ukraine were submitted in total 1075.16 thousand, of which the most in the Mazowieckie Province - 212.65 thousand, and the least in the Podlaskie Province - 17.32 thousand (Figure 2).

Figure 2 - Number of applications for assigning a PESEL number to refugee from Ukraine (in thousands) in the Polish regions.



Source: Own elaboration based on the data of the Chancellery of the Council of Ministers (May 2022).

The types of assistance offered in Poland to refugees from Ukraine were grouped by Elżbieta Ociepa-Kicinska and Małgorzata Gorzałczyńska-Koczkodaj [2022] into the following tasks.:

- Establishing/distribution of provisions,
- Child benefit (500+),
- "Start of School" benefit,
- Family Care Capital,
- Subsidy for crèche,
- Social Welfare—cash benefits and benefits in kind,
- Granting one-off cash allowance,
- Cash allowance for hosting,
- Nursing care and healthcare benefits,
- Waiving donation tax on aid received by Ukrainians,
- Applying the crisis provision,
- EU funds,
- Psychological care,
- Medical care,
- Access to higher education institutions,
- Possibility of obtaining maintenance grants,
- Facilitating employment of teachers and teacher's assistants in schools,
- Employing Ukrainian citizens as teachers based on the Teacher's Charter Act,
- Access to crèche, kindergarten and school,
- Assigning personal identification numbers (PESEL).

Armed conflicts, whose aftermath is refugees, affect not only the countries involved in the conflict - in this case Ukraine and Russia, but also other countries. Threats from the perspective of socio-economic sphere include, disruption of social functioning, shortage of supply and inflation, threat of fake news, threat of cyberattacks, threat of digital and sustainable development, short- and long-term sanctions and support, test of business ethics and moral duty, and test of brand management [Lim et al., 2022]. Mass migration to Poland has affected the housing market in this country. Due to the situation, an increase in prices and rents is observed – even more noticeable on the rental market [Trojanek, Gluszak, 2022] and energy prices. There are also voices about concerns regarding overexploited social assistance, overloading of the health service and major challenges for the education system, as well as lack of places in nurseries and kindergartens.

4 From Ukraine to Czech Republic

The migration history of Ukraine and the Czech Republic dates back about 150 years [Bisof, 2021]. Nowadays, the movement of refugees from Ukraine is also the largest wave of migration for the Czech Republic since the end of World War II [Institute of Central Europe, 2022]. Currently, the Czech Republic has accepted 380,000. refugees (BBC News, 2022), and this number exceeds the initially accepted limits (300,000 people).

Among the types of assistance offered in the Czech Republic to refugees from Ukraine, should be mentioned [Institute of Central Europe, 2022; Wasiuta, 2022]:

- establishment of the Regional Aid Centre for Ukraine,
- the visa process,
- "Lex Ukraina" (regarding the social security system, co-financing for natural persons accommodating refugees, employment without work permits),
- basic material assistance (humanitarian allowance),
- educational opportunities,
- free train ride to the Czech Republic.

The Czech Republic has begun to implement a number of legal solutions for the accommodation of refugees and the improvement of their situation. Provisions have entered into force enabling refugees to be included in the social security system, employed without a work permit, enrolled in Czech schools and paid them humanitarian allowance and co-financing for natural persons accommodating Ukrainians (the so-called Lex Ukraine) [Center for Eastern Studies, 2022]

A resolution was drawn up in March, on the basis of which refugees from Ukraine are to be sent to accommodation throughout the Czech Republic, but the number of people addressed to individual regions of the country is carried out according to a fixed key taking into account the number of inhabitants of this region.

According to the president of the Association of Countries of the Czech Republic, Martin Kuba, each locality is to be assigned a certain number of refugees to accommodation.

The costs of maintaining the population of Ukraine will be coverded by local governments and then paid from the state budget on the basis of contracts concluded by them with entities providing accommodation (200-250 crowns per person, i.e. 37-47 zlotych). In addition to these activities, the authorities of selected cities are to draw up and make available a list of vacant premises in which it is possible to accommodate the Ukrainian population collectively.

The data indicate, that about 300,000 refugees have already arrived in the Czech Republic, and the government has recently declared that the maximum ceiling for their reception is 250,000. According to data from the Ministry of the Interior from March 27, 236,600 people have received visas. Most Ukrainians stay in Prague and the Central Bohemian, South Moravian and Plzeň countries [Center for Eastern Studies, 2022].

Czech society, like Polish society, reacted very quickly to the situation related to migration and massively supported Ukrainians, giving them shelter in their own apartments. This form of aid is still maintained, on March 23 the government decided to increase the solidarity allowance for people who accommodate refugees.

The amount of the subsidy is 3,000 crowns per month (i.e. 570 zlotych per refugee with the possibility of receiving funds for accommodation for up to four, i.e. 12,000 crowns per month). Also to facilitate the relocation of refugees arrived, the Ministry of Labor and Social Affairs prepared an application for submitting applications for payments to people renting premises once in order to register people who came from Ukraine.

5 Conclusions

In general, since the beginning of the armed conflict, NATO member states have declared their willingness to help the Ukrainian population. The first step was military assistance. Only some NATO countries already in February 2022 decided to transfer arms and ammunition to Ukraine free of charge, these were the countries: the USA, Great Britain, Lithuania, Latvia, Estonia, the Czech Republic and Poland. These actions – apart from the political demonstration of solidarity – are aimed at showing that in general countries do not accept the escalation of military actions against Ukraine.

However, in addition to military assistance, the armed conflict caused a mass migration of people from the conflict areas. In recent months, neighbouring countries have undertaken active programs to help people who do not take direct part and seek refuge in European countries.

Since 21 March, Poland and the Czech Republic have also undertaken programs to relocate people from Ukraine. The scale of these activities varies and proceeds in different ways. This is due to the number of people who have so far crossed borders seeking refuge in these countries.

Currently, it is noted that in Poland there are about 4 400 000 000 refugees from Ukraine, while in the Czech Republic about 300 000. Nevertheless, it is noted that aid mechanisms have been activated in both countries, which has been presented in the following paper.

There is no doubt, that the situation related to the migration of refugees from Ukraine is an international problem, which results in huge social and economic changes taking place throughout Europe. Currently, there is no migration policy in terms of programs that take into account the interests and capabilities of various countries that could strengthen their aid activities in relation to countries in need.

Therefore, the international assistance programs and mechanisms for the relocation of migration groups should be developed. Especially such programs that allow a more balanced (harmonized) distribution of incoming refugees in the Member States. The current political conditions indicate, that conflicts of various kinds may arise over the next few years – circumstances that are difficult to predict, as shown by the crisis and the escalation of the conflict in Ukraine on an unprecedented scale.

The policies and governments of individual European countries should unite their actions for social integration, building the common good and order to ensure the security of the inhabitants of the entire Europe.

Undoubtedly, the European Union is currently facing a huge challenge, which is the management of refugees from Ukraine, both in the social and economic contexts. It therefore seems that proper management of refugee migration should be a key element of sustainable regional development.

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Cyclo-Mobility as a Contribution to Sustainable Development: Analysis and Forecast of Demand for Bicycles and their Components Before and During the Pandemic Time

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Abstract

In connection with the efforts to support cycling as a form of green mobility, the content of this article is an analysis of the demand for bicycles in a selected e-shop in the pre-pandemic and pandemic period. The aim was to find out whether and how significantly the demand for bicycles increased in the pandemic period, what the components of variability were and what changes in variability occurred, then to make a forecast of demand for the next period. Time series of daily sales and number of orders, seasonality analysis, calculations of variability indicators, and year-on-year growth indices were decomposed. It was found that in the pandemic period there was both a significant increase in demand and some changes in seasonal fluctuations and an overall increase in demand variability. In this way, knowledge has been gained that will allow a better understanding of the components of demand, which is also important for the functioning of supply chains. At the same time, knowing of an increase in demand may be a signal of a further shift in people's behavior in favor of the development of sustainable transport. On the basis of the analysis of time series, a forecast of demand was made and new factors of demand for bicycles in the next period are discussed.

Keywords: *bicycles, demand decomposition, demand forecast, pandemic period, sustainability in agglomerations, transport*

JEL Classification: *M21, M14, O31*

1 Introduction

Currently, especially in large agglomerations, increased car traffic is a major problem. Despite the more environmentally friendly operation of new cars, the air pollution of car traffic is still evident (Blondel et al., 2011). Due to the excess of cars, car traffic is slowing down and congestion costs are rising. The solution to this unfavorable situation can be support, i.e., green mobility in big cities. The European Union has decided to adopt a Sustainable and Intelligent Mobility Strategy, which seeks to significantly reduce the negative impacts of transport and mobility (European Commission, 2020).

The development of cycling mobility can make a significant contribution to sustainable development, not only in agglomerations. Cyclo-mobility can be described as the use of bicycles as a means of transport for shopping, work, recreational trips or sports, and recently also the use of cargo bicycles to transport cargo, children or immobile persons. It is environmentally friendly mobility, reduces transport costs and at the same time contributes significantly to the maintenance and improvement of the population.

In the pandemic period, which began in the spring months of 2020, social contacts were reduced due to fears of infection and the measures taken. To a greater extent, people started working from home. It was necessary to avoid public transport and this was followed by physical activity in leisure time, even with family and close to the residence. As a result, there may have been an increase in demand for bicycles and further changes in customer shopping behavior. The question is whether the typical increase in demand in the spring was repeated

in the covid period or whether the new situation during the covid period led to a more even interest in buying bicycles due to the distribution of physical activities throughout most of the year.

In this article, we focus on the development of the sale of bicycles for personal use, which is implemented through an e-shop located in the Czech Republic and focused on the sale of consumer goods. Therefore, we will not deal with the sale of bicycles used for the operation of shared bicycle services or for the operation of cargo services, as there are separate distribution chains for these segments.

The aim of the paper is to find answers to these research questions:

1) whether and how significantly the demand for bicycles in the selected e-shop increased in the pandemic period compared to the period before the pandemic,
2) how the variability of demand changed and what its components were.

Subsequently, to perform a demand forecast based on a method selected from the group of exponential smoothing methods (hereinafter ETS).

Answers to research questions will be sought through the decomposition and analysis of the time series of daily turnovers and daily order numbers.

If the growth in the size of demand is confirmed, it means a favorable signal for a potential increase in the share of cyclo-mobility in the following period. At the same time, knowledge of changes in the size, seasonality, and variability of demand is important for managing the supply chains of bicycles and their components.

2 Research Background

According to research by the European Environment Agency EEA (Blondel et al., 2011), 171-200 g of CO_2 per km driven are produced in the production of cars and the combustion of fuel while driving. Cyclo-mobility can potentially mitigate large numbers of cars in cities and reduce leakage. Rising traffic density, congestion, and a lack of parking spaces, especially in large cities, are leading people to consider cycling short distances to save time. At the same time, governments and cities are massively building infrastructure to support cycling (Bicycle Market, 2022).

The Bicycle Market (2022) source states that in 2021, the largest share of bicycle sales worldwide were sales through stores (over 50%). Many buyers prefer it because they can try it on the bike. The advantage of selling through stores is that the stores offer customization of the bike to the interests of the buyer (design, color, equipment) and the product can be obtained immediately. For e-shop sales, it is estimated (Bicycle Market, 2022) that this segment will be the fastest growing in the period 2022-2030. According to the Bicycle Market (2022), it is expected to grow at a CAGR of 10.9%. The CAGR (Compound Annual Growth Rate) indicator represents the geometric average of the annual growth rate.

An important factor that supports the development of bicycle use is the accompanying cycling infrastructure. This infrastructure includes cycle paths, cycle lanes, equipment such as bicycle stands for parking, sheds, service centers, and special traffic signs and signals. According to MD (2010), bicycle parking facilities include stands, storage rooms, bicycle boxes, bicycle sheds, and parking garages (bicycle depots).

The existence of advanced bicycle parking facilities in the immediate vicinity of public transport stops is a prerequisite for the combined use of bicycles, known as bike-and-ride (linking cycling and public transport). Research by Yang, Chaoli, and Wang (2014) led to the conclusion that shortening the distance between bus stops / rail stations and public bike spots and generalizing the use of the transport card (containing both of the transit service and public bike service) can appeal to more people with high income and cars using to the bike-and-ride mode.

The authors Sottile, Piras, Calli, and Meloni (2021) conducted an extensive survey of respondents' attitudes towards the use of bicycles for commuting to work in the metropolitan area, who are already cycling to work. The survey showed that the creation of a dense network of cycling paths, combined with the elimination of free car parking at the employer, could double the proportion of people who commute to work / school by bike in the study area.

The use of bicycles to transport to work is supported by cities and employers in the form of competitions. An example is the annual *Bike to Work Competition*, which has a national framework and local specialties in the Czech Republic. Within it, both the most active individuals and supporting employers and cities are valued (Cykloměsto, 2022).

The use of bicycles for long-distance trips is also supported by the introduction of cycle bus lines, bicycle rental by railway carriers at railway stations with the possibility of booking, equipping railway wagons with space and

stands for bicycle placement, free bicycle transport on selected routes, loyalty program based on bicycle rentals, and more services for cyclists.

Articles on the impact of covid on the development of cycling mobility are focused mainly on the use of shared bicycles, which may be an alternative to the need to own a bicycle. Kubaľák, Kalašová, and Hájnik (2021) published findings on the decline in public transport passengers and at the same time on the decline in interest in shared bicycles in the large city of the Slovak Republic at the time of the covid.

Nikitas et al. (2021) provide an overview and evaluation of the initiatives developed by selected states and cities during the competition to promote cycling. Among other things, they point to the need for sustainability of transport policy objectives and also to the fact that cycling is an option only for those who are able to self-mobilize and those who are able to buy, maintain, and securely store a bicycle.

3 Material and Methods

For this study, data on bicycle sales were obtained in an e-commerce dealing with the sale of consumer goods and located in a large city in the Czech Republic. The name of the e-shop remains confidential according to the company's requirements. In this study, a product line of bicycles and bicycle components was selected. The data set contains 1003 values of daily turnover of the e-shop for the sale of bicycles and bicycle components (in CZK) and the same number of data on daily orders, for the period from 1.1. 2019 to 30.9.2021.

The first case of covid disease occurred in the Czech Republic at the beginning of March 2020. Large waves of the disease occurred in the autumn months of 2020, at the turn of 2020/2021, in the spring months of 2021 and from autumn to spring 2022. The strictest government restrictive measures applied in the period from 14 March. 2020 until 30 April. 2020 (shops and restaurants were closed with the exception of the sale of basic necessities, school teaching was transferred to the online form, work from home was largely introduced, the possibility of gathering people was fundamentally reduced) and from 1 March 2021 to 11 April 2021 (in this period, the physical movement of people was restricted only within the district of permanent residence).

The data processed in this article therefore relate both to the period before covid (year 2019 to February 2020) and to the individual waves of the covid pandemic. Data on sales in the fourth quarter of 2021 are no longer included in the file, but the pandemic continued in 2022.

Time series of data on daily values of turnovers and numbers of orders were displayed in graphs, and their basic statistical characteristics were determined. The decomposition was then performed using the R program, a forecast package by (Hyndman & Athanasopoulos, 2018) , both time series to spread the demand into a trend, seasonal and random component. An additive relationship decomposition method was used,

$$D(n) = T(n) + S(n) + e(n), \text{ where} \tag{1}$$

D(n) represents the demand for the selected product, *T(n)* is the size of the trend component of demand, *S(n)* represents the size of the seasonal component of demand, and *e(n)* is the size of the random component.

To determine the trend for the entire monitoring period, all data were decomposed into annual seasonality.

Furthermore, both data sets were divided into partial time series according to individual years, monthly values of turnovers and number of orders were calculated, and seasonal graphs were compiled to highlight both differences in demand levels and differences in seasonal fluctuations between individual years. Furthermore, year-on-year growth indices of monthly turnover values and number of orders were also calculated and evaluated.

The examination of demand variability was also performed on the basis of sample standard deviations and coefficients of variation of daily values, according to the relations:

$$s = \sqrt{\frac{\sum_{i=1}^{n}(y_i - \bar{y})}{n-1}}, \tag{2}$$

$$v = \frac{s}{\bar{y}}, \tag{3}$$

where s is the sampling standard deviation, n is the number of monitored periods, y_i is the size of demand in the i-th period, $\bar{y}$ is the average size of demand, v is the coefficient of variation. The coefficient of variation expresses the relationship between the standard deviation and the arithmetic mean.

The demand analysis was followed by a prediction of future demand for the next 100 days. To predict the demand, a selection of a suitable method was made from the group of ETS methods using the R program. The forecast package (Hyndman and Athanasopoulos, 2018) was used to select the most appropriate method. Using this package, it was selected from groups of ETS methods based on the ets function. According to Hyndman and

Athanasopoulos (2018) 'Each model consists of a measurement equation that describes the observed data and some state equations that describe how the unobserved components or states (level, trend, seasonal) change over time'. The ets function is a fully automated function and selects the most accurate of the 11 possible ETS models (Hyndman, Koehler, Snyder & Grose, 2002).

The list of models is given in Table 1, where in the first column is the designation of the model and in the second the exact name. To select the most suitable method, the AIC criterion (Akaike information criterion) is selected in this automated function. This criterion is more suitable for these models than other standard prediction error indicators such as MSE (Mean Squared Error), MAPE (Mean Absolute Percentage Error) and others because it penalizes models with too many parameters. This is desirable for the ETS method, as stated in (Hyndman, Koehler, Snyder & Grose, 2002). Furthermore, this criterion also allows the choice between additive and multiplicative errors in the models. The point predictions of these models are identical, so a standard measurement of accuracy would not allow one to choose between these models. In contrast, AIC is not based on point predictions, but rather on probabilities.

Table 1 – ETS forecasting methods

Short hand	**Methods**
ETS (N,N)	Simple exponential smoothing
ETS (A,N)	Holt's linear method
ETS (Add,N)	Additive damped trend method
ETS (A,A)	Additive Holt-Winters' method
ETS (A,M)	Multiplicative Holt-Winters' method
ETS (Add,M)	Holt-Winters' damped method
ETS (N,N)	Simple exponential smoothing
ETS (A,N,N)	Simple exponential smoothing with additive errors
ETS (M,N,N)	Simple exponential smoothing with multiplicative errors
ETS (A,A,N)	Holt's linear method with additive errors
ETS (M,A,N)	Holt's linear method with multiplicative errors

Source: Hyndman, Koehler, Snyder, and Grose (2002)

4 Results

The basic characteristics of the analyzed time series on daily turnovers and daily order numbers are summarized in Table 2.

Table 2 – Statistical characteristics of the time series analyzed

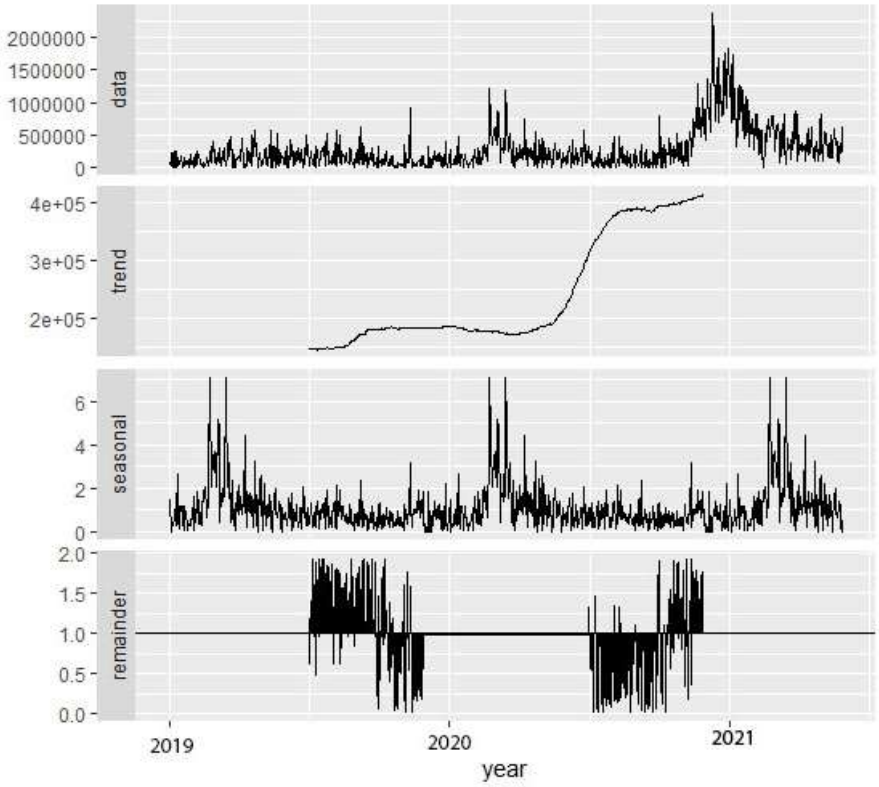
Revenues (CZK)	
Minimum	0
1st Quartil	66 337
Median	168 619
Mean	260 993
3rd Quartil	333 198
Maximum	2 371 324

Number of orders	
Minimum	0
1st Quartil	24
Median	46
Mean	64.13
3rd Quartil	85
Maximum	330

Source: Own Processing

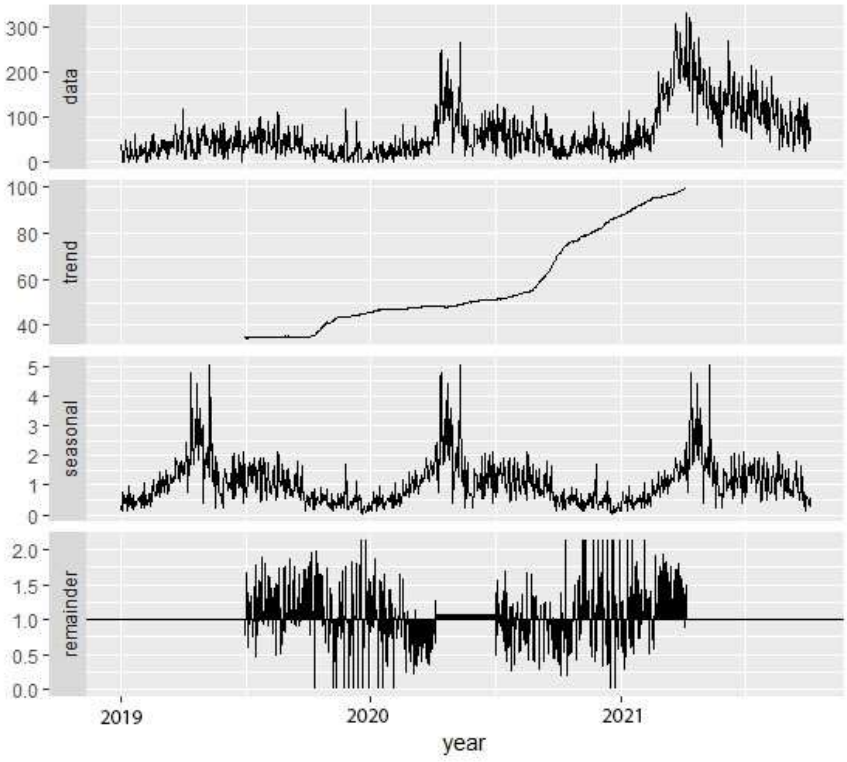
Figure 1 shows the results of decomposition of the time series of turnover values, Figure 2 shows the results of decomposition of the time series of the number of orders.

Figure 1 – Dekomposition of revenues 2019-2021



Source: Own Processing

Figure 2 - Decomposition of the number of orders for 2019-2021

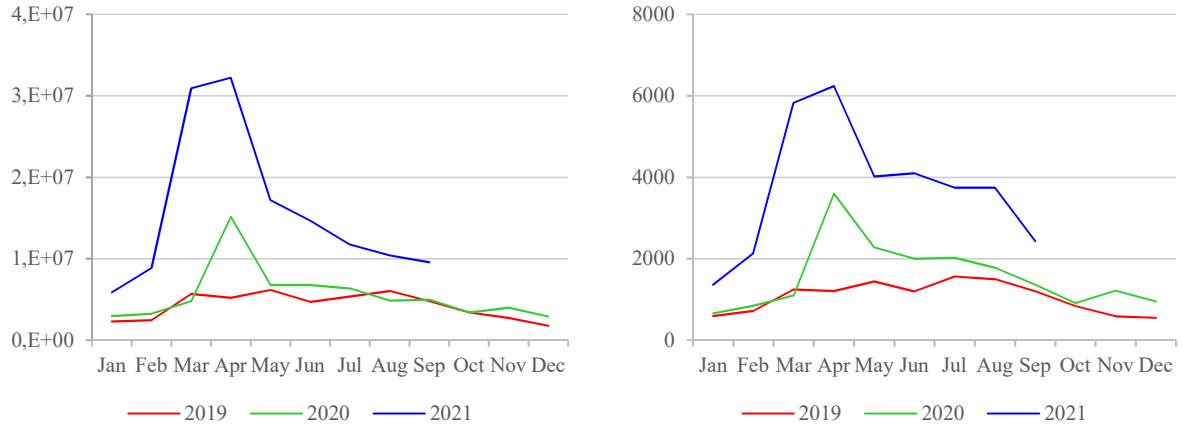


Source: Own Processing

Figure 1 shows the growth of the demand trend component, where the largest tender component was in the second and third quarters of 2020 and then the trend stagnated. The trend component forms a concave curve. The decomposition of the time series of the number of orders in the e-commerce (Figure 2) shows a similar development to the value of sales, with the trend component of the number of orders remaining growing in 2021. Figures 1 and 2 show the recurring seasonality of turnover and number orders with above-average values in spring.

More detailed year-on-year comparisons are provided by seasonality graphs showing monthly turnovers and monthly order numbers (Figure 3) and the calculated year-on-year indices of monthly values, which are given in the annex.

Figure 3 - Seasonal plots revenues (left) and number of orders (right) 2019, 2020, 2021



Source: Own Processing

Figure 3 shows that in all three years, the greatest interest in bicycles was in the spring months, which is not surprising. However, there were differences in the size and duration of seasonal fluctuations. Although in the pre-pandemic year 2019 there was increased interest in bicycles in the spring and summer months and there was no significant extreme in these seasons, in the pandemic years 2020 and 2021 there were much sharper seasonal increases concentrated in a shorter period (April 2020 and March and April 2021).

Figure 3 also shows how significantly demand has increased compared to the pre-prediction year 2019. Quantification of this growth is evidenced by the year-on-year indices listed in the annex. In April 2020, demand increased almost threefold year-on-year (the year-on-year turnover index 2020/2019 for April was 2.91 and the number of orders was 2.98). Turnover in the period from May to December 2020 represented 104 to 165% of the turnover of the respective months of 2019 (with the exception of August and October, when there was no year-on-year increase), in the number of orders, it was 109 to 207%.

In 2021, there was a further seasonal jump in turnover and the number of orders compared to 2020, when year-on-year turnover increased almost 6.5 times in March 2021 and the number of orders more than fivefold. Figure 3 also shows that in 2021, while there was a rather sharp decline in turnover after a large seasonal fluctuation, the number of orders continued to decline at a slower pace after a sharp decline in May, but demand was still well above the level of 2020 and 2019 (year-on-year indices 2021/2020 of individual months ranged between 1.85 - 2.54 for turnovers and between 1.73 and 2.10 for the number of orders).

In the next steps of the analysis, differences in the size of statistical indicators of the variability of daily demand were examined. Table 3 shows the average daily values of sales and number of orders, standard deviations, and coefficients of variation calculated from daily values for the years 2019 and 2020.

Table 3 – Variability of daily sales and number of orders

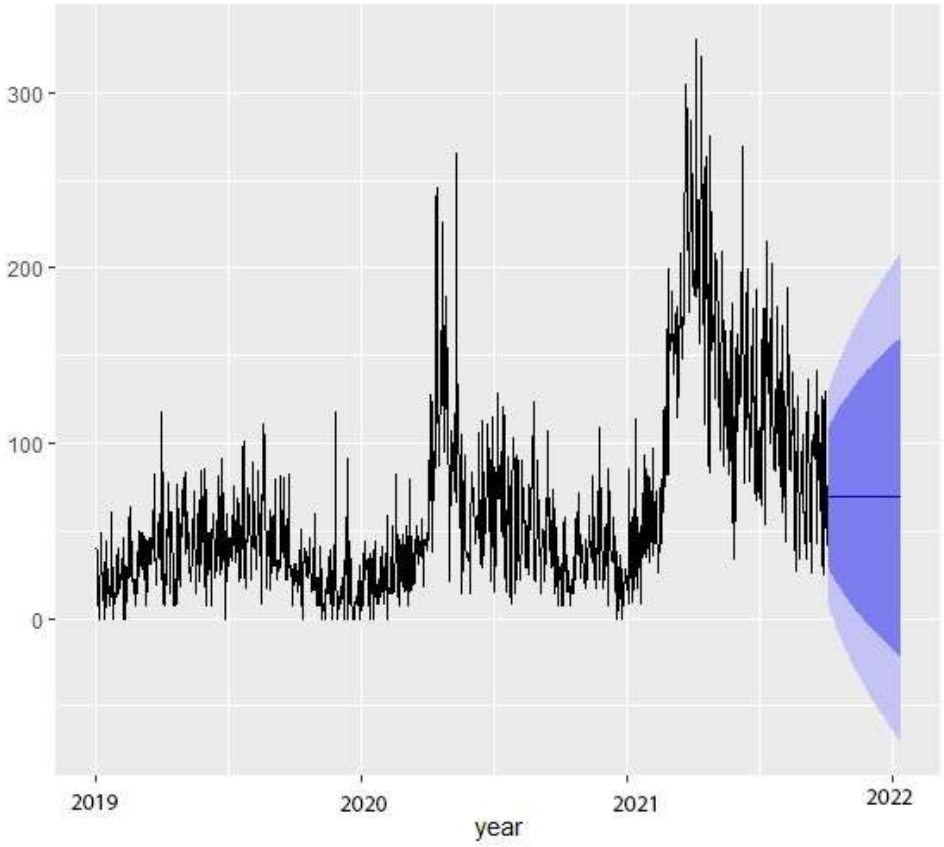
Year	Revenues			Number of orders		
	Average	Standard deviation	Coefficient of variation	Average	Standard deviation	Coefficient of variation
2019	138 704.84	131 155.91	0.946	34.73	23.15	0.667
2020	190 783.63	187 960.54	0.985	51.14	39.38	0.770

Source: Own Processing

From the values of the variability indicators, it is evident that in the first pandemic year 2020, both the daily average and the variability indicators increased, both in terms of turnover and the number of orders. For turnovers, the standard deviation in 2020 was almost 100% of the average daily values (coefficient of variation 0.985). The increase in variability this year can be attributed to inconsistencies in conditions (March onset of the first wave of the pandemic, then a few months of apparent decline and autumn outbreak of the second wave of the pandemic). We do not present the values of the average and variability indicators for 2021, as they would be calculated only from data for three quarters, which would not allow a comparison between years. The general fluctuation of turnovers and numbers of orders in 2021 is evident from Figure 3.

As the last step in data processing, a forecast of the demand for bicycles was made in the examined e-shop for the next 100 days. Using the R program and the *forecast* package, the most suitable method from the ETS group was selected according to the accuracy stated in the methodological part of the paper. The method of simple exponential smoothing with additive errors in the abbreviation ETS (A, N, N) was calculated as the most accurate. The result of the forecast for the number of e-shop orders is declared in Figure 4, in which the solid line expresses the mean value of the forecast, the colored areas then the bands of interval forecasts at the significance level 95% and 80%.

Figure 3 – Forecast of demand for the number of orders in the e-shop (method ETS(A,N,N))



Source: Own Processing

It is clear from this picture that after the increase in demand, demand has finally stabilized, and its stagnation is predicted in the future. Demang forecasting was also performed for the value of turnover in the e-shop, with the future stagnation of demand also being predicted for this indicator.

5 Discussion and Conclusion

The decomposition of the time series of daily data revealed the fact that the demand for bicycles in the selected e-shop recorded a jump growth in the pandemic period compared to the pre-pandemic situation (both in 2020 compared to 2019 and even stronger jump growth in 2021 compared to 2020). After a sharp increase, demand remains at a higher level. Therefore, it can be stated that the pandemic has increased the demand for bicycles sold in the e-shop.

Analysis of demand led to the finding that in the pandemic years, the duration and magnitude of the typical spring increase in demand changed compared to the period before the pandemic. Although in 2019 the seasonal fluctuation was spread over several spring and summer months, in the pandemic years 2020 and 2021 there was a much stronger spring fluctuation and its concentration within 1-2 months, which can be related to the timing and duration of lockdowns.

The results of the study are valid for the period to which the processed data relate and for a specific e-shop that does not have its own stores. At the time of the two covid closures of stores, customers may have had no choice but to turn to e-shops. This probably happened to some extent, but on the other hand, the data show that even after the stores were already open (second half of 2020 and 2021), turnovers and order numbers were significantly higher than before the pandemic.

The size of turnover in monetary units could be burdened by changes in the assortment structure of sales (change in the share between conventional and electric wheels, change in the share between more expensive and cheaper wheels, change in the share of wheels and accessories) and changes in prices. This difficulty was remembered in the research, and therefore an analysis of the number of orders was performed, which is a quantity that is independent of the size of turnover. Analyzes of the development of both quantities led to almost identical conclusions.

For the socially desirable development of cyclo-mobility, the findings of the increase in bicycle sales in the pandemic period are a positive signal. They indicate a certain change in the needs of the people caused by the long-running covid situation.

The identified large fluctuations in demand both in terms of months and days, together with a large increase in the overall level of interest in buying bicycles, indicate the difficulties faced by the supply chain of bicycle manufacturers and dealers and their components in production planning and inventory management. The covid pandemic was therefore also one of the factors in the emergence of global manifestations of bicycle supplies disruptions, which have occurred since mid-2020 (ČTK, 2020). As stated by several sources (Svoboda, 2022; ČTK, 2022), delivery times of the components are extended from the previous three to five months to half a year to two, or even 2.5 years, and the ordered bikes can reach people in about a year.

Based on an analysis of time series of past sales, it was predicted that demand was expected to stagnate in the last quarter of 2021. There are several new factors that will affect the demand for your own bikes and their actual use in the future. Many are contradictory, making it difficult to predict demand. A significant new factor is the high rate of inflation, which can lead people to save on fuel and public transport fares. To some extent, this can lead to the use of bicycles for commuting and shopping. On the other hand, inflation also leads to higher prices for the bikes themselves, which will reduce demand. Financial problems can lead to a significant reduction in activities for some groups of the population, which would require expenditure on the purchase of bicycles. When walking short distances, they may prefer to walk or ride on shared bikes. A limiting factor in buying your own bike is the lack of bikes on the market.

Therefore, forecasting demand is increasingly complex. A large number of factors that influence the demand for bicycles and their partial contradiction encourage the use of more advanced analysis and forecasting of demand, which are based on databases of detailed data on buyers.

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Appendix 1 - Year-on-year indices of monthly values of turnover and number of orders

Month	Year - on - year indices of revenues		Year-on-year indices of the number of orders	
	2020/2019	2021/2020	2020/2019	2021/2020
January	1.29	1.99	1.12	2.06
February	1.31	2.74	1.18	2.52
March	0.84	6.47	0.88	5.33
April	2.91	2.13	2.98	1.73
May	1.10	2.54	1.58	1.77
June	1.45	2.16	1.67	2.05
July	1.19	1.85	1.29	1.85
August	0.81	2.14	1.19	2.10
September	1.04	1.93	1.14	1.79
October	1.00		1.09	
November	1.47		2.07	
December	1.65		1.72	

Source: Own Processing

Interconnections Between Human Development and Poverty: A Pilot Analysis for the Czech and Slovak NUTS 2 Regions

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Abstract

Human development is a concept of development that places people and enlargement of their choices and opportunities for valuable life to the centre of all development strategies focusing on social progress. Progress in human development is measured with the human development index capturing achievements in three essential dimensions of human well-being in nearly all countries in the world. However, in the European Union and EU countries, the main targets for the social progress are formulated as the reduction of poverty and social exclusion. In 2010, the European Commission formulated the target to reduce the number of people living at risk of poverty by 20 million by the year 2020. However, this target was not achieved. Although all EU countries are classified as countries with very high human development, significant differences in human development exist among them as well among regions in EU countries. It means that some EU citizens face barriers for the progress in human development, and risks of poverty and social exclusion can pose these barriers. Therefore, analysis, which results are introduced in the paper, aimed to identify any possible relationship between human development, and the risks of poverty or social exclusion at the level of EU NUTS 2 regions. The analysis was designed as a pilot study, the NUTS 2 regions of two EU countries (Czechia, Slovakia) were examined in two years (2010, 2019). Premilitary results indicated strong negative relationship between human development and poverty in both countries and years.

Keywords: *EU countries, human development, human well-being, poverty, social exclusion*

JEL Classification: *I31, I32, O15*

1 Introduction

In 2020, the United Nations Development Programme launched the next Human Development Report (HDR) and celebrated thus the 30th anniversary of the first HDR. In 1990, the first HDR introduced breakthrough concepts of human development and Human Development Index, as a new and more people centred understanding of development applicable in developed as well as developing countries. Human Development Index (HDI) was constructed to show the differences among the countries, going in its scope beyond the differences recognized at the level of GDP per capita. Today, human development is considered a standard concept of the development economics, and HDI represents most common indicator measuring the achievements in three dimensions of human well-being – health, knowledge, and decent standard of living, which are considered essential for the valuable life of all humans.

Since the 1990s, progress in human development has been visible in all countries, but some countries are more progressive than the others. However, further progress in human development can be constrained everywhere by many risks the human society copes with, and these risks are closely related to the sustainability of humans' lives. Therefore, the Human Development Report 2020 related the concept of human development to the topic of Anthropocene and called for the expanding of human development and easing of the planetary pressures (UNDP,

2020). However, future progress in human development would be constrained not only by the environmental threats, but also by persistent poverty, which prevalence was increased globally in recent years because of the covid-19 pandemic and other regional or global consequences concerning the increasing prices of energies and agricultural commodities. Although the issues of human development and poverty are primarily highlighted in the context of developing countries, well-being of the EU citizens, living mainly in the countries with advanced economies with hight standard of living, was also hit with the most recent challenges.

In 2010, the European Commission adopted ambitious Strategy Europe 2020 that introduced five mutually interrelated targets, aiming in transformation of the Europe economy. The emphasis was also placed to socio-economic risks affecting the EU citizens. Therefore, the European Commission declared the target to reduce the number of people living at risk of poverty by 20 million by 2020. This EU target was then translated into national targets of EU countries. Despite the political and policy attention given to poverty reduction, most EU countries did not success fully in elimination of poverty risks. Although the proportions of people living at risk of poverty or social exclusion declined in most EU countries, the absolute number of EU citizens living at risk of poverty grew between 2010 and 2020 by 3.7 million (from 71.5 to 75.2 million).

All EU countries are currently ranked among the countries with very high human development, but values of HDI and its dimension indicators revealed that achievements in human development are not equal when the EU countries or the regions in individual countries are compared. It indicates that some EU citizens face barriers limiting their human development, and these barriers can be related to the socio-economic conditions existing in regions people live in. And persistent poverty – or living at risk of poverty or social exclusion – can be then considered a possible constraint for the progress in human development at the level of whole regional community. Therefore, it is meaningful to examine the interconnections between human development and poverty in the context of EU countries.

The paper introduces the results of a pilot analysis, which preliminarily investigated interconnections between human development and poverty, and helped to understand the possible directions of these interconnections. The attention was given to some theoretical consequences of human development, and an initial empirical analysis was done as well. *The aim of the analysis was to identify any possible relationship between human development, and the risk of poverty or social exclusion at the level of EU NUTS 2 regions.* As the analysis was considered a pilot study, the NUTS 2 regions of two EU countries (Czechia, Slovakia) were examined in two years (2010, 2019). The relationship was assessed with the use of Pearson Correlation Coefficient, and although its values indicated strong negative relationship between human development and poverty, it was too early to formulate any serious research findings or policy implications. However, at the same time, these results can be considered promising for further research, because they helped to understand the ways how to analyse the interconnections between human development and poverty, as the poverty affects human development, and low achievements in human development can lead to higher poverty risks.

2 Theoretical Background

The Cambridge Dictionary (2022) understands, similarly to other online dictionaries, *development* a process in which someone or something grows or changes and becomes more advanced. Traditional economics gave *development* the meaning of increasing incomes, and particularly in the 1950s and 1960s, many development strategies formulated their primary goal as an acceleration of growth of a national product or an income. In the 1970s, the focus of these strategies was shift from the income growth to income distribution, and reduction of poverty became the most discussed development goal (Ravallion, Anand, 1993). However, the most important shift in understanding of development was made with the introduction of human development concept in 1990, which was developed by Mahbub ul Haq and was anchored in Amartya Sen's work on human capabilities (UNDP, 2015). The concept of human development aimed to show that it was not only the growth of national product or income what mattered for development, the importance had to be assigned to the transmission from growing national incomes to improvement of human lives (Ul Haq, 1992).

2.1 Human Development and its Interconnection with Poverty

The first *Human Development Report* was launched by the United Nations Development Programme (UNDP) in 1990. Publication of the Report became a breakthrough event for all stakeholders dealing with the issue of development, because it introduced a new approach addressing the topic of human well-being, and so-called *human development* was introduced as a new, more people centred concept of development. The Report explained "Human development is a process of enlarging people's choices. The most critical of these wide-ranging choices are to live a long and healthy life, to be educated and to have access to resources needed for a decent standard of living" (UNDP, 1990, p. 1). The concept of human development was described as having two sides: 1. the process of widening of people's choices, (formation of human capabilities), and 2. the use of these capabilities for employment, productive activities, political affairs, or leisure (UNDP, 1990). The Human

Development Report 1990 also offered a new indicator, the *Human Development Index* (HDI), applicable for the measurement of achievements in three dimensions of human development. Today, it is a common indicator used by researchers as well as policymakers, but those days, it was regarded as a breakthrough measure. However, the initial reactions on first HDR as well as HDI were quite ambiguous. While Bhanojirao (1991) denoted the first HDR to be a landmark study; McGillivray (1991) after making some calculations claimed that HDI was redundant composite intercountry development indicator.

Since their introduction in 1990, the concept of human development and HDI were reviewed, improved, and updated several times, and today, they represent the most standard approach to the understanding and measuring of development in wider consequences. The importance of human development concept and HDI was highlighted in next years for instance by the Commission on the Measurement of Economic Performance and Social Progress that was appointed in response to the call of French President Nicholas Sarkozy in 2008. The Commission acknowledged the benefits connected with communication role of HDI in countries' ranking (Stiglitz et al., 2009), but at the same time, the Report prepared by the Commission introduced more complex (in terms of dimensions) approach to the measurement of human well-being. However, it was obvious that the Commission's approach was still inspired by HDI. The Commission recommended to measure achievements in several dimensions of well-being, including material living standards (income, consumption, and wealth); health; education; personal activities including work; political voice and governance; social connections and relationships; environment (present and future conditions); insecurity of an economic as well as physical nature (Stiglitz et al., 2009). The Commission's report was followed with the Organisation for Economic Co-operation and Development that launched the OECD Better Life Initiative, including the introduction of the *Better Life Index* (BLI) in 2011. BLI was designed as an interactive composite indicator combining eleven dimensions of well-being, including housing, income, jobs, community, education, environment, government, health, life satisfaction, safety, and wok life balance (OECD, 2013). Some other measures of well-being have been introduced in recent years. They worked with various dimensions of human well-being in the context of different countries, and assessment of well-being was considered in subjective as well as objective terms (for instance see the studies of Mero-Figueroa et al., 2020; Ghislandi et al., 2019; Bacchini et al., 2019; Qiu et al., 2018; Yang, 2017; Chaaban, et al., 2016). Despite the introduction of many new or improved measures of human well-being, the HDI remains an indicator calculated for the highest number of countries and years, and thus it enables to analyse the issue of human development in the context of various countries.

The Human Development Report 1997 related the concept of human development to poverty eradication. The HDR 1997 interpreted poverty as a lack of necessities for material well-being, and as a denial of opportunities and choices the most basic for human development (UNDP, 1997). The HDR 1997 introduced a new measure of poverty, the *Human Poverty Index* (HDI), closely related to the concept of human development and HDI. Human Poverty Index was designed to measure "deprivation in basic human development in the same dimensions as the HDI" (UNDP, 1997, p. 14). Since 2010, HPI has been replaced in the official UNDP documents with the *Global Multidimensional Poverty Index* (GMPI) that was developed by the Oxford Poverty and Human Development Centre and UNDP. The GMPI works again with deprivations in three main dimensions defined as health, education and living standard (OPHI, 2022), and thus it is methodologically interconnected with the concept of human development. Although the HDI is a measure of well-being and GMPI is a measure of poverty, they complement one each other (Alkire, 2016), and together they offer more complex assessment of the social progress in developed as well as developing countries.

Interconnections between human development and poverty can be addressed at macro- as well as micro-level. Existence of the relationship between human development and poverty at the macrolevel was investigated in some recent studies, for instance in studies of Amaluddin et al. (2018) analysing the situation in Indonesia, Madan (2012) addressing this relationship in Indian states, Arimah (2004) examining how the adoption of human development strategies resulted in poverty reduction in Africa. In 2011, the European Union published the study of Bubbico and Dijkstra who revealed that human development was not a guarantee of low levels of human poverty in EU regions, and vice versa (Bubbico and Dijkstra, 2011).

2.2 Human Development and Poverty in the EU Regions

At the highest political levels of the European Union and its member states, the policy attention has been paid to efforts leading to poverty reduction since the 1970s. The Strategy Europe 2020, the strategic document of the European Commission launched in 2010, introduced as one of five main EU targets the reduction of the number of people living at risk of poverty. The Commission aimed to reduce the number of people being affected by poverty risk by 20 million by the year 2020 (European Commission, 2010). However, the Strategy considered all targets as being interrelated. Poverty reduction was thus interconnected with targets concerning the education (reduction of the number of early school-leavers and increase of number of people with tertiary education), and employment (growth of the employment rates). Therefore, the main policy attention has not focused on social

progress in terms of human well-being or development in the EU and EU countries, but poverty reduction was explicitly interconnected with growing educational levels and higher rates of employment, which affect the achievements in all dimensions of human development.

Achievements or progress in human development or well-being can be monitored in the EU countries with the use of various indicators. The most fundamental tools represent HDI and BLI. The former one is calculated and is available for all EU countries, the latter one only for the EU countries that are also the members of OECD. However, either UNDP or OECD do not offer data that can be used for the analysis of human development at the reginal level. Unfortunately, the sub-national HDI is calculated by the Dutch Institute for Management Research, Radboud University and data are available on websites of the Global_Data_Lab. At the EU regional level, social progress can be assessed with the use of the *Social Progress Index* (EU-SPI) as well. This indicator was designed in 2016 and updated in 2020 and can be considered a tool enabling the benchmarking across EU regions (recognized at the level of NUTS 2 regions) based on a wide range of criteria. The social progress is monitored in three dimensions, including basic human needs, foundations of well-being and opportunities (European Commission, 2022). At the first sight, it is obvious that EU-SPI is again inspired by the concept of human development, but EU-SPI is more complex as it covers also sub-dimensions like shelter and personal security (within the dimension basic human needs), environmental quality (within the dimension foundations of well-being), or personal rights, tolerance, or personal freedom of choice (within the dimension opportunity). Although these sub-dimensions are understood to be pivotal for the human development as well, they are not explicitly captured with the current HDI. The main disadvantage of the EU-SPI is the fact that its values are available for only two years (2016, 2020).

3 Data and Methods

Nowadays, human development is understood as having two main dimensions (UNDP, 2015): 1. directly enhancing human abilities (including long and healthy life, knowledge, decent standard of living); 2. creation of the conditions for human development (including participation in political and community life, environmental sustainability, human security and rights, gender equality). However, HDI measures explicitly achievements only in the first dimension. It is calculated as the geometric mean of normalized indices calculated for each of the three (sub)dimensions (see Table 1).

Table 1 – Human development index and its components

Dimensions	Long and healthy life	Knowledge	A decent standard of living
Indicators	Life expectancy at birth	Expected years of schooling Mean years of schooling	GNI per capita (PPP USD)
Dimension index	Life expectancy index (HI)	Education index (EI)	GNI Index (II)

Source: United Nations Development Programme (2022)

The values of HDI range from 0 to 1, and higher values mean higher achievements. According to the values of HDI, countries are classified as countries with 1. very hight human development, 2. high human development, 3. medium human development, or 4. low human development. In 2019, HDI was used to measure the achievements in 189 countries. Norway reached the highest value of HDI (0.957), and was followed with Ireland, Switzerland, and Hong Kong. The lowest values of HDI were calculated for Niger (0.394), Central African Republic (0.397) and South Sudan (0.433). All EU countries were ranked among the countries with very high human development in 2019 (UNDP, 2022).

Since the 1990s, the poverty has been regarded in the EU as being associated with social exclusion that is understood as more complex and dynamic concept, supplementing narrow and static understanding of poverty. The risks of poverty and social exclusion the EU citizens must cope with are monitored with the use of the indicator measuring the numbers and proportions of people living at risk of poverty or social exclusion (AROPE). This indictor was proposed within the framework of the Strategy Europe 2020 and was designed to cover three components. These components are related to EU understanding of monetary (income) poverty, material deprivation, and low work intensity (see Table 2). People are at risk of poverty or social exclusion when they are affected at least with one of these three phenomena.

Table 2 – Components of the AROPE indicator

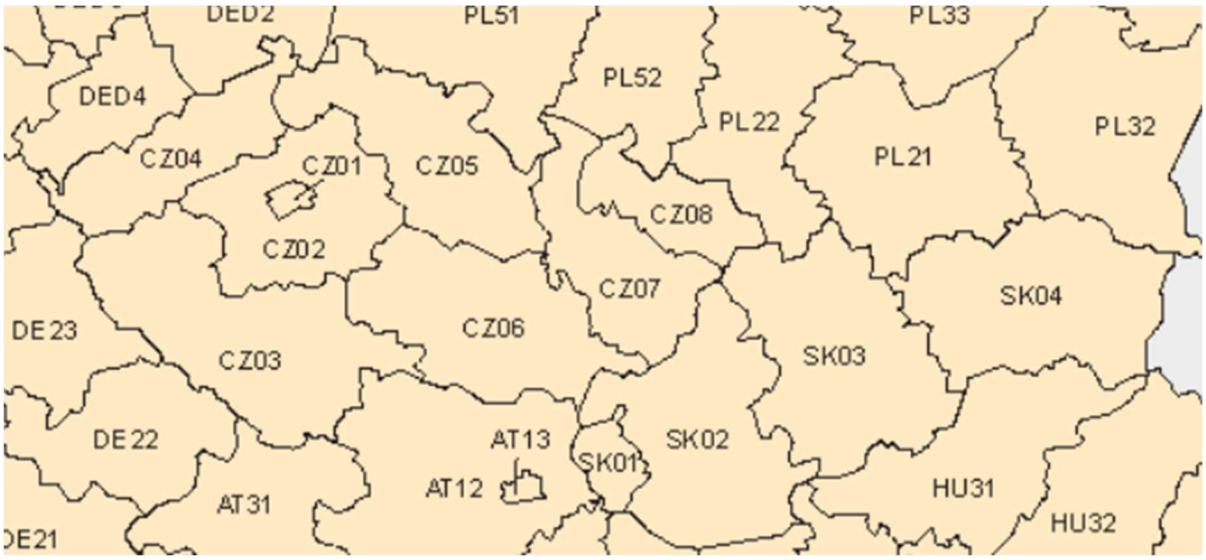
AROPE components	At risk of poverty rate (AROP)	Low work intensity indicator (LWI)	Severe material deprivation rate (SMD)
Description	Percentage of people in total population living at risk of poverty, it means with incomes below the national poverty threshold (60 % of median of net national equalised income).	People living in households where the adults worked a working time equal or less than 20 % of their total combined work-time potential during the previous year	Proportion of the population that cannot afford (rather than the choice not to do so) at least 4 out of 9 predefined material items considered by most people to be desirable or even necessary to lead an adequate life

Source: Eurostat (2022a)

In 2019, the values of AROPE indicator ranged from 12.5% to 31.2% across the EU countries, and the mean value calculated for all EU 27 countries was 21.1%. This value corresponded to 16.6% of EU citizens living in the conditions of monetary poverty, and to 12.0% citizens facing the conditions of material deprivation. Most EU countries did not meet their targets formulated at the national level in relation to the Strategy Europe 2020, and poverty reduction remains one of the most serious challenges for the national policymakers after the year 2020. Persistent poverty can thus pose a barrier that limit the choices and opportunities of some EU citizens to live a valuable life and thus to achieve a progress in human development. Therefore, it is meaningful to examine the interconnections between human development and poverty in EU countries, although most EU countries have advanced economies with very high standard of living. *The aim of the analysis,* which results are presented here*, was to identify any possible relationship between human development, and the risk of poverty or social exclusion, at the level of EU NUTS 2 regions.* The analysis was based on the research hypothesis that *the relationship between the values of HDI and AROPE indicator will be strong and negative*. It means it was expected that declining values of AROPE indicator or its components were associated with increasing values of HDI and its dimension indices.

The analysis was considered a pilot (initial) study, therefore, NUTS 2 regions of two EU countries (Czechia and Slovakia) were examined (see the specification of these NUTS 2 region in Figure 1). Czechia and Slovakia were chosen for the pilot analysis because of their socio-economic and social policy similarities resulting from the common history, as well as because of the availability of statistical data on AROPE at the level of NUTS 2 regions of both countries and for both examined years. Not all EU countries reported data on poverty or social exclusion risks at the regional (NUTS 2) level, as for instance Poland did not report in Eurostat such long data series on these risks that would enable to make presented analysis. However, the analysis can be considered worthful for all EU countries facing the persistent poverty and having reginal differences concerning achievements in human development and risks of poverty or social exclusion.

Figure 1 – NUTS 2 regions – cut-off for Czechia and Slovakia



Source: Eurostat (2022b), own cutting

The relationships between human development the risks of poverty or social exclusion was assessed in two selected years (2010, 2019). The year 2010 was the year, when the Strategy Europe 2020 was introduced, and the year 2019 was the last year that was not affected by the pandemic of covid-19 bringing new risks for the prevalence of poverty as well as regress for the achievements in human development.

Statistical data on AROPE indicator and its components were taken from the statistical database of European Commission (Eurostat 2022c), and statistical data on sub-national HDI and its dimension indices were taken from the database called Global_Data_Lab (2022). Both datasets were downloaded in June 2022.

The possible relationship between the values of HDI and its dimension indices (HI, EI, II) and AROPE and its components (AROP, LWI, SMD) were assessed with the Pearson Correlation Coefficient that was calculated in the form of *Pearson Product-Moment Correlation* (PCC) that was defined as follows:

$$PCC = \frac{\sum_{i}^{I} = 1(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{(x_i - \bar{x})^2 (y_i - \bar{y})^2}} \quad (1)$$

Where:

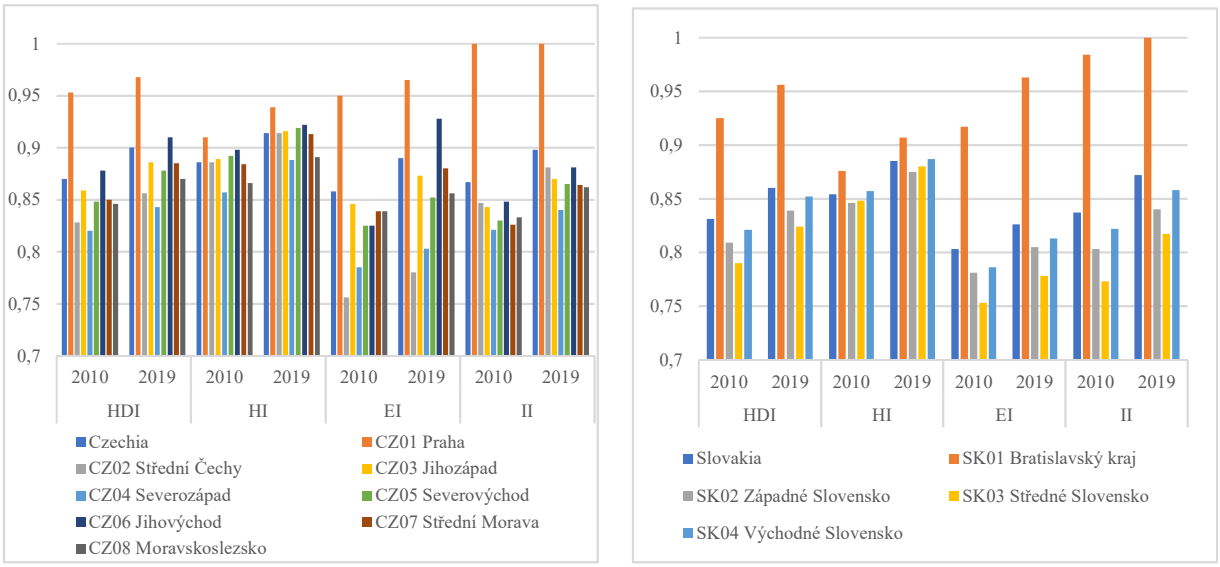
- I – means number of NUTS 2 regions of Czechia or Slovakia
- x_i – means values of HDI (or its dimension indices) for a region *i* in Czechia or Slovakia
- $\bar{x}$ – means the mean value of HDI (or its dimension indices) for Czechia or Slovakia
- y_i – means values of AROPE indicator (or its components) for a region *i* in Czechia or Slovakia
- $\bar{y}$ – means the mean value of AROPE indicator (or its components) for Czechia or Slovakia

PCC assesses the linear relationship/correlation between two sets of data, and its values range from –1 to 1. Values close to 1 (or –1), indicate strong relationship between x and y, either positive or negative. Values of PCC were calculated separately for Czechia and Slovakia in both years. It means that for each country, 10 relationships were assessed for the year 2010 and 10 relationships for the year 2019.

4 Results

Czechia and Slovakia were ranked among the countries with very high human development in both years. Czechia had 27th highest level of human development (from 189 assessed countries) in 2019 and its HDI reached the value of 0.900. Level of human development in Slovakia was lower than in Czechia, and Slovak HDI reached the value of 0.860. Slovakia was ranked 12 positions below Czechia in the countries' ranking. Like other EU countries, progress in human development was positive in Czechia and Slovakia between 2010 and 2019, and both countries had higher values of HDI in 2019 than in 2010 (see details for all EU countries in Appendix 1). However, Slovakia declined between these two years from the 31st to 39th rank in countries' ranking despite the higher values of all dimension indices of HDI, and progress in human development in most Slovak NUTS 2 regions. Overall and regional progress in human development was achieved in Czechia as well, and Czechia moved up by one rank in countries' ranking between 2010 and 2019.

Figure 2 – HDI and its components in the Czech and Slovak NUTS 2 regions, years 2010 and 2019

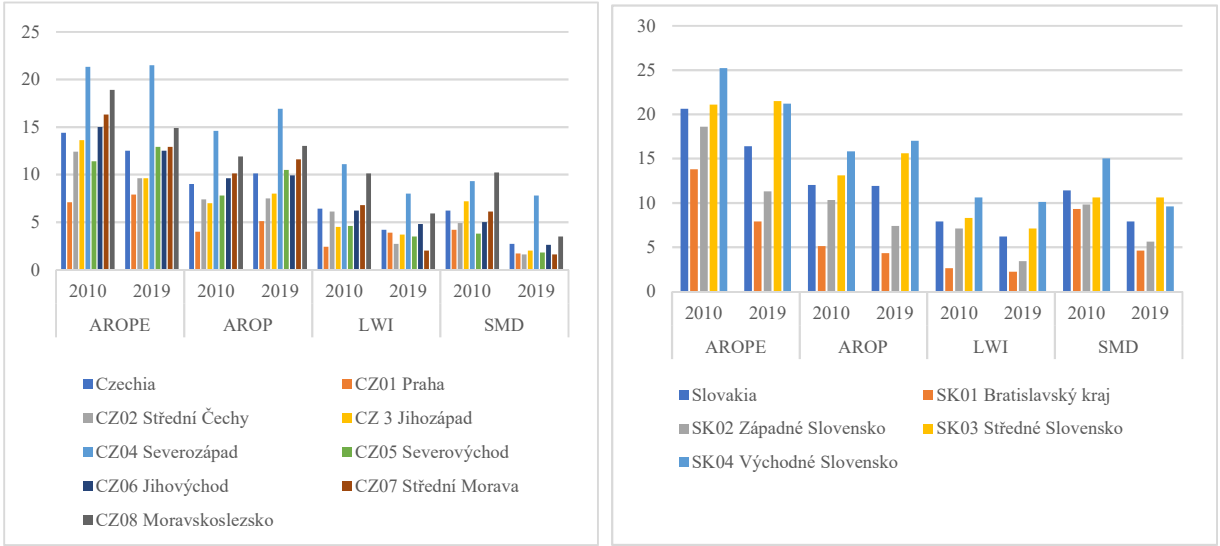


Source: Global_Data_Lab (2022), own data processing

Figure 2 clearly shows that in both countries, the values of HDI and its dimension indices were the highest ones in the NUTS 2 regions surrounding the capital cities, namely in Prague and Bratislava region. Between years 2010 and 2019, values of HDI and its dimension indices were increased in all Czech and Slovak regions, which indicated higher achievements in all dimensions of human development (health, education, and decent standard of living). However, differences between regions remained visible in both years, and particularly the values of EI and II revealed significant differences among the Czech and Slovak regions. Both dimensions are closely interconnected with poverty, as higher poverty risks are associated with lower educational level, and poverty is mainly understood in the EU in terms of income inequality.

Risks of poverty or social exclusion have received highest policy attention in the EU countries in recent years. Despite the preference that the poverty reduction received at the EU and national level of EU countries, the occurrence of poverty and exclusion risks was not fully reduced in most EU countries between 2010 and 2019, and in some EU countries the proportions of people living at risk of poverty or social exclusion even grew between these two years (see the details for all EU countries in Appendix 1). In Czechia, values of AROPE indicator were the lowest ones among all EU 27 countries in 2010 as well as in 2019, and even declined between these two years by 1.9 pp. In Slovakia, higher percentage of people lived at risk of poverty or social exclusion than in Czechia, but still the prevalence of the poverty or exclusion risks was lower than the EU average level was. Between 2010 and 2019, the Slovak values of AROPE indicator declined by 4.2 pp (see Figure 3).

Figure 3 – AROPE and its components in the Czech and Slovak NUTS 2 regions, years 2010 and 2019



Source: Eurostat (2022c), own data processing

Figure 3 clearly shows that in both countries the proportions of people living at risk of poverty or social exclusion were the lowest ones in NUTS 2 regions surrounding the capital cities, where the highest levels of human development were reached as well. In Slovakia, all AROPE components reached the lowest values in Bratislava region in 2010 as well as in 2019. Similar situation was observed in Czechia, where the overall risks of poverty or social exclusions were the lowest ones in Prague. However, in 2019, the values of LWI revealed higher proportion of people living in households with very low work intensity in Prague than in three other Czech regions.

At the first sight, above presented descriptive analysis indicated that the relationships between the values of HDI (and its dimension indices) and values of AROPE indicator (and its components) probably existed in both years. The possible interconnections between human development and poverty or exclusion risks were examined separately for Czech and Slovak NUTS 2 regions. The relationships between the AROPE indicator and HDI were assessed with PCC. Values of PCC for both countries and years are presented in Table 3.

Table 3 – Relationship between HDI and AROPE – values of PCC

Czech NUTS 2 regions					Slovak NUTS 2 regions				
Year 2010	AROPE	AROP	LWI	SMD	Year 2010	AROPE	AROP	LWI	SMD
HDI	-0.72	---	---	---	HDI	-0.74	---	---	---
HI	---	**-0.90**	**-0.95**	**-0.86**	HI	---	-0.66	-0.70	-0.14
EI	---	-0.57	-0.57	-0.23	EI	---	**-0.84**	**-0.86**	**-0.38**
II	---	-0.70	-0.64	-0.42	II	---	**-0.81**	**-0.83**	**-0.34**
Year 2019	AROPE	AROP	LWI	SMD	Year 2019	AROPE	AROP	LWI	SMD
HDI	-0.63	---	---	---	HDI	-0.73	---	---	---
HI	---	**-0.88**	**-0.64**	**-0.74**	HI	---	-0.47	-0.34	-0.46
EI	---	-0.48	-0.18	-0.39	EI	---	**-0.74**	**-0.62**	**-0.73**
II	---	-0.75	-0.26	-0.42	II	---	**-0.71**	**-0.58**	**-0.70**

Source: own data processing

Values of PCC indicated that interconnections between human development and poverty probably existed in Czech and Slovak NUTS 2 regions in both years. All relationships were negative, which meant that increasing risks of poverty or social exclusion, expressed through increasing values of AROPE indicator and its components, were associated with lower values of HDI and its dimension indices (expressing lower levels of human development). In Czechia, the highest negative values of PCC were identified for the relationship between the HI and AROPE components in 2010 as well as in 2019, while in Slovakia strong negative values of PCC revealed possible interconnections between EI or II and AROPE components. Therefore, results were ambiguous in terms of interconnections between human development and risks of poverty or social exclusion, and thus the analysis opened space for further, more detail research that will be focused on all NUTS 2 regions in most EU countries and will cover longer data series. Particular attention must be paid not only to outcomes concerning the achievements in human development and prevalence of poverty risks, but also to the determinants of these outcomes.

5 Conclusion

Human development and poverty are quite frequent research issues that are addressed in various consequences and in the context of different countries. The official interpretation of the human development interconnects it with poverty, and poverty reduction is a long-term priority for the policymakers operating at global, national as well as regional levels. It seems that poverty can pose barriers for human development, because living in poverty means living with limited choices and opportunities, but low achievements in human development can lead to higher occurrence of poverty risks. Therefore, it was considered a meaningful issue to examine the relationship between the progress in human development and poverty occurrence. Several studies dealing with the relationship between human development and poverty have been already published. For instance, Bubbico and Dijkstra (2011), examining the relationship between HDI and HPI in EU countries in 2007, revealed that the regional HPI and HDI were only weakly correlated. They showed that many regions combined a high score on one index and at the same time a low score on the second index.

The analysis, which results were presented in the paper, addressed the issue of interconnections between human development and risks of poverty or social exclusion in the context of EU countries and their NUTS 2 regions. As the analysis was designed as a pilot study, the attention was paid to two chosen EU countries – Czechia and Slovakia and was done for two years – 2010 and 2019. Countries were chosen because of their similarities and availability of regional data on AROPE indicator. It was described that both countries were ranked in both examined years among the countries with very high level of human development, and countries with lower occurrence of poverty or exclusion risks than the EU average occurrence was. Despite the identified strong

negative relationship between overall values of HDI and AROPE indicator, as well as between the values of some HDI dimension indices and AROPE components, it was too early to formulate any serious or research findings and claims about the relationship between human development and poverty in both countries, because of narrow scope of the analysis (in terms of time). However, the results of the presented pilot analysis indicated that further research examining the interconnections between human development and poverty can bring important and worthful insight on both issues, while the importance of such research topic is highlighted by recently arose challenges affecting the occurrence of poverty as well as achievements in human development.

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Appendix 1 - Human development index, EU countries, years 2010 and 2019

EU country	HDI 2010 (rank)	HDI 2019 (rank)	Change HDI/rank	EU country	HDI 2010 (rank)	HDI 2019 (rank)	Change HDI/rank
Austria	0.851 (25)	0.922 (18)	+/+7	Italy	0.854 (23)	0.892 (29)	+/-6
Belgium	0.867 (18)	0.931 (14)	+/+4	Latvia	0.769 (48)	0.866 (37)	+/-11
Bulgaria	0.743 (58)	0.816 (56)	+/+2	Lithuania	0.783 (43)	0.882 (34)	+/+9
Croatia	0.767 (51)	0.851 (43)	+/+8	Luxembourg	0.852 (24)	0.916 (23)	+/+1
Cyprus	0.810 (35)	0.887 (33)	+/+2	Malta	0.815 (33)	0.895 (28)	+/+5
Czechia	0.841 (28)	0.900 (27)	+/+1	Netherlands	0.890 (7)	0.944 (8)	+/-1
Denmark	0.866 (19)	0.940 (10)	+/9	Poland	0.795 (41)	0.880 (35)	+/+6
Estonia	0.812 (34)	0.892 (29)	+/5	Portugal	0.795 (40)	0.864 (38)	+/+2
Finland	0.871 (16)	0.938 (11)	+/+5	Romania	0.767 (50)	0.828 (49)	+/+1
France	0.872 (14)	0.901 (26)	+/-12	Slovakia	0.818 (31)	0.860 (39)	+/-8
Germany	0.885 (10)	0.947 (6)	+/+4	Slovenia	0.828 (29)	0.917 (22)	+/+7
Greece	0.855 (22)	0.888 (32)	+/-10	Spain	0.862 (20)	0.904 (25)	+/-5
Hungary	0.805 (36)	0.854 (40)	+/-4	Sweden	0.885 (9)	0.945 (7)	+/+2
Ireland	0.895 (5)	0.955 (2)	+/+3				

Source: UNDP (2010, 2022), own data processing

Appendix 2 - People at risk of poverty or social exclusion (AROPE), EU countries, years 2010 and 2019

EU country	AROPE 2010	AROPE 2019	Change	EU country	AROPE 2010	AROPE 2019	Change
Austria	18.9%	16.9%	-2.0 pp	Italy	25.0%	25.6%	+0.6 pp
Belgium	20.8%	19.5%	-1.3 pp	Latvia	38.2%	27.3%	-10.9 pp
Bulgaria	49.2%	32.8%	-16.4 pp	Lithuania	34.0%	26.3%	-7.7 pp
Croatia	31.1%	23.3%	-7.8 pp	Luxembourg	17.1%	20.6%	+3.5 pp
Cyprus	24.6%	22.3%	-2.3 pp	Malta	21.2%	20.1%	-1.1 pp
Czechia	14.4%	12.5%	-1.9 pp	Netherlands	15.1%	16.5%	1.4 pp
Denmark	18.3%	16.3%	-2.0 pp	Poland	27.8%	18.2%	-9.6 pp
Estonia	21.7%	24.3%	2.6 pp	Portugal	25.3%	21.6%	-3,7 pp
Finland	27.7%	30.0%	2.3 pp	Romania	41.5%	31.2%	-10.3 pp
France	19.2%	17.9%	-1,3 pp	Slovakia	20.6%	16.4%	-4.2 pp
Germany	19.7%	17.4%	-2.3 pp	Slovenia	18.3%	14.4%	-3.9 pp
Greece	27.7%	30.0%	2.3 pp	Spain	26.1%	25.3%	-0.8 pp
Hungary	29.9%	18.9%	-11 pp	Sweden	17.7%	18.8%	+1.1 pp
Ireland	27.3%	20.6%	-6.7 pp				

Source: Eurostat (2022c), own data processing

Organizational Structure and Management of the Company within Sustainable Development

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Abstract

The current challenging economic environment, the pursuit of social responsibility and sustainable development influence the behaviour of organizations that seek to adapt to new conditions. They focus on a sustainable concept of competitiveness as part of their organizational development. They must be sufficiently flexible and efficient. Taking advantage of the change in its internal organizational structure and functioning is one of the options that facilitate adaptation. It is a deflection from hierarchical organizational structures and directive management to flat structures with the possibility of using teamwork. That also requires a different approach to organizational management. Teamwork is a basic form of creative cooperation and preparation for the implementation of autonomous teams and flat network organizational structures. The goal of the paper is to point out the basic characteristics of teamwork on a theoretical level and then, based on a survey, to find out what the situation is in the area of teamwork in organizations in the Czech Republic. To find out what extent teamwork is used and how teams work. At the same time, it is monitored whether there was a significant change in the use of teamwork in the period 2012–2021.

Keywords: *management, organizational development, organizational structure, sustainable development, team*

JEL Classification: *D23, J53, M12, M21*

1 Introduction

In 2008, financial crisis halted the economic prosperity of recent years, which gradually escalated into an economic recession and hit most of the economic agents unprepared. In the Czech Republic, it was reflected in a significant decline in gross domestic product at constant prices by 4.7% in 2009. Only since 2014 the improvements can be monitored according to the published results of the Czech Statical Office. Economic agents fought for survival and many companies had to undergo restructuring, reorganization or revitalization. The situation after 2014 and for the economic environment also applies, but it is still just as chaotic, turbulent and difficult to predict. In 2020, unexpected and unpredictable problems associated with the Covid-19 pandemic arose and the global economy stopped for almost two years. Before the economy could even recover – the energy crisis associated with the war in Ukraine ensued.

Completely new approach to the possibilities for further development and functioning of organizations is needed in this time of chaos and turbulence. At the same time this situation provides them with new opportunities that they can take advantage of. Anticipation, as the basis of the methodology of classical management, loses its meaning in connection with how the turbulence deepens to the limit of chaos. It is unrealistic to make a sufficiently probable forecast in the longer term in the event of unpredictable developments in the environment. On the other hand, the instability of the environment is becoming an ideal business environment for the prepared ones (Truneček, 2004). An organization is ready that can withstand the competitive struggle - the one that responds flexibly to the constantly changing conditions of the environment. As Hauser (2021) points out, a

company's crisis is its loss of control over adaptability, either total or partial. Maintaining adaptability means having four basic perspectives under control: the *customer perspective* (knowing where the organization is heading), *the employee perspective* (social capital - motivated and engaged employees), *the competition perspective* (knowledge capital) and *the ownership perspective* (producing value). According to Ackoff (1971, p. 668), *a system is adaptive if there are changes in the environment and/or its internal state. Internal state reduces its effectiveness in meeting set goals, it responds by changing its internal state and/or its environment so that again, it has increased its effectiveness in relation to its goals*. *Adaptability is the ability of a system to modify itself or its environment, to transform disadvantages so that the system regains at least part of the lost efficiency.* The process of adaptation must be permanent, it is impossible to stop and rejoice in the successes achieved. The process of adaptation (and improvement) of the organization can be described as organizational development. This process should benefit shareholders (owners) and employees, as well as other stakeholders. And it is the consideration of the interests of other interest groups, not only the effort of the owners to maximize profits and maximize market value, but that also leads the organization to social responsibility and the pursuit of sustainable development.

There are many definitions of sustainable development. There is a concise description of sustainable development from Ivan Rynda on The Ministry of Regional Development's website: *"Sustainable development is a comprehensive set of strategies that enable economic needs and materials to meet human needs, material, cultural and spiritual, while fully respecting environmental limits. For this to be possible on a global scale in today's world, it is necessary to redefine their socio-political institutions and processes at the local, regional and global levels. "*

Therefore, the organization must ensure its competitiveness and develop within the framework of sustainable development. This is often not easy for the organization. Organizational development can be characterized as a comprehensive strategy. Strategy aimed at changing the beliefs, attitudes, values, culture and structure of the organization. With this strategy the organization can better adapt to new technologies, markets and challenges to increase individual and organizational efficiency (Yaeger, Head, Sorensen, 2006). In foreign literature and practice, great attention is paid to organizational development - there any many foreign authors who mention organizational development such as Cummings, Worley (2009), Hesseelbein, Goldsmith (2009), Rothwell, etc. (2010), Daft, Murphy, Willmont (2010), etc. The organization must ensure its development precisely within the conditions of sustainable development and regarding other actors in the economic space. Because of that, there is great pressure not only on the organization's management but also on its employees. Burton (2021) characterizes an organization's ability to make the right change at the right time and at the right speed as *agility*. He identifies agility as an important feature of an organization that is fundamental to its functioning in a changing environment.

As mentioned above, for an organization to function and be competitive in a rapidly changing environment - it must be competitive. However, every organization is composed of primarily people - whether managers or ordinary employees. So, it is them who are the bearers of change, and they are responsible for the prosperity of their organization. The organization should be organized in such a way that its organizational structure helps the organization to make better use of the flexibility and creativity of its employees. The organizational structure is to serve the organization as support and "facilitator" of fulfilling their goals and can be understood as a critical factor in the success of the organization within the organizational development. The organizational structure must support the growth of the company's performance and support the course of processes and activities ensuring the effective functioning of the organization. *"Because the organizational structure is an integral part of the company - it is difficult to determine only its effectiveness. On the other hand, its dysfunction clearly affects the efficiency of the company. The effectiveness of the organizational structure is evaluated by analysing the effectiveness of the company"* (Kassay, 2006, p. 627). Directive management methods applied in classical (hierarchical) organizational structures do not belong to the 21st century. Modern organizations must be built on different principles. If we understand the organizational structure as the arrangement of the basic elements in organization (i.e., people, work, technology and information), then it must be flexible and complemented by a culture based on trust, openness and shared knowledge. Organizational development is obviously marked by developments towards flexibility of organizational structures. It manifests itself in decentralization, low level of formalization, implementation of reengineering and lean processes. It is accompanied by active involvement of their employees in tasks and supporting their independence (3S - self-management, self-control, self-organization) and supporting knowledge sharing (learning - knowledge organization). One way an organization can operate based on these principles is to use teamwork. Teamwork is a fundamental form of creative collaboration and preparation for the implementation of autonomous teams and flat networked organizational structures. Considering that teams and teamwork are often talked about in organizations, but the characteristics of the team are not fulfilled in practice. The questions in the survey were focused on whether organizations use teamwork, what management style managers apply and what is the degree of team's independence when deciding on tasks.

The goal of the paper is to point out the basic characteristics of teamwork on a theoretical level and then, based on a survey, to find out what the situation is in the area of teamwork in organizations in the Czech Republic. To find out what extent teamwork is used and how teams work. At the same time, it is monitored whether there was a significant change in the use of teamwork in the period 2012–2021.

1.1 Teamwork

The basis of the functioning of flexible organizations is team (together everyone achieves more) and teamwork, which requires a significantly different approach to employees and the overall management of the organization. We can think of using coaching, leadership and neuroleadership. Proper implementation of these management styles should encourage the use of teamwork, give teams autonomy in their decision-making in performing tasks, as well as responsibility for achieving them. However, it was the period of the Covid-19 pandemic that revealed some shortcomings and dissatisfaction with teamwork. As Tarshis, Roberts (2022) point out - hybrid work and teleworking have made teamwork more complex. Workers are often frustrated by the group of people they work with, leaders and members struggling with working overtime, inefficient ways of working, lack of responsibility and group dynamics. However, it is important to realize that not every group of people who work together is a team. A real team does not exist just because someone put some names (people) in the box in the organization chart and marked the leader. On the contrary, the team exists for a specific reason and should have a specific support structure. Tarshis, Roberts (2022) state that a real team is a small group of people with complementary knowledge and skills who are committed to a common goal, who succeed or fail together, who hold each other accountable and focus on solving a single and complex problem. Real teams need a leader who prefers to build relationships in a team. A similar definition and characteristics of the team is given by Thomasová (2013). If one of these characteristics is missing, then it is not a real team, which may not be a bad thing. It is important to realize whether we need to function as a real team or whether a functioning and effective working group is enough. It can also happen that a group is referred to as a team, but it is a team in name only. Table 1 describes the features of the three different types of teams. As stated, the optimal size for real teams is three or four members, unless the leader is a full-time team member, and the goal of the meetings is to solve problems. The working group can be larger and have 6-8 members (Tarshis, Roberts 2022).

Table 1 – Description the qualities of three different kinds of teams.

	Real team	Working group	Team-in-name-only
Work type	New project or problem	Routine/business as usual	Undefined
Needs from colleagues	Intellectual partnership and emotional commitment	Information sharing	Undefined
Leadership requirements	Shared and fluid leadership responsibilities distributed among all members	Single, strong leader with well-defined role	No formal leader, or an appointed leader lacking the necessary skills or experience
Time use	Open-ended, accommodating ample discussions and active problem-solving	Efficient, with interactions that allow the group to reach answers quickly or delegate a decision	Open-ended and not well-defined
Emotional investment	High	Low	Low

Source: Tarshis, Roberts (2022)

1.2 Management and Leadership

If the basis of the functioning of modern organizations is teamwork and team independence based on self-management, then what is the role of managers in these organizations? Are they needed at all? From this point of view, the opinions of experts differ. It is possible to meet with the opinions of authors who defend the importance of middle management, top management or with opinions that completely reject managers. According to Nonaka, Takeuchi (1995) is a very important middle management for the organization, because it has a position at the intersection of vertical and horizontal information flows within the company. However, in view of the importance of the role of middle management, Japanese authors contradict many authors such as Peters, Kanter or Quinn (Nonaka, Takeuchi, 1995), who see middle management as an unnecessary element and burden. However, based on their experience and research, the Japanese authors clearly emphasize the key role of middle management as a bridge between the visions of top management and the often-chaotic reality of business with which first-line workers are confronted. On the contrary, based on his experience, Hamel (2011) considers

managers to be unnecessary, unnecessarily very well paid, and describes the costs associated with them as "cost of tyranny". In practice, there are organizations that work and prosper without managers, but the spread of this trend is very slow. This may be due not only to the reluctance of managers to change their attitudes and attitudes towards employees, but also to the reluctance of employees to take responsibility. The size of the organization also plays a role - because large corporations which are mostly centrally managed, do not provide much room for self-management.

So how the organization should be managed today? One can take the view that the organization needs a manager, a coach and a leader. As stated by Hogan (2022), it is necessary to specify the requirements according to the management level. A first-line manager needs leadership skills because he must build a team, motivate and coach to ensure that tasks are completed. The midline manager must be a diplomat. His task is to mediate the fulfilment of ideas and tasks coming from superiors, which may not always be completely clear. Also, he must defend the performance and interests of his subordinates. Hogan, Nonaka and Takeuchi defend the position of middle managers. The top manager should be a strategist, because planning a strategy for what and how to do things is based on his judgment. Analytical thinking is important to a top manager, much more than the ability to lead and negotiate. Real management is at the lowest level because there is contact with the employee. An interesting view of the "role of manager" has Handy (2019), who says that this designation is only for those who are responsible for things, i.e. inanimate or physical parts of the organization (transport, information systems, buildings, resources). The organization must be organized, the work must be divided, people must know what is required of them, when and in what quality, but this is, according to Handy (2019) management of the work not individuals. Handy sees a significant difference in that - because in relation to the employees he talks about leadership. He explains leadership as the ability to create conditions for work, choosing the right people, setting up goals that need to be achieved. It is important that employees understand them, and they will be rewarded if they meet them. This means that in a modern organization, work is organized, things are managed, and people are supported, inspired and guided. In contrast, Drucker (1999) says that management is a human and social art and practice. If the manager is a trustworthy person with a good character, nothing can be objected to. The promotion to the role of manager and leadership often leads to misinterpretation and misuse by people who see it as an excuse to abuse the power over their co-workers. For that reason, the concept of managing people and often the word manager itself evokes negative emotions. Often this can be caused by the inability of managers to treat people decently. Being a good "boss" is not easy task. According to research for McKinsey by Allas, Schaninger (2021) only 10% of people naturally have all the qualities needed to be good manager. Often managers are self-centred, overconfident, narcissistic and manipulative people, even though mutual trust, support, empathy and good communication should be essential elements of a good relationship between manager and employee. An interesting finding of an American study from 2016 is 21% of people in senior positions in large companies show significant psychopathic features (Dutton, 2019).

A survey was focused on the situation in the area of team functioning and teamwork in companies in the Czech Republic.

2 Material and Methods

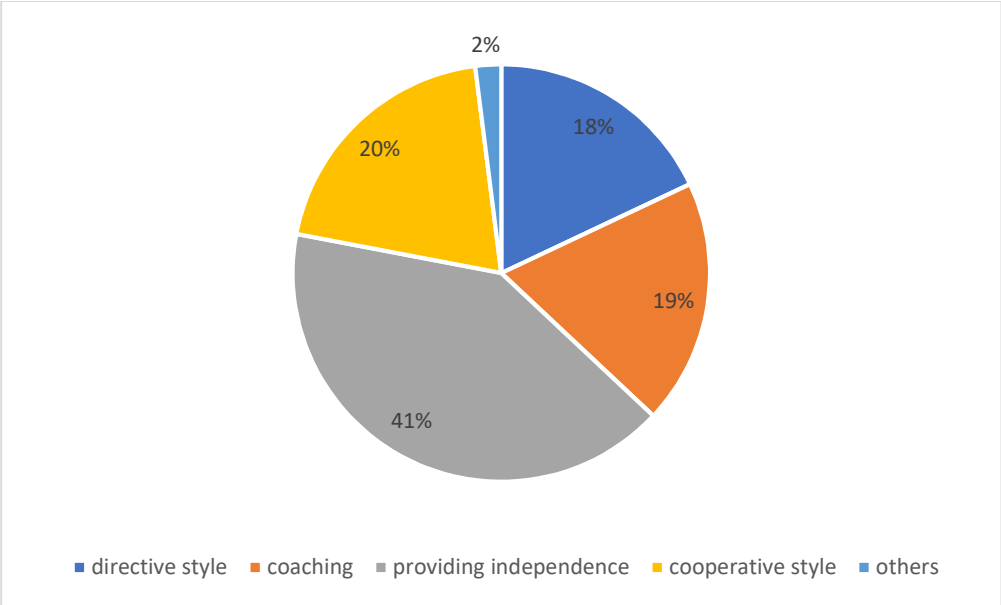
The basis for ascertaining the current situation in the area of the use of teamwork in organizations in the Czech Republic was a survey. So, the goal of the survey was to find out to what extent teamwork is used, how teams work and whether there were more fundamental changes in the field of team functioning and teamwork compared to 2012 research. A similar comparative survey was carried out in 2018 with questionnaire return of 46%. The last survey took place from February to March 2021 - the period when several covid measures were still in force. Regarding this situation - the question concerning work efficiency in a virtual team has been added. Other issues concerning the style of management, the delegation of authority, the use of teamwork and the degree of independence of teams, which is considered beneficial, were retained. The research group consisted of companies operating in the Czech Republic with 100-500 employees. Again, 250 organizations were contacted, of which 64 responded to the electronic questionnaire (which is a return of only 25.6%). The willingness of respondents to respond was thus almost half lower. The situation can be explained by the situation related to the Covid-19 pandemic, which affected the functioning of companies for almost two years. The results of the survey were processed based on the classification of the first degree (descriptive statistics). The data were arranged in tables and graphs and the basic indicators for the given set (absolute and relative frequencies) were calculated.

3 Results and Discussion

Respondents' answers to the question concerning the management style show differences in the management styles used in 2012 and 2021, but these differences are not so fundamental. In 2021, 18% of respondents state that they use a directive management style, which is about one percent less than in 2012. 19% of respondents consider coaching to be their management style in 2021 (in 2012 it was 12%). Management that provides space

for employee independence is used by 41% of respondents in 2021 (31% in 2012) and cooperative style is used by 20% of respondents (33% in 2012). The division of the management styles according to Duchoň, Šafránková (2008) was used in the survey. A change in management style must necessarily be related to a change in the person of the manager. It cannot be assumed that a manager who has been in a leading role for several years and uses a management style that matches his personality will suddenly start using a different management style. Figure 1 shows the results of the management style.

Figure 1 – Management styles applied in 2021 (%).

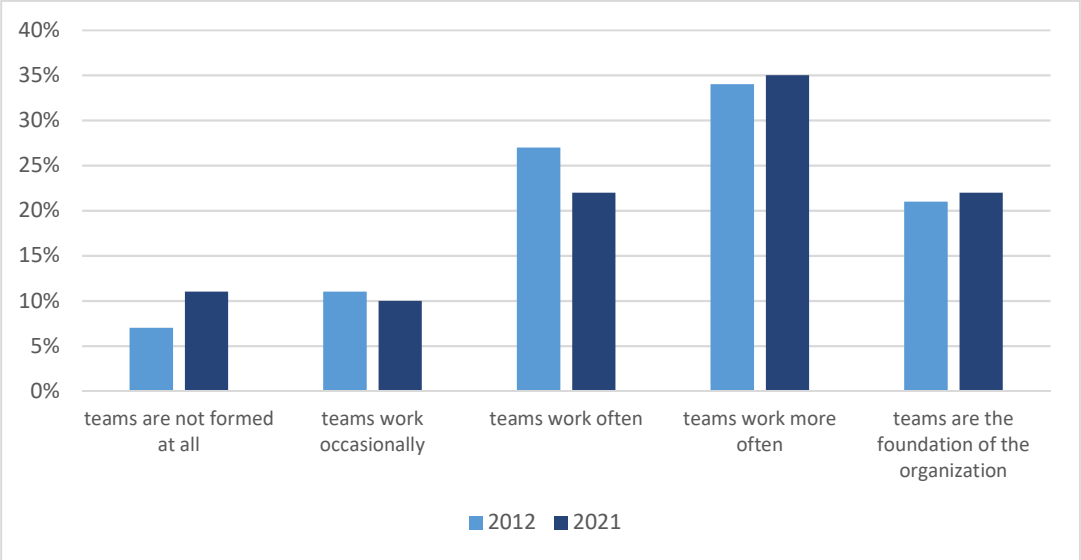


Source: own processing of the chart

Management style is related to the degree of delegation of authority. Respondents rated the degree of delegation on a scale of 1-5 (where 1 = they retain most of their authority and 5 = delegate whenever possible). The results in 2021 show that 10% of respondents retain most of their powers and 27% delegate whenever possible. There is a more significant difference in the evaluation of level 5, when in 2012 this evaluation was for only 11% of respondents. If we combine the assessment of the degree of delegation with levels 1 and 2, then the retention of powers corresponds to about a percentage when the directive management is applied. The sum of the respondents who assessed the level of delegation at levels 3, 4 and 5 is a total of 81%, which corresponds to the use of other management styles mentioned by the respondents. The manager should be able to sufficiently delegate tasks and responsibilities to his subordinates. It is one of his basic competencies, but of course he retains the so-called managerial responsibility. The manager is responsible for ensuring that the selected employee has the prerequisites to complete the task. This strengthens not only the skills but also the motivation of employees. There should not be a situation where competencies and tasks are deliberately transferred to the employee beyond his capabilities. And this way is leading to “get rid” of the employee.

Another question was focused on the use of teamwork. Respondents again rated on a scale of 1-5 (where 1 = teams are not formed at all, 5 = teams are the basis of the functioning of the organization). The results and comparison of 2021 and 2012 are shown in Figure 2.

Figure 2 – Use of teamwork in the organization (%).

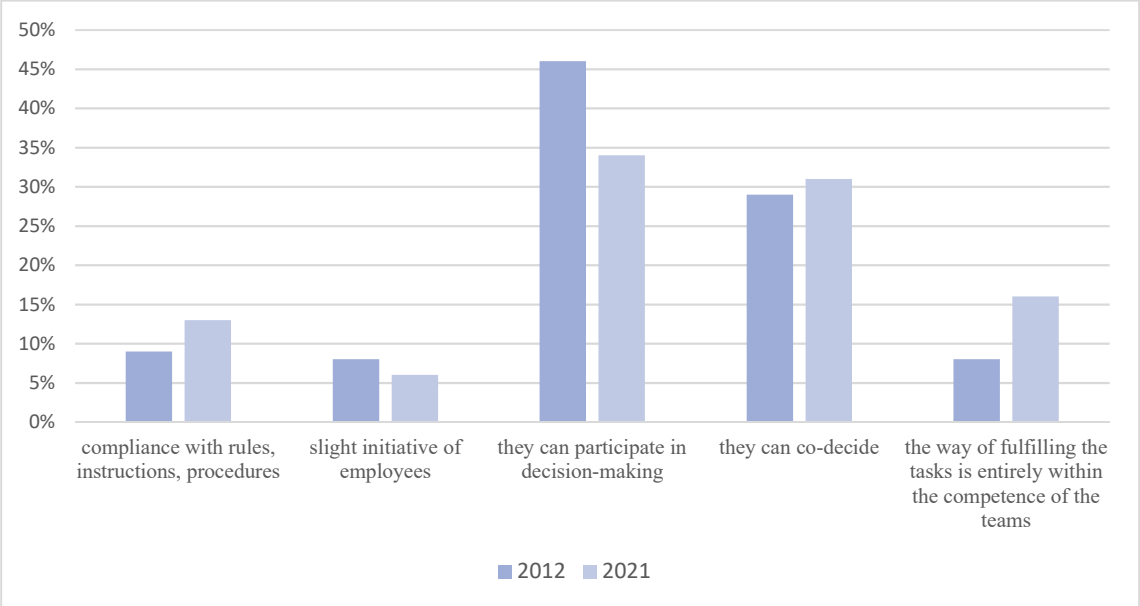


Source: own processing of the chart

It is clear from the chart that 11% of respondents stated that teams are not formed at all and 10% state that teams are formed only occasionally. Non-use of teamwork does not necessarily mean a problem. According to the above-mentioned characteristics of the team and working group - organizations can use effectively working group. Working group will be more likely used in many industrial companies. On the contrary, 22% of respondents state that teams are the basis of the functioning of their organization. It is important to answer the question how much of the degree of autonomy provided to teams in carrying out their tasks.

Respondents rated the degree of initiative and autonomy they give teams in processing tasks, also on a scale of 1-5 (where 1 = compliance with rules and assigned instructions and procedures and 5 = the way of performing tasks is entirely within the competence of the team). More detailed results and a comparison of both periods are shown in Chart 3. Extreme values - compliance with procedures and rules are required by 13% of respondents (slight increase compared to 2012), conversely, leaving the performance of tasks to teams increased to 20% in 2021 from the original value 8%. This significant increase in leaving competencies to the discretion of the team may be related to a situation where challenging changes and requirements related to the Covid-19 pandemic required management attention and day-to-day tasks were left to individual teams. This may be related to the increased degree of delegation in 2021.

Figure 3 – Degree of initiative and independence of the team (%).



Source: own processing of the chart

The last question concerned the evaluation of the effectiveness of the team's work at a time when it functioned as a virtual one (e.g. when being home office). Whether the team is as effective as in personal contact. Respondents could only choose between yes and no. 43% rated their virtual team as equally effective, and 57% of respondents saw a decrease in efficiency.

4 Conclusion

The challenging economic environment puts a lot of pressure on organizations. They must be socially responsible, they must behave in such a way that their growth is sustainable, and to this is now added the difficult period of the Covid19 pandemic and the war in Ukraine. The environment is variable and difficult to predict. Organization must be able to adapt in order to succeed. That means adapting your internal functioning of the organization, being flexible and efficient. As the functioning of the organization and its structure is a function of the environment in which the organization operates - the paper focuses on the possibility of using the team and teamwork. This should provide the organization with sufficient flexibility and the role of managers, whose task should not only be ordering and control, but they should also cover the role of coach and leader. This approach should ensure efficiency, motivate employees to take responsibility and encourage their creativity. Based on the survey, the results from 2012 (when the consequences of the crisis of 2008 gradually subsided) and the year 2021, which was a burden and test for almost every organization, are compared. A certain trend away from hierarchical and directive management can be observed, but it is not a fundamental shift. The fundamental changes are not even visible in the management style of the organization, which managers apply. The problem will probably not only be in managers, who often see a loss of status and prestige in the dismantling of their power, but also in employees and their reluctance to take responsibility.

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Productivity of German General Hospitals

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Abstract

The aim of this study is to determine the productivity of all German general hospitals in the 16 federal states. Here, productivity is defined as the ratio between output and input and the maximum achievable output at an input level can be seen as the production limit. By applying the Malmquist productivity index, using a full survey of all 1,559 general hospitals, it was possible to calculate a predominantly deteriorating productivity for each of the time periods examined, 2015 to 2018, 2015 to 2020, and 2018 to 2020. Only two states were able to improve their productivity in the first observation period from 2015 to 2018. This sobering result highlights the urgent need for action to improve the efficiency of German general hospitals. The COVID-19 pandemic that has occurred since 2020 has disrupted and tested the healthcare systems of every country in the world. In Germany, general hospitals have been able to respond to this in an adequate manner. While productivity scores continue to show deterioration from 2018 to 2020, the respective deterioration scores have been softened. As a result, this research shows, nevertheless, that all general hospitals in the 16 states have deteriorating productivity and therefore there is an urgent need for improvement.

Keywords: *efficiency, general hospitals, Germany, productivity*

JEL Classification: *C67, H51, I100*

1 Introduction

Accordingly, the European Commission is clearly aware that high-quality health services are of central importance to European citizens (Papanicolas, 2013). Thus, health care and health protection of citizens are anchored in the individual constitutions worldwide. However, the sustainability and future feasibility of the health care system are closely linked to research of the supply and demand equilibrium. Here, efficiency and effectiveness of the healthcare system represent a possible strategy to solve the differences or discrepancies between the supply and demand of healthcare in a publicly funded healthcare system. This means that the actual production of health care itself is improved, while the budget needed to finance it and the quality of services remain the same. For political representatives, but also for the public and the entire population, monitoring and evaluating the effectiveness and financial efficiency of the health care system is therefore enormously important in the long term (Gavurova and Kocisova, 2020).

Improving the productivity of health systems with limited resources is of great importance (Medarević and Vuković, 2021). Productivity can be defined as the ratio between output and input, where the maximum output that can be achieved with any level of input is the production frontier (Diewert and Fox, 2021). The peculiarity of hospitals, however, is that they work with a variety of inputs and outputs, many of which are difficult to express in concrete prices or costs (Medarević and Vuković, 2021). A productivity change can be measured using the DEA-based Malmquist Productivity Index by comparing the efficiency values of homogeneous units from two different time periods (Medarević and Vuković, 2021; Vrabková and Vaňková, 2015).

Inefficiency in general is a pervasive problem in healthcare systems. In fact, the World Health Organization estimates that, on average, 20-40% of total health spending worldwide is wasted (WHO World Health Organization, 2010; Asbu *et al.*, 2020). It is therefore not surprising that this political and economic discussion about the efficiency and quality of the public health care system has been going on for many years, not only in

Germany but also at the international level (see exemplary Vrabková and Vaňková, 2015; Kalb, 2010; Lindlbauer, 2017; Mitropoulos, 2021). The German health care system considered here has been the subject of increasing political and economic debate for many years. Almost in alternation, the efficiency of the health care system, the quality of the services offered, and the level of expenditures and costs are discussed (Helmig, 2005; Kuchinke *et al.*, 2004; Augurzky and Schmitz, 2010; Schneider *et al.*, 2020). In the discussion about possible cost-saving potential, of the various groups of service providers such as physicians, pharmacies and hospitals and their respective associations, the focus on the hospital sector appears to make the most sense. Especially since the hospital sector is regularly named first when it comes to potential cost savings and the issue of cost explosion in the healthcare system (Helmig, 2005; Vrabková and Vaňková, 2015; Taube, 1988). At first sight, this seems understandable, since spending on inpatient hospital services accounts for the largest share of costs in the German healthcare system in absolute terms (Helmig, 2005). At almost 103,5 billion Euros, around 25 % of total healthcare spending is generated by the hospital sector alone (Federal Statistical Office, 2022).

Increasing efficiency and therefore increasing productivity has become an area of increasing importance for hospitals in order to cope with growing competitive pressure in the hospital market. At the same time, unpredictable fluctuations in demand can make it difficult for hospitals to operate efficiently (Schneider *et al.*, 2020; Iseringhausen and Staender, 2012; Mitropoulos, 2021). Efficiency is understood to mean technical efficiency. This is defined as the ability to produce a certain amount of output with the least possible amount of input (input-orientation) (Augurzky and Schmitz, 2010; Kuchinke *et al.*, 2004) or as to maximize output given a fixed amount of input (output-orientation) (Schneider *et al.*, 2020). Thus, efficiency is given when the profits achieved (output) exceed the expenses for ensuring the production process (inputs) (Vrabková and Vaňková, 2015). In contrast, inefficiency exists if the production costs are higher than the costs that can be achieved with the given state of the technology (Kuchinke *et al.*, 2004).

The question of the efficiency and productivity as well as, consequently, the sustainability of the health care system now arises, especially in the context of the COVID-19 pandemic, when governments have begun to look for solutions, especially for the financing of the health care system in such a crisis (Gavurova and Kocisova, 2020; Androniceanu, 2020; Federal Ministry of Health, 2020). The COVID-19 pandemic is a serious health emergency that has therefore affected the lives of everyone around the world (Giménez-Espert *et al.*, 2020; Bharati *et al.*, 2020). In the focus of this crisis are especially the hospitals (Schreyögg, 2020). The Corona pandemic COVID-19, which has emerged since the beginning of 2020, also confronts the German healthcare system with extreme challenges (Dercks *et al.*, 2020; Hübner *et al.*, 2020; Federal Ministry of Health, 2020).

1.1 German Healthcare System

With 83.2 million inhabitants (as of September 2021), Germany is not only the most populous country in the European Union (EU) but also the most economically powerful, with 3.57 trillion euros GDP (Federal Statistical Office, 2021b; Eurostat - statistical office of the European Union, 2022). In the EU, there are ultimately two fundamentally different healthcare systems: One is the mixed public-private, as represented in Germany today, and the other is the pure centralized single-payer system, as currently exists in the United Kingdom. The exclusively private health care system, is practically non-existent, not even in the U.S., where there are now comprehensive government Medicare and Medicaid systems (Mance *et al.*, 2019).

In Germany, the Bismarck model is applied. This model uses a social insurance system and is usually financed jointly by employers and employees through payroll deduction. The objectives of the insurance companies are non-profit and they must include all citizens. The system is also characterized by the fact that there are both public and private providers of health care services (Wallace, 2013). The central political authority for the German health sector is the Federal Ministry of Health, which is one of the highest federal authorities. The main task of this authority is to maintain, secure and further develop the efficiency of the statutory health insurance and the long-term care insurance. The task of providing services of general interest is established by law in the German Basic Law (Grundgesetz). The right to life and physical integrity from Article 2 (2) sentence 1 of the Basic Law and the principle of the welfare state from Article 20 (1) of the Basic Law come into question for a claim to health care to be derived from the Basic Law itself (German parliament, 2015).

1.2 Political and Economic Context

The Federal Republic of Germany is a federal and parliamentary republic composed of 16 federal states (Länder). Each of these states has its own constitution, which reflects the federal, democratic and social principles of the national constitution, the so-called Basic Law, for its respective state. A key feature of the German political system, which here has a particular influence on the health care system, is the division of decision-making authority between the federal government, the states, and civil society organizations. The federal and state governments delegate powers to provide health care services to membership-based and self-regulated organizations, which are referred to as "corporalist bodies" (Busse and Blümel, 2014; Busse *et al.*,

2017). Thus, Germany has decided for a "self-administration principle" in which neither the state nor the market regulates the complex health care system, but the participants themselves. In the existing economic system of the social market economy, the state sets the framework conditions and tasks for medical care. It issues laws and regulations for this purpose. The market, however, is regulated by the participants (Federal Ministry of Health, 2020). Furthermore, the "system duality" between statutory and private health insurance for primary and mandatory coverage is another key feature of the German health care system. Around 11 % of the population is fully insured with a private health insurance company; among OECD countries, only Chile has a similar mixed system between public and compulsory private health insurance (Müller, 2020).

Compared with other European and OECD countries, the performance of the German healthcare system is one of the best. Of all the OECD countries, Germany spends especially high sums on health care (Müller, 2020). Looking at the share of healthcare spending in GDP, Germany is well above the OECD average in the year 2019. With almost 12 % of total gross domestic product (GDP) spent on healthcare, Germany is one of the leading countries. With a per capita expenditure of 6,000 USD /about 5,200 EUR, Germany is also among the countries with the highest healthcare spending (OECD, 2021a, 2021b; Mance *et al.*, 2019). Also, earlier data from WHO show a similar picture (WHO World Health Organization, 2010). Similarly, the paramenter of physician density with 4.3 physicians per 1,000 inhabitants in 2018 as well as hospital beds with 7.9 per 1,000 in 2019 in Germany are among the highest of the OECD countries (OECD, 2021c, 2021a).

In summary, it can be seen that the Federal Republic of Germany has one of the best healthcare systems compared to other european member states and OECD countries. However, there is a lack of more detailed information on how the healthcare system and its efficiency in Germany is characterized in the individual federal states and what influences it.

1.3 German Hospital Sector

In Germany, there are a total of 1903 hospitals in 2020, according to the most recent calculations. Of these, 551 are public, 732 private and 620 non-profit. 344 hospitals are either psychiatric or university hospitals, which are excluded from the sample for reasons of comparability. The total number of hospitals included in the survey thus covers all 1,559 general hospitals in Germany, of which 456 are publicly owned, 512 are non-profit and 591 are privately owned (GBE Health reporting of the federal government, 2022).

The 16 states in Germany differ in many aspects such as land size, population, gross domestic product and economic strength, as Table 1 shows.

Table 1 - Overview of federal states, size of area, GDP and hospitals in Germany in 2019

State (territorial states and city states)	Population	Area in sqkm	GDP in billion euros	Number of hospitals		General hospitals per 100,000 inhabitants
				Hospitals total	Of which: General hospitals	
Baden-Württemberg	11.100.394	35.747,83	522,59	250	189	1,7
Bayern	13.124.737	70.541,57	636,22	347	280	2,1
Berlin (city state)	3.669.491	891,12	156,84	87	76	2,1
Brandenburg	2.521.893	29.654,43	74,79	58	52	2,1
Bremen (city state)	681.202	419,37	33,39	14	12	1,8
Hamburg (city state)	1.847.253	755,09	123,59	60	54	2,9
Hessen	6.288.080	21.115,64	294,00	157	135	2,2
Mecklenburg-Vorpommern	1.608.138	23.295,22	46,65	37	33	2,1
Niedersachsen	7.993.608	47.709,80	306,67	177	148	1,9
Nordrhein-Westfalen	17.947.221	34.112,44	717,50	341	284	1,6
Rheinland-Pfalz	4.093.903	19.858,00	146,37	87	70	1,7
Saarland	986.887	2.571,11	35,38	24	21	2,1
Sachsen	4.071.971	18.449,93	128,93	77	69	1,7
Sachsen-Anhalt	2.194.782	20.456,51	64,12	47	40	1,8
Schleswig-Holstein	2.903.773	15.800,54	98,70	108	74	2,6
Thüringen	2.133.378	16.202,35	63,32	43	39	1,8
Germany	83.166.711	357.580,95	3.449,05	1.914	1.576	1,9

Source: Own illustration based on GBE Health reporting of the federal government, 2022; Federal Statistical Office, 2022.

Looking at the individual German states, it is clear that a regional analysis of hospitals makes a significant amount of sense. For one, Germany has different heavily populated and economically strong regions. Secondly, the number of hospitals in the individual federal states varies considerably. There are states with 2,9 general hospitals per 100,000 inhabitants and states with only 1,7 general hospitals per 100,000 inhabitants. Considering all federal states therefore provides a more differentiated picture and a good basis for the sample selection.

Healthcare spending in Germany has doubled over the past 20 years and has now exceeded the 400 billion euro mark for the first time. Health care spending will amount to 11.9% of gross domestic product in 2019 with 410.8 billion euros (Federal Statistical Office, 2021c). Hospitals alone accounted for 25.2% of all healthcare costs in these terms in 2019 (Federal Statistical Office, 2021a). The percentage of public hospitals has decreased from 45.6% to 28.47% since 1991 to 2019. Privately owned hospitals have more than doubled from 14.84% to 37.82% during this period. The share of non-profit hospitals has declined only slightly from 39.11% to 33.69% (Federal Statistical Office, 2021a). Especially the cost pressure on public hospitals has led to a wave of privatization in recent years and decades. Privatization does not mean the change of legal form of public hospitals from a public to a private legal form, with the hospital's owner remaining public. Privatization rather describes the change of ownership of a hospital from a formerly public to a now non-public and therefore a private or non-profit owner (Lindlbauer, 2017; Jeurissen *et al.*, 2021; Herr, 2009). Therefore, in this study, the definition of "private" is used to refer as a synonym for "private for-profit“ (Herr, 2009). In addition to this, it has not yet been possible to confirm whether the privatization of hospitals has also led to better quality care and more efficient use of resources (Herr, 2012; Sloan, 2008; Jeurissen *et al.*, 2021).

From a legal point of view, the main functions of hospitals under § 107 of the Fifth Book of the German Social Code (SGB V) are to improve the health of patients and to provide maternity care. Nevertheless, German hospitals are under an obligation to act economically, to use resources efficiently and to be economical with public finances. To achieve these goals, a new reimbursement and payment system was introduced in 2004 for all inpatient hospital care services. The previously existing nursing rates per day of hospitalization were replaced by diagnosis-related per-case flat rates (DRG, diagnose-related groups). The purpose of this reform was to reduce the length of hospital stays and consequently also to further increase efficiency through competition. At that time, such reimbursement systems had already been introduced in many other countries to reduce the length of stay in regulated hospital markets and to increase efficiency through competition based on standardized criteria (Lindlbauer, 2017; Hafsteinsdottir and Siciliani, 2010; Lindlbauer *et al.*, 2016). As a result of this reform, the pressure to cut costs on the one hand and increase efficiency on the other has increased significantly for all hospitals in Germany in order for them to be able to continue to exist on the healthcare market. Until now inefficient hospitals ultimately have an economic incentive to treat the same number of patients with a lower use of resources, since the compensation per hospital is calculated on the basis of the average costs of all hospitals. As a result, public hospitals in particular must find efficient and effective solutions in order to survive on the market (Lindlbauer, 2017; Lindlbauer *et al.*, 2016; Schneider *et al.*, 2020).

Due to the high economic and socio-political pressure hospitals and especially public and municipal hospitals are increasingly confronted with (Gavurova and Kocisova, 2020; Androniceanu, 2020; Lindlbauer, 2017; Mandl *et al.*, 2008; Mitropoulos, 2021), as well as the not impossible potential to increase efficiency, it makes sense to take up and continue research in this area.

2 Model and Data

Multiple-criteria decision-making (MCDM) models are used to calculate hospital efficiency. The evaluation of hospital efficiency on the basis of the years 2015 to 2020 will be carried out with a longitudinal data analysis using the Malmquist Productivity Index.

MCDM methods are among the most commonly used methods in health economics today. The models are based on applied efficiency measurement and evaluation and refer to the comparison between the actual and the optimal amounts of inputs and outputs (Vrabková and Vaňková, 2015). Often used models with multiple decision criteria (here multiple inputs and outputs) are the Data Envelopment Analysis (DEA), the Free Disposable Hull Model (FDH), as well as the Malmquist Index. Based on the assumption that hospitals can influence the number of inputs (e.g. number of physicians and nurses as well as the number of available beds) rather than the number of patients to be treated as outputs, the input-oriented DEA model seems to be more appropriate than the output-oriented DEA model (Schneider *et al.*, 2020).

2.1 Data

The data used was taken from the official information system of the "Reporting of the Federal Government". This reporting body is formed from the cooperation between the Federal Statistical Office and the Robert Koch Institute. The aim of this body is to ensure valid statistical, medical and epidemiological data for health

reporting. Among other things, this data also contains data from the reports of the 16 statistical offices of the federal states and from the quality reports of the individual hospitals. As a result, a full survey of all 1,558 German general hospitals from 2015 to 2020 could be conducted.

The inputs and outputs used to calculate the Malmquist Index are shown in Table 2. All input and output variables are relative values, as they are each given as a value per 1,000 inhabitants of the respective federal state.

Table 2 - Input and Output variables for calculation the MI models

Input variable	Description
I1	Number of beds per 1000 population
I2	Number of physicians per 1000 population
I3	Number of nurses and non-physician staff per 1000 population
Output variable	Description
O1	Number of cases (hospitalizations) per 1000 population
O2	Number of bed occupancy days per 1000 population

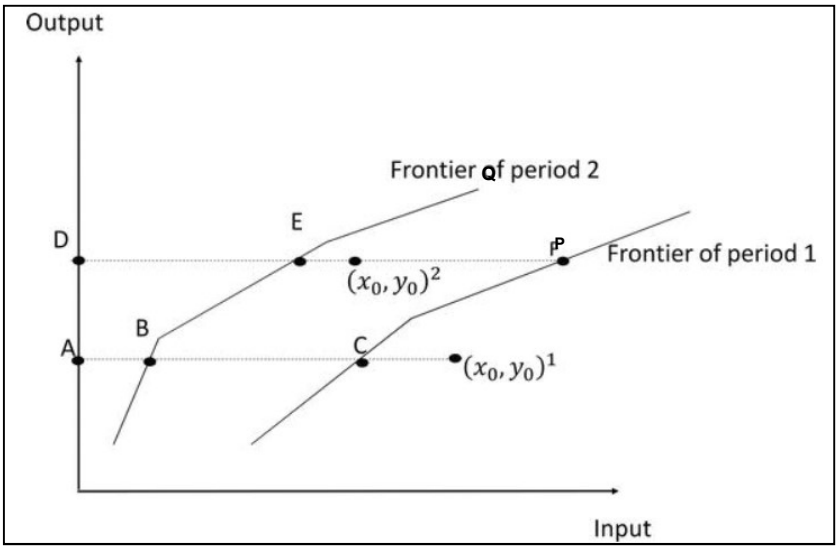
Source: Own illustration.

2.2 Methods

The Malmquist Productivity Index is another model for multi-criteria decision-making, which can be applied in terms of health care to evaluate the efficiency of hospitals. The Malmquist Index (MI) is an instrument for assessing the efficiency of production units over at least two time periods, which attempts to measure the effects of technological change and of other sources of efficiency improvement (Vrabková and Vaňková, 2015; Jablonský and Dlouhy, 2004; Mitropoulos, 2021; Vrabková and Friedrich, 2019).

Thus, the DEA based Malmquist Productivity Index evaluates the efficiency change over time and therefore the change of productivity of homogenous units between two subsequent periods. The temporal DEA model, which evaluates the productivity change of a Decision Making Unit (DMU) between two periods, is thus an example in comparative statistics analysis. It is defined as the product of the terms "catch-up" and "frontier-shift". The first term of "catch-up" (or recovery) is the term which is calculated to study the effect of growth or deterioration in a DMU, or to measure the degree of efficiency improvement or deterioration. The "frontier shift" (or innovation) term, on the other hand, is used to examine the change in efficient frontiers (frontier lines) between the two periods (Cooper *et al.*, 2007; Vrabková and Vaňková, 2015; Sánchez, 2018; Mitropoulos, 2021). Figure 1 shows the technical efficiency change based on the MI. It illustrates the technical efficiency change in which one in- and one output is shown. The same DMU is characterized as point P $(x_0, y_0)^1$ in time period 1 and point Q $(x_0, y_0)^2$ in time period 2.

Figure 1 - Technical efficiency change based on the Malmquist Productivity Index Model.



Source: Cooper *et al.* (2007), Sánchez (2018).

The Malmquist Productivity Index (1) is defined as:

$$MI = \left[\frac{\delta^1((x_0,y_0)^2)}{\delta^1((x_0,y_0)^1)} \; x \frac{\delta^2((x_0,y_0)^2)}{\delta^2((x_0,y_0)^1)}\right]^{1/2} \quad (1)$$

The productivity change between periods *t* and *t + 1* is measured by M_0. Therefore productivity declines if $M_0 > 1$, remains unchanged if $M_0 = 1$, and increases if $M_0 < 1$. The first part of the formula inside the bracket measures the magnitude of technical efficiency change from period *t* to period *t + 1* (catch-up). The latter part of the formula measures the shift in the frontier between *t* and *t +1* (frontier-shift) (Cooper *et al.*, 2007; Cooper *et al.*, 2004; Vrabková and Vaňková, 2015).

The described catch-up effect in an input-orientation can be calculated as follow (2) (Vrabková and Vaňková, 2015):

$$\text{Catch-up} = \frac{BD}{BQ} / \frac{AC}{AP} \quad (2)$$

3 Results and Discussion

Three models were created. The Malmquist Productivity Index was applied for the years 2015 to 2018 (MI 1), 2015 to 2020 (MI 2) and 2018 to 2020 (MI 3) for all 16 German federal states. This makes it possible to see the extent to which the efficiency of general hospitals in the individual German federal states has changed over the respective time periods considered and whether there have been "frontier shifts" or innovations. The productivity change results indicate whether the productivity of individual DMUs has

- improved when $M_0 < 1$,
- remained the same if $M_0 = 1$
- or has deteriorated, if $M_0 > 1$.

See Appendix 1 for compehensive data, like the list of DMUs and results.

3.1 MI 1

Figure 2 shows the results of the input-oriented Malmquist Productivity Index calculation for 2015 to 2018, with a range of productivity change from 0.980 (DMU 5 Bremen, best result) to 1.048 (DMU 4 Brandenburg, worst result).

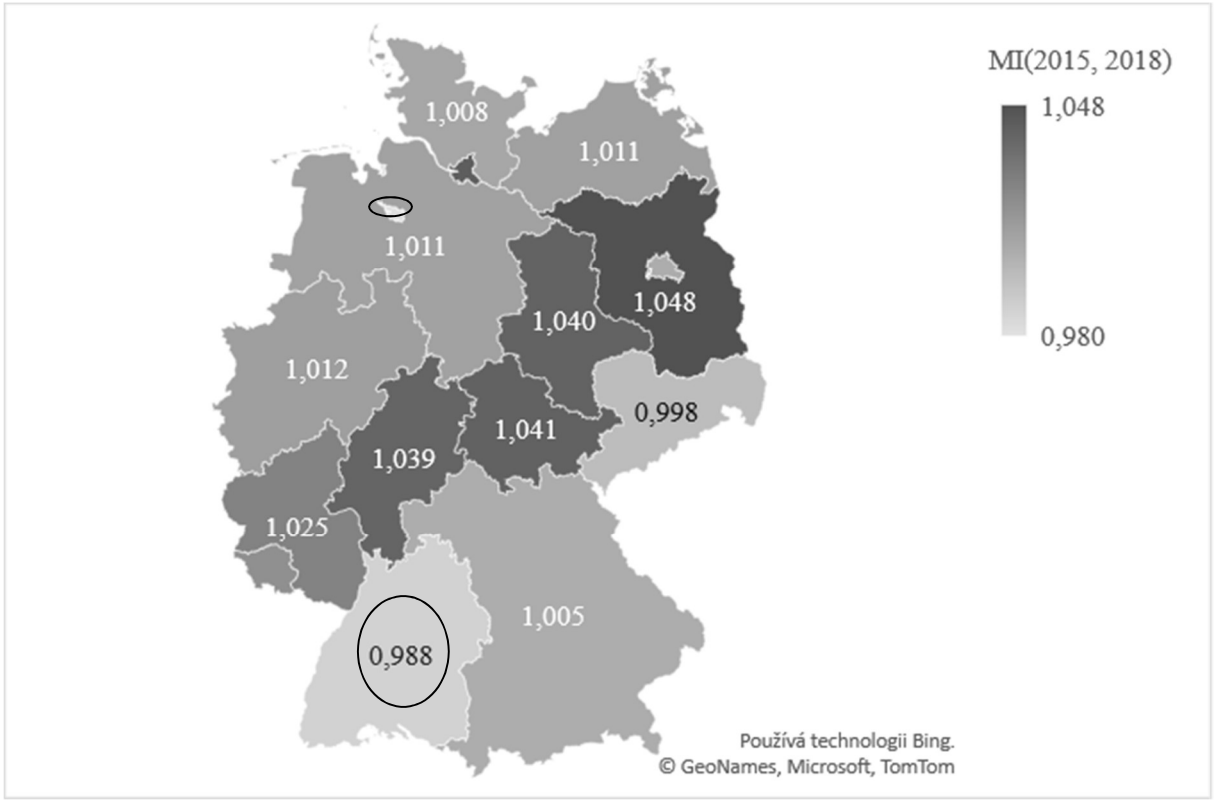
It can be observed that only two DMUs can show improved productivity (DMU 1 with 0.988 and DMU 5 with 0.980). DMU 5 is also a city state and can be seen as a smaller bright dot on the figure. Thus, the 186 general hospitals in Baden-Württemberg (DMU 1) and the 12 general hospitals in the city-state of Bremen (DMU 5) were able to increase efficiency and improve productivity.

Table 3 - Aggregate results of the MI 1 modelling

Malmquist Index	Number	DMU (incl. ranking)
Productivity increase $M_0 < 1$	2	1, 5
Equal productivity $M_0 = 1$	1	13
Deteriorated productivity $M_0 > 1$	13	2,3,4,6,7,8,9,10,11,12,14,15,16

Source: Own processing

Figure 2 - Graphical results of the MI 1 modelling



Source: Own processing

3.2 MI 2

Figure 3 shows the results of the input-oriented Malmquist Productivity Index calculation for the years 2015 to 2020, with a range of productivity change from 1.108 (DMU 1 Baden-Württemberg, best result) to 1.298 (DMU 4 Brandenburg, worst result).

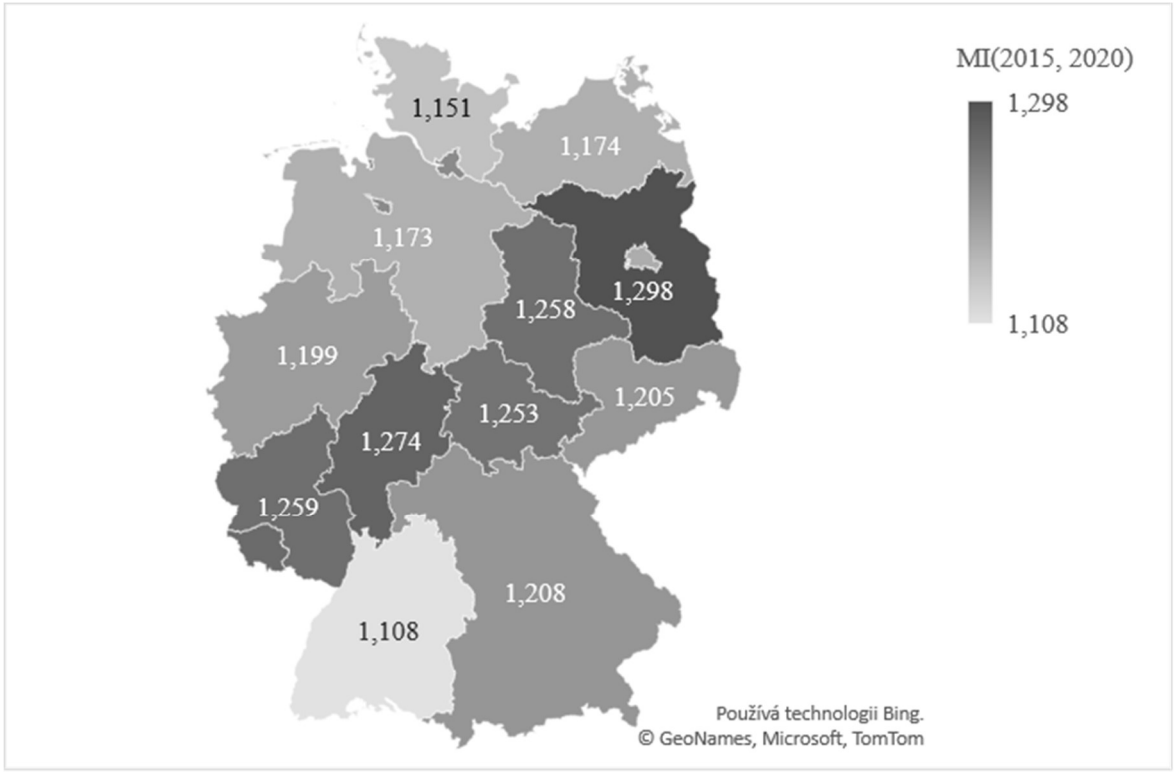
No federal state was able to increase the productivity of general hospitals from 2015 to 2020. All 16 states have deteriorated productivity, with six DMUs below the 1.200 MI value and DMU 1 (Baden-Württemberg) having the lowest deterioration value 1.108 (Table 5).

Table 4 - Aggregate results of the MI 1 modelling

Malmquist Index	Number		DMU
Productivity increase $M_0 < 1$	0		0
Equal productivity $M_0 = 1$	0		0
Deteriorated productivity $M_0 > 1$	16		1-16

Source: Own processing

Figure 3 – Graphical results of the MI 2 modelling



Source: Own processing

Table 5 - Benchmark of efficiency change results of the MI 2 modelling

Malmquist Index	Number	DMU (incl. ranking)
Deteriorated productivity 1,108-1,999	6	1, 15, 9, 8,3,10
Deteriorated productivity 1,200-1,298	10	13,2,5,6,16,14,11,12,7,4

Source: Own processing

3.3 MI 3

Figure 4 illustrates the results of the input-oriented Malmquist Productivity Index calculation for 2018 to 2020, with a range of productivity change from 1.112 (DMU 1 Baden-Württemberg, best result) to 1.269 (DMU 12 Saarland, worst result).

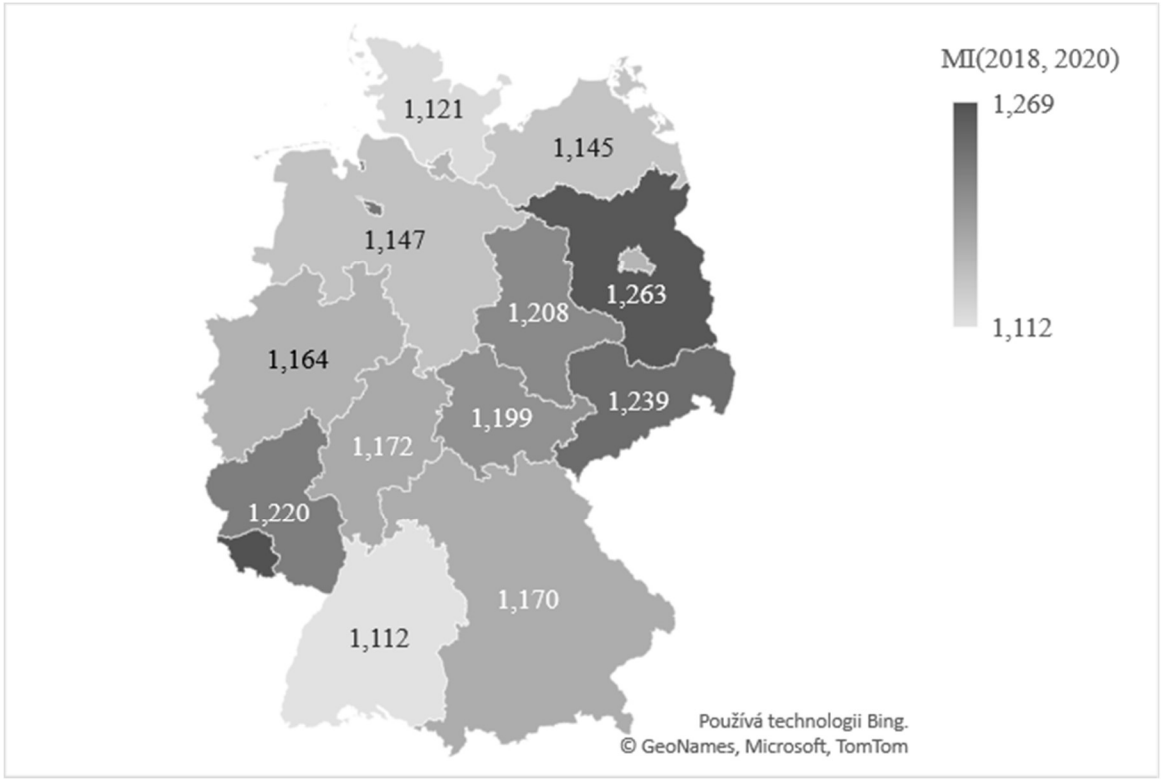
In the most current time period of 2018 to 2020, no federal state was able to increase the productivity of general hospitals once again. All 16 states have deteriorated productivity, with 10 DMUs below the 1.200 MI value and DMU 1 (Baden-Württemberg) having the lowest deterioration value (Table 7).

Table 6 - Aggregate results of the MI 1 modelling

Malmquist Index	Number	DMU
Productivity increase $M_0 < 1$	0	0
Equal productivity $M_0 = 1$	0	0
Deteriorated productivity $M_0 > 1$	16	1-16

Source: Own processing

Figure 4 - Graphical results of the MI 3 modelling



Source: Own processing

Table 7 - Benchmark of efficiency change results of the MI 2 modelling

Malmquist Index	Number	DMU (incl. ranking)
Deteriorated productivity 1,112-1,999	10	1,15,8,9,6,3,10,2,7,16
Deteriorated productivity 1,200-1,298	6	14,11,5,13,4,12

Source: Own processing

4 Conclusion

In summary, the results show that general hospital productivity improved only in Bremen (DMU 5) and Baden-Württemberg (DMU 1) from 2015 to 2018. In subsequent years, all states in Germany show deteriorating general hospital productivity. Nevertheless, the state of Baden-Württemberg (DMU 1) stands out positively in all periods considered. While its general hospitals still occupy second place in the first observation period and show an improvement in productivity, they are in first place in the further observation periods 2015 to 2020 and 2018 to 2020; despite a deterioration in productivity in these periods. Accordingly, it can be concluded that the input use of beds, physicians, and other non-physician personnel per 1,000 population are most efficiently used in this federal state across the time periods.

Furthermore, it can be said that the most recent period under review, 2018 to 2020, shows changes in productivity. While the majority of the German federal states were still in the worse range of over 1,200 MI in the period under review from 2015 to 2020, only six federal states are still in this range in the period from 2018 to 2020. Accordingly, the deterioration value of four federal states has decreased slightly. This could be partly due to the drastic changes in the COVID-19 pandemic that has occurred since 2020. Treatment rates have decreased from 22,670.7 in 2018 and 22,673.2 in 2019 to 19,570.1 per 100,000 population in Germany in 2020. Accordingly, resources that were used have been appropriately adjusted and relatively efficiently used.

Nevertheless, it is clear that although the state of Baden-Württemberg achieves the best productivity results in comparison, the productivity of all German federal states is steadily deteriorating. Thus, political decision-makers at state and local level for public general hospitals as well as private and non-profit operators of general hospitals are required to successively increase the efficiency - and thus the productivity in the long term - of general hospitals in all German federal states.

To this point, there have been no adequate considerations of hospital efficiencies and declining productivity, nor any concrete and up-to-date proposals for solutions, at either the federal or the individual state level. In March 2022, the Federal Ministry of Health announced that a key point for improving quality and increasing efficiency in the healthcare system is to strengthen competition between service providers (such as hospitals and contract physicians) and health insurers. Thus, the federal government states that it is primarily the competitive aspect that should be strengthened. However, concrete proposals and measures to strengthen competition are not mentioned by the federal government (Federal Ministry of Health, 2022). Also, the declining productivity of hospitals is not sufficiently considered by the federal states. For example, on 23 March 2022, the Ministry of Social Affairs, Health and Integration in Baden-Württemberg issued the following statement at the request of a political group in the state parliament on the financing of hospitals in Baden-Württemberg in response to the question as to why hospitals in Baden-Württemberg, despite their effectiveness compared with the rest of Germany, nevertheless make annual losses in the millions: The main reason for the difficult economic situation of hospitals in Baden-Württemberg does not lie in the area of investment funding, but in the area of insufficient funding of operating costs. They point out that the operating costs, such as personnel and material costs, are simply higher in Baden-Württemberg than in many other federal states. Thus the ministry refers only to the monetary and financial dimension. However, there is no mention of efficiency gains through the reduction and improved use of input factors such as the number of physicians, nursing staff or beds (State Parliament of Baden-Württemberg, 2022). In conclusion, the results of this study show that the productivity of general hospitals in all states is declining and that policy makers responsible for public general hospitals, as well as private and non-profit general hospital providers, need to take urgent action to improve productivity, especially given the ongoing additional burden of the COVID-19 pandemic on the health care system.

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Appendix 1

	DMUs	MI(2015, 2018)	MI(2015, 2020)	MI(2018, 2020)
1	Baden-Württemberg	0,988	1,108	1,112
2	Bayern	1,005	1,208	1,170
3	Berlin	1,005	1,177	1,161
4	Brandenburg	1,048	1,298	1,263
5	Bremen	0,980	1,223	1,229
6	Hamburg	1,043	1,224	1,161
7	Hessen	1,039	1,274	1,172
8	Mecklenburg-Vorpommern	1,011	1,174	1,145
9	Niedersachsen	1,011	1,173	1,147
10	Nordrhein-Westfalen	1,012	1,199	1,164
11	Rheinland-Pfalz	1,025	1,259	1,220
12	Saarland	1,019	1,265	1,269
13	Sachsen	0,998	1,205	1,239
14	Sachsen-Anhalt	1,040	1,258	1,208
15	Schleswig-Holstein	1,008	1,151	1,121
16	Thüringen	1,041	1,253	1,199

Source: Own processing

The Role of Ethnic Diversity in the Regional Development - the Case of German Minority in the Opole Province

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Abstract

Nowadays, the role and importance of ethnic groups play an increasingly crucial role and thus they constitute challenges of the twenty-first century. There is no doubt that contemporary events, especially in the context of the war in Ukraine or Afghanistan, have a direct impact on today's ethnic image of the world. Which, in turn, significantly affects all aspects of economic and social development. Thus, it seems that ethnic groups should be a permanent element of regional development, as well as a key factor in achieving sustainable regional development.
The Opole Province constitutes the most ethnically distinct Polish area that is characteristic of a high concentration of the German-originated population. Up-to-date research studies have shown different characteristics of the Silesian population of German origin resulting from unique cultural and civilizational roots and a different systems of values, which causes different effects in the social and economic spheres. The paper aims to show the role of ethnic diversity from a regional perspective. The method chosen for this study is a survey, carried out among local government officials, who expressed their opinions on whether the ethnic diversity of the region, and thus the occurrence of the German minority, has a notable positive impact on the tolerance of the region's inhabitants towards other nationalities and ethnic groups, and whether, this ethnic diversity in the context of German minority has a positive influence on the image of the region as a region open to otherness, tolerant and integrated. The local government officials also considered the role of the ethnic diversity in improving the educational and cultural offer in the region, as well as in the enrichment of the common cultural heritage. The paper concludes with an overview of the positive features that an ethnic group can constitute from a regional perspective.

Keywords: *ethnic diversity, German minority, national and ethnic minorities, regional development, Silesian population of German origin in Poland*

JEL Classification: *F22, J00*

1 Introduction

In today's world, the role and importance of ethnic diversity is playing an increasingly important role. Not only in connection with globalization, but above all in the context of the recently burning problem of refugees, especially from Ukraine.

From an economic perspective, ethnic diversity can be interpreted in two ways. On the one hand, the ethnic factor has become a driving force for achieving common political, economic, and social goals. From this point of view, ethnic diversity can influence regional development, in particular there is a notable positive impact on productivity, competitiveness, entrepreneurship, innovation [Ottaviano and Peri, 2006; Nathan, 2011; Nathan and Lee, 2013; Lee, 2015], tolerance towards other nations and ethnic groups. On the other hand it may

influence development disproportions. Ethnic diversity can be a threat to national integrity and national security maintenance, thus undermining sustainable development.

Confirmation of this can be the conflict theory, which suggests that cognitive biases affect ethnically diverse societies. Firstly, it follows from the theory of social identity that in a group favoritism, called homophilia, results from the psychological benefits of association with those who are just like us [Bobo, 1988; Olzak, 1992]. Secondly, it claims that mating between ethnic groups can lead to perceived and real ethnic competition that helps explain why groups struggle for control of limited resources or modernization spoils [Bobo, 1988; Olzak, 1992]. Thirdly, Blalock's [1967] theory of "racial threat" is often used by conflict theorists to suggest that majority groups may use their advantages to control minorities, spreading prejudice and propagate stereotypes against them.

Basically, the attitude of governments and societies towards minorities and ethnic groups is also an important issue, as it still happens that minorities are ignored or discredited and their rights seem to be not respected [Cashmore, 2002; Gerring *et al.,* 2018, Gibney, 2020].

However, in the relation to the migration crisis, ethnic diversity can be considered in the framework of a relationship with the social capital [Laurence, 2011; Fernando and Pendakur, 2014; Meer and Tolsma, 2014; Thomas, 2014; Koopmans and Schaeffer, 2016; Carling and Schwel, 2018; Crawley and Skleparis, 2018; Fitzgerald, 2020).

Nevertheless, the assessments made by Alesina and Ferrara [2005] indicate both, the positive and negative effects of ethnic diversity on economic policies and outcomes. The main focus is on the countries, regions, cities in developed countries and on villages in developing countries. The findings show that the potential benefits of heterogeneity come from variety in production.

The costs come from the inability to agree on common public goods and public policies. However, the benefits in production from variety in skills are more likely to be relevant for more advanced societies. Research indicate that rich democracies are more capable of dealing with ethnic diversity [Alesina and Zhuravskaya, 2011].

The results also show that the negative impact of ethnic diversity is significantly mitigated by the presence of appropriate institutions promoting ethnicity. In addition, ethnic fragmentation is negatively correlated with a measure of the quality of infrastructure, illiteracy and school achievement and positively correlated with infant mortality [Alesina *et al.*, 2002].

Though, according to Akay *et al* [2017] ethnic diversity, measured by immigrants' nationalities, influences the well-being of the host country. The authors find a positive effect of ethnic diversity on the well-being of German natives. The positive effect of ethnic diversity is stronger for immigrant groups that are culturally and economically closer to Germany. Researchers highlight the welfare benefits of greater diversity and importantly, it is diversity in each region that positively correlates with well-being, but not diversity across the region.

The literature of the subject indicates that ethnic diversity can positively stimulate the education process, particularly language skills [Maestri, 2017]. What is more, diverse ethnic environment and backgrounds provide valuable experience and skills for new educational, community, and workplace settings [Nishina *et al.,* 2019]. Moreover, ethnic diversity can benefit students' mental health, intergroup attitudes, and school adaptation [Graham, 2018].

Regions inhabited by national and ethnic minorities are characterized by an outstanding knowledge of foreign language skills among their inhabitants. The study of Maestri [2017] proved that ethnic diversity positively effects the test scores of minority students, principally the language skills. Basically ethnic diversity stimulates language proficiency and increases the time students spend studying.

In addition, Mickiewcz *et al*. [2019] considered the impact of ethnic diversity and immigration on entrepreneurship, distinguishing between individual characteristics and environmental characteristics. The authors assumed that as ethnic diversity increases, the probability of engaging in initial activities decreases.

The aim of the article is to show the role of ethnic diversity in the modern world, especially in the context of the development and perception of regions. The method chosen for research is the analysis of the literature on the subject and existing research, as well as own research, conducted among local government officials on their opinion on ethnic diversity, in this case the German minority in the context of regional development.

2 Material and Method

At the present time, the importance of the ethnic factor plays an increasingly important role, and the issues of ethnicity and multiculturalism have become one of the important dilemmas in reflections on the directions of the future development of humanity.

In Poland, the region where ethnic and national differences are most strongly visible is the Opole Province, in which, after the post-war changes of borders, a large concentration of people of German origin remained, not only ethnically different from other Polish inhabitants, but previously remaining in a different cultural and civilizational sphere, distinguished by a different system of values and different patterns of behavior. This group is also distinguished by formal and legal differences, which means that due to their origin they have, in addition to Polish citizenship, also German citizenship or the right to obtain it.

The political breakthrough in 1989 enabled this group to undertake a number of initiatives and activities generally concentrated in the organizations of the German minority. On the other hand, related with the political transformation, the opening of borders allowed for freedom of travel and the possibility of using the privilege of having German citizenship, which was impossible in the case of other citizens with only Polish citizenship. This meant that this population began to work abroad when the profitability of working abroad was still very high. This was due to the very favorable wage and currency conditions of earning in Germany.

Accordingly, the economic migration of people of German origin has become a key factor for the area of their residence, namely the Opole region, determining the high, although diverse, standard of living of its inhabitants. Other economic effects are relatively low unemployment and the transfer of huge amounts of earnings to support the demand for goods and services.

There is no doubt that the economic emigration of the population of German origin, especially the one taking place in the 90s, would not have been possible if it had not been for the dynamically operating organizations of the German minority at that time and the possibility of confirming German citizenship [Jończy and Łukaniszyn-Domaszewska, 2018].

It should also be emphasized that the transfer of money earned from emigration has created good conditions for conducting business activity in the central-eastern part of the Opole Voivodeship, namely where the German minority lives. What's more, it made the average disposable income of the inhabitants of the Opole region the highest in the country in the years 2008-2012. This is confirmed by the results of "Social Diagnoses", according to which the Opole region had the best living conditions in the country at that time [Czapiński and Panek, 2005, 2009, 2015].

Currently, the population of German origin in the Opole region counts about 200,000 people, which is thus about one fifth of the inhabitants of the entire region, and lives in mostly rural areas of the central-eastern Opole Province, where numerically prevails and lives for generations. This area is distinguished from other Polish areas not only by cultural and ethnic diversity, but also by a number of other important features, e.g. intensive economic emigration, relatively low levels of unemployment, urbanization, strongly developed infrastructure, industrialization [Jończy and Łukaniszyn-Domaszewska, 2018].

It seems that many of these features are directly related to the population of German origin living in this area and the activities of its organizations, which have a significant impact both on the socio-economic diversity of the area and on the directions of its development, and thus on the development of the entire Opole region, causing a number of consequences, primarily economic, but also social, cultural and political occurring only in this area.

It should also be added that the Opole Province was chosen for the research area because it is characterized by the largest share of the population of German. In addition, this region is relatively small, so the effects of the activity of this population should be clearly noticeable in it.

The research method used in this study was aimed at obtaining, presenting and interpreting the social assessment of the German minority in the region of its residence. In order to make findings in this respect, a survey was carried out, to which representatives of the self-government sphere of the Opole Province were subjected.

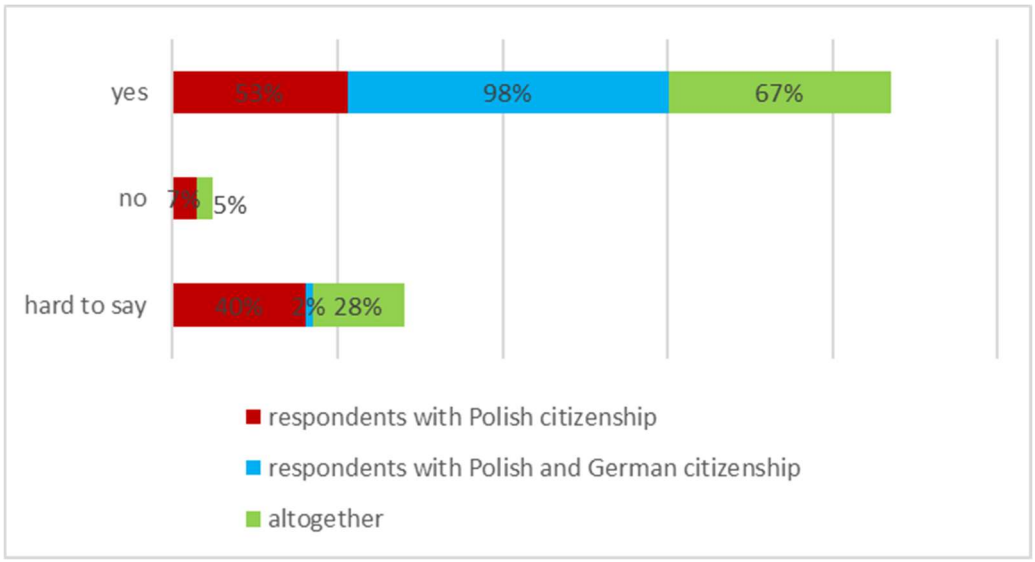
The questionnaires were addressed to 183 local government officials of the Opole region at the aforementioned levels, of which 124 questionnaires were completed and returned, which constituted 68% of the surveyed population. The study was complemented by in-depth interviews with local government officials of the Opole region.

3 Results

The most important conclusion resulting from the conducted analyses confirms that the ethnic diversity in the form of German minority has a positive impact on the socio-economic development of the Opole Province, causing a number of economic, social, cultural and political consequences, occurring only in this region. The surveyed group of local government officials of the Opole Province was divided into those who have only Polish citizenship (68% of all respondents) and those with dual citizenship, both Polish and German one (32% of all respondents).

In the opinion of the majority of respondents, representatives of local authorities in the region (67%) the ethnic diversity has a positive impact on the socio-economic development of the Opole Province. Despite the appearance of some discrepancies in assessments, in the case of dividing the surveyed population of local government officials according to the type of citizenship they hold, both the vast majority of respondents with German origin (98%), as well as most of the respondents from the Polish group (53%) agreed with the thesis that the ethnic diversity has a positive impact on the socio-economic development of the Opole region (Fig.1).

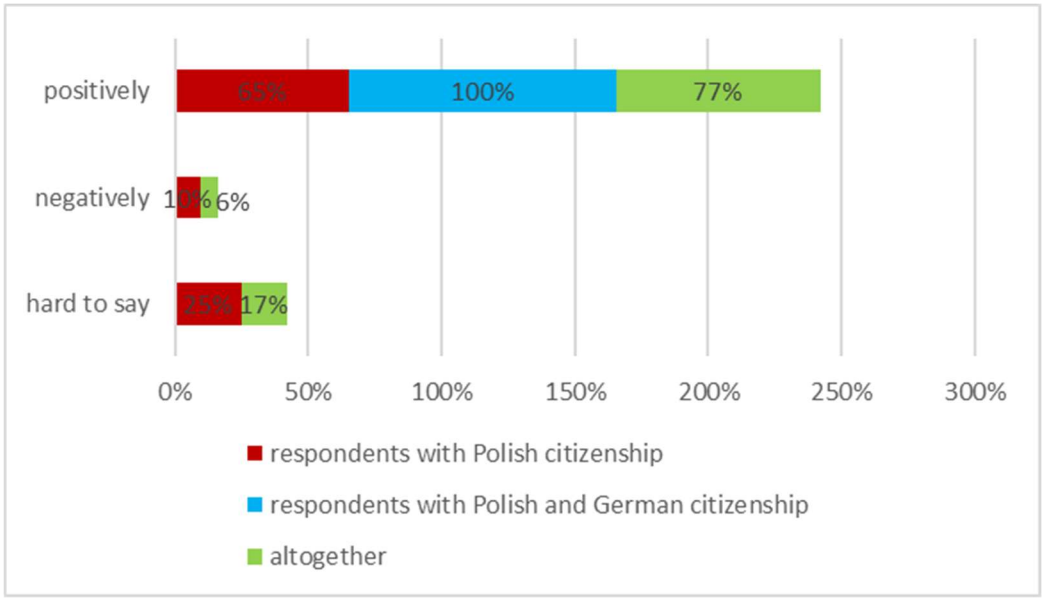
Figure 1 - Respondents' answers to the question: Does the ethnic diversity have a positive impact on the socio-economic regional development of the Opole Province?



Source: Own elaboration.

The analyses and studies conducted in the local government environment also confirmed the influence of the German minority on enriching the educational and cultural offer in the region. Research conducted in the local government environment, which proved that the majority of the surveyed local government officials from the Polish group (65%) and all respondents from the German group made a positive assessment of the wider offer of the German language in schools in the region. Nevertheless, 10% of respondents with Polish citizenship rated the wider offer of German in schools negatively (Fig.2).

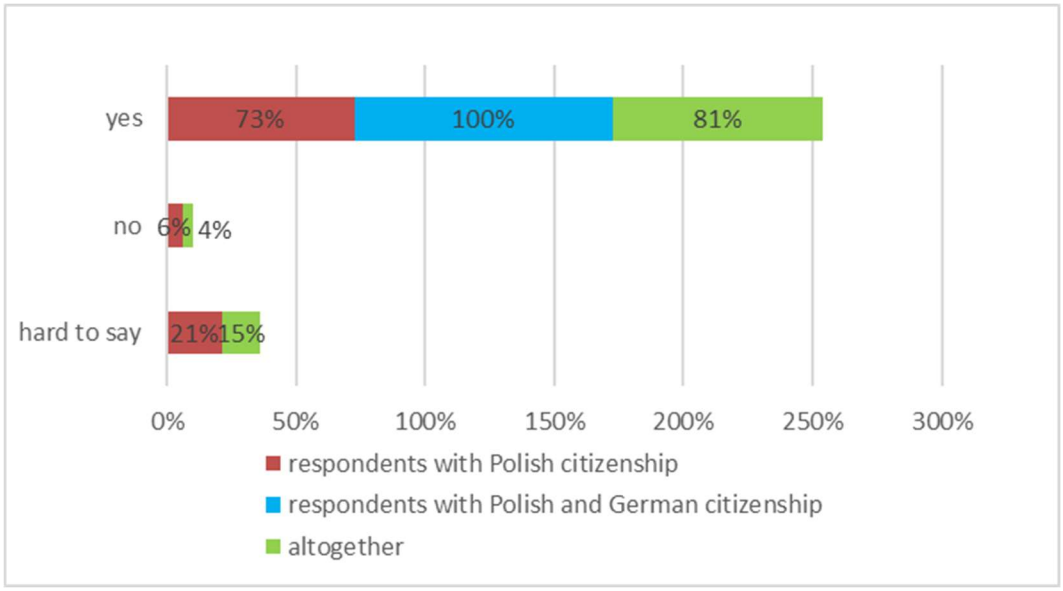
Figure 2 - Respondents' answers to the question: How do you assess the wider offer of the German language in schools in the Opole Province?



Source: Own elaboration

The conducted research has shown that ethnic diversity increases the achievements in the field of common cultural heritage. This thesis was confirmed by 73% of respondents with Polish citizenship and all respondents with Polish and German citizenship (Fig.3)

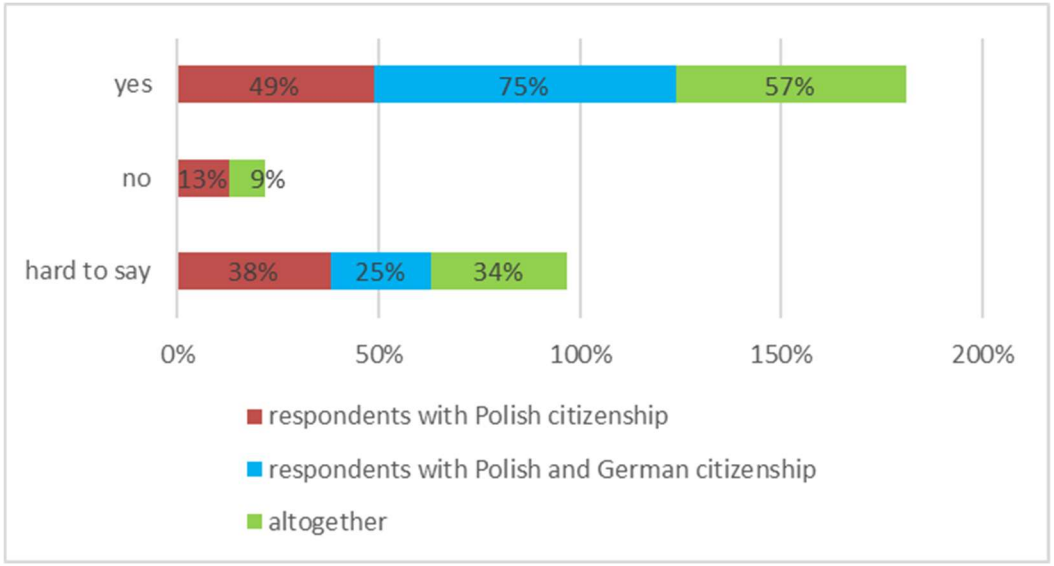
Figure 3 - Respondents' answers to the question: Does the ethnic diversity increase the achievements of the common cultural heritage?



Source: Own elaboration

Studies have also shown that the ethnic diversity of the region has an impact on the greater tolerance of its inhabitants towards other nations and ethnic groups. This thesis was confirmed by 57% of the surveyed local government officials (Fig.4).

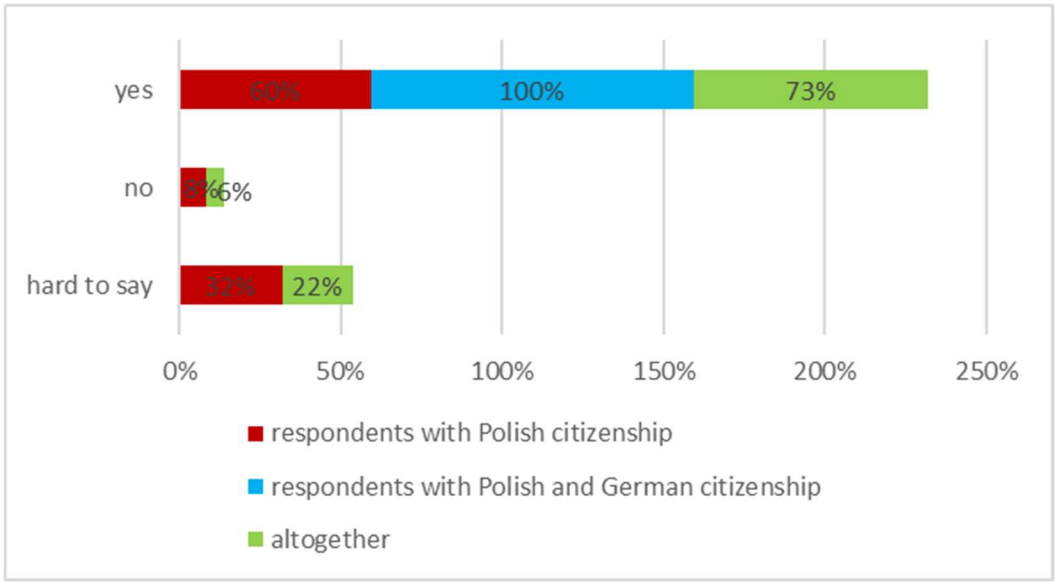
Figure 4 - Respondents' answers to the question: Does the ethnic diversity of the Opole Province influence on the greater tolerance of its inhabitants towards other nations and ethnic groups?



Source: Own elaboration

The last presented aspect is an issue, whether the ethnic diversity has a positive impact on the image of the Opole Province as an integrated region, open to other nationalities and ethnic groups. Almost three-quarters of the surveyed local government officials confirmed that ethnic diversity has a positive impact on the image of the Opole region as a region open to other cultures, nationalities and ethnic groups (Fig.5).

Figure 5 - Respondents' answers to the question: Does the ethnic diversity of the Opole Province influence on the positive image of the region as an integrated region, open to other nationalities and ethnic groups?



Source: Own elaboration

4 Conclusions

Studies have shown that the ethnic factor plays an important role in the regional development. Analysis of the literature on the subject indicates that ethnic diversity can have a positive impact on language skills, innovation and entrepreneurship [Maestri, 2017; Graham, 2018; Mickiewicz *et al*., 2019; Nishina *et al.,* 2019].

This is confirmed by research conducted in the local government environment, which clearly shows that ethnic diversity in this case the German minority has a notable positive impact on the socio-economic development.

The study has shown that local government officials of the Opole region positively assessed the role of the German minority in the development of the region, especially in the context of its impact on the image of the region as a region of open, tolerant and integrated people.

This impact is also noticeable and appreciated in the context of high German language skills among inhabitants of the Opole Province, enriching the culture of the region, as well as co-creating a common cultural heritage.

The ethnic diversity positively stimulates the education process, in particular the language skills. At this point, it is necessary to emphasize the significant role of the German minority in the sphere of education, especially learning German in schools and kindergartens, which is a privilege that can be used by all young inhabitants of the province.

This creates a huge opportunity and potential for the Opole region, especially in the context of attracting foreign investment, as well as from the perspective of the competitive advantage of young inhabitants of the Opole region also on foreign labor markets. It turns out that the presence of the German minority influenced on the very good German language skills among the inhabitants of the region. This is confirmed by the fact that more and more international companies choose the Opole region for their location, and justify it with a very good knowledge of German among the inhabitants of the region (it can be mentioned here: Capgemini, IFA, Ifm Ecolink, Ista, Opta data, PwC, Prixpol, Polaris, Stefanini and others).

The literature on the subject also points to the impact of ethnic diversity on the well-being and quality of life of the inhabitants of the regions [Akay *et al*., 2017]. This is also confirmed by the Opole region, which for many years has been at the forefront of Polish regions with the highest quality of life [Czapiński and Panek, 2005, 2009, 2015].

However, it should also be emphasized that ethnic diversity can also have negative effects specifically within the functioning of the educational and care systems, as well as social or cultural areas for the current population of the given territory. In the context of refugees, their influx can certainly lead to increased financial demands on the public budgets of the local/regional or national level of any receiving state in Europe.

It should also be considered that the influx of ethnic groups from countries with a relative lower level of the socio-economic development can cause negative changes in the society.

For example, the current mass migration from Ukraine to Poland is having an impact on the housing market in that country. This situation has led to an increase in prices and rents, which is particularly noticeable in the rental market and in energy prices. Also of concern are the excessive use of social benefits, the overburdening of the health care system, as well as the major challenges in the education system and the lack of daycare and kindergarten places.

Nevertheless, the presented research and analyses, as well as assessments made by local government officials show that the ethnic factor – in this case the German minority – is an important and positive feature, which is of a great value from the regional perspective.

It should be concluded that currently the presence and expansion of various ethnic groups, as well as national and ethnic minorities or refugees, are a huge challenge for the modern world, both in social and economic aspects.

Currently, in particular the European countries, especially in the context of refugees from Ukraine, have to meet the challenge of managing ethnic diversity, especially through integration policies. This may include encouraging inter-ethnic communication using common languages, supporting ethnicity mixing through urban planning, participation in civic life and inclusive political institutions, promoting a common national identity.

Therefore, regional authorities should exploit the potential of proper management of ethnic diversity because ethnic groups undoubtedly should constitute an eternal component of regional development and a significant feature in achieving sustainable development.

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Perception of Harmonious Communication in the Opinion of Young Generation of Czech and Chinese Inhabitants

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Abstract

The article discusses harmony and its importance in interpersonal communication. The text presents the results of research conducted among Chinese and Czech students from the University of International Business and Economics in Beijing (对外经济贸易大学) and the VŠB - Technical University of Ostrava (VŠB - Technická Univerzita Ostrava) in 2017 and 2018. Due to the fact that communication between representatives from culturally different countries requires additional understanding of intercultural differences, which might be of particular importance in future trade, both in the case of running small and large joint projects, the article aims to indicate the similarities and differences in perception of harmony in communication by representatives of the young generation of the inhabitants of both countries.

Keywords: *culture, Czech Republic, economic culture, harmony, intercultural differences, People's Republic of China*

JEL Classification: *D83, Z19*

1 Introduction

The communication in business concerns the exchange of information for the needs of business, in the simplest form – sending and receiving messages within the organization and between the enterprise/ elements of the organization and broadly understood external environment (being the part of both the domestic and foreign market). Therefore, communication might take place on the interpersonal level [Hafskjold et al., 2015] (both face to face or in an indirect way, for example, by means of modern technology) and on the group level (between employees of an enterprise and between an enterprise and external market groups), both up (e.g. with superiors) and down (e.g. with subordinates), and horizontally (e.g. with people from the same department) within organizational structure. The importance of business communication is also emphasized in fields such as: business meetings (e.g. conferences, fairs), preparation of reports and multimedia presentations, instructional videos, announcements, letters, offers, advertisements, subscriptions, speeches, writing tests for magazines published by an enterprise, etc. In this article, the issue of communication has been examined in the aspect of interpersonal communication in the international business environment.

In the workplace, soft skills are increasingly recognized as important and valuable [Touloumakos, 2022]. Despite the observation that the era of global communications is now in full swing [Noort, 2021], differences in communication are noticeable among partners representing different cultural backgrounds. It applies to various spheres of life, both private and professional. In the workplace, differences in the way of communicating depending on culture may apply to both communication within an organization, as well to the communication used between the organization and elements of its environment (including service providers and service users [Zhao, 2021]), as well as other parts of the environment - e.g., via social network platforms [Zhang et al., 2022].

In communication in the international environment, the key word is *culture* which determines the behaviour of each side of business partners. The field of communication is also related to the theoretical and practical issues

of the development of the cultural borderland. The People's Republic of China and the Czech Republic do not border each other directly but are linked under the Belt and Road Initiative (OBOR/ BRI).

Analyzing the dimensions of culture devised by Geert Hofstede, which characterize the citizens of China and the Czech Republik, it can be noticed that some of the characteristics describing the two countries seem to have elements of similar value. It especially concerns the dimensions such as: *masculinity* (China – factor 66, the Czech Republic – 57); *long term orientation* (respectively: 87 and 70), as well as *indulgence* (24 and 29). However, significant differences are visible in the following spaces: *individualism* (20 and 58), which differentiate depending on the level of interdependence among the members of society; *uncertainty avoidance* (30 and 74) and *power distance* (80 and 57), which indicate that the representatives of the two countries have different approach to equal treatment of citizens [Compare countries, Hofstede Insights].

In Chinese culture, the category of *harmony* (和谐) plays an important role. This category with Chinese specificity concerns a much broader range than in the Czech Republic. Issues related to the theme of harmony are the most often analyzed in connection with the Confucian philosophy, specifically with the *doctrine of the mean* (中庸) or the idea of the *great harmony* (大同). Its roots can be found in much earlier texts, for example, the *Book of Changes* (易经), which was used not only by Confucius' followers, but also by Taoists. A series of characters assigned to harmony (among others, synonyms for 和谐, such as: 叶、融、怡、均衡、平衡、雍、燮、大同; symbolic: 太极 – *taiji*, 阴阳 – *yin-yang*, and even homophones: 鹤 – *crane* and 河蟹 – *crab* [the symbols of harmony are described in more detail in: Mazur-Włodarczyk, 2021] also indicate how deeply-rooted it is in the language and culture of the Middle Kingdom. Similarly to its connections with, among others: the way of achieving physical and mental health, aesthetics determinants, key values of socialist society (社会主义核心价值观) and association with the model of economic growth – sustainable development (可持续发展). In Chinese space, the characters of *harmony* and its rich content are exceptionally conspicuous, they decorate urban areas in the form of banners and social billboards, informational posters, and they even appear as decorative elements of walls and buildings – examples are presented in the appendix (Figure 15 and 16).

In Europe, the category of *harmony* is mainly identified with Greek philosophy (i.a. related with: opposing things, harmony of numbers, justice, beauty, divine act of creation and theory of music) as well as with creating and practicing music, which in relation to the area of the Czech Republic, might be associated, for example, with music for wind instruments bands popular in the period of musical classicism or with music prepared for playing on a squeezebox [Rykowski, 2010] (instrument from the group of bellows-driven idiophones or aerophones). Contemporary perception of the *harmony* category in the Czech media is above all related to these fields, namely [Mazur-Kajta, Kovarova, 2019]: magazines and supplements for music magazines (also literature and politics); musical concerts and group of activities conducted as a part of children and youth through musical activity – children orchestras; additionally, it is associated with: exhibitions of works by Czech artists; artistic competitions related to craft; promotion of the southern region of the Czech Republic; physical and mental support centers, schools, hotels, restaurants, cafés, spas, social services providers for the elderly, companies producing goods that focus on relaxation and leisure. There was not found any article exclusively related to the issue of harmony in communication in the Czech Republic. Among studies devoted to communication (in generally aspects), the idea of harmony was presented as a sign of honesty, associated with credibility [Plamínek, 2009], or the category of harmony referred to adjusting one's own communication style to the communication style of the conversation partner [Bělohlávek, 2010].

However, it is difficult to find the results of empirical research on *harmony* in interpersonal relations concerning the Chinese and the Czechs. In view of the above, the aim of this article is to present the results of own research on harmonious communication, which were carried out in 2018 among the young generation of the Czechs – students of VSB - Technical University of Ostrava, and juxtaposing them with the results of research carried out in 2017 in China at the University of International Business and Economics in Beijing. In the text an attempt was made to present the group of similarities and differences in perceiving the category of *harmony* in communication by the representatives of the young generation of the residents of China and the Czech Republic. The two groups of respondents are geographically separated by the distance of over 7400 km and, apart from the language, also other cultural characteristics. The comparison of responses of both of the groups of respondents seems to be particularly useful due to the BRI [see: Sarker et al., 2018], within which the two countries undertook cooperation in 2016 as strategic partners.

2 Research Methods and Data

Two methods were used in the research – subject literature analysis and a questionnaire survey. Assuming that most of all effective communication is taken into consideration, in Słownik Języka Polskiego PWN the word *effective* (*efektywny*) is defined as *giving a good result, significant, real* [Efektywny, *Słownik Języka Polskiego PWN*]. A synonym for that word is *efficient* (*skuteczny*), whose definition according to the same source relates to

something that is *giving desired results* and, *whose activity brings effects* [Skuteczny, *Słownik Języka Polskiego PWN*]. *Effectiveness* (*efektywność*) is also combined with adjectives, such as *efficient* (*wydajny*) and *proficient* (*sprawny*). Nevertheless, according to Renata Winkler, these synonyms do not guarantee the occurrence of efficiency, because the aspect of real action and positive assessment due to a given criterion are necessary [Winkler, 2013, pp.156–159]. Effective communication was observed, among others, by Barbara Rzepka, Józef Penc, Leszek Kozioł, Grażyna Rosa, Tadeusz Listwan, Renata Winkler, Agnieszka Olsztyńska and Ricky W. Griffin. In their works, these authors referred to the fact that effective communication conditions are, among others: intention included in messages, specifically its consistency/ high similarity with information received by the recipient; motivational element encouraging interaction (need); feedback enabling specification or modification of the message; similarity of interlocutors related to education; level of cultural and social experience; creating clear, concise and full information; its significance, form and means – considered from the recipient's perspective; self-image – self-assessment; openness, behaviour in nervous situations – glaring emotions; roles adopted in a group; the pursuit of high/low material status and the occurrence of errors in communication, based on, for example, poor understanding, language and worldview differences, non-verbal and verbal communication inconsistency, etc.; credibility; maintaining integrity of communication with organizational culture of an enterprise and appropriate division of communication roles, as well as adapting activities to the needs of the current state [Rzepka, 2012, pp.10-27; Penc, 2010, p.111; Kozioł, 2019; Griffin, 2007, p.593; Listwan eds., 2000, p.220; Rosa, 2009, p.9; Olsztyńska, 2002, pp.169-170; Winkler, 2013, pp.179, 189]. Because effective communication in the field of work suits people who need clarity, it is related also to *openness* and *honesty* [Illes, Mathews, 2015, p.12]. Communication effectiveness can be divided into levels: full, high and low. The first one refers not only to the understanding of a communication, but also to taking action resulting in realization of established goals. The high level is related to receiving of the message and a chance of realization of those goals. However, the last of the levels takes place when a sender receives a communication, but the chance of realization of the goal is rather low [Gajdzik, Ocieczek, 2015, p.116]. Each of those levels depends on verbal and non-verbal communication [Nikołajew, Liśniewska, 2011, p.45]. According to Katalin Illes and Martin Mathews, for good communication with high quality information, emotional intelligence or interpersonal skills and understanding of intercultural differences are also necessary [Illes, Mathews, 2015, pp.13-14].

Due to the last of the abovementioned elements/conditions of effective communication and awareness of the importance of harmony in Chinese culture [Xiao, Chen, 2009; 陈斌斌, 李丹, 2009] a comparative study on the opinion of the students from universities located in the People's Republic of China and the Czech Republic was carried out. Polling was conducted in two ways. The first part took place in December 2017 among 198 students of economics majors at the University of International Business and Economics in Beijing (对外经济贸易大学). The second part took place in September 2018 and included 150 respondents of economics majors at VSB - Technical University of Ostrava (VŠB – Technická Univerzita Ostrava). The main tool used in the study was a questionnaire consisting of 14 questions related to the perception of the category of *harmony* and its role in interpersonal communication, as well as 5 questions concerning sociodemographic respondents' data. The survey was accompanied by single interviews carried out directly with the students.

The structure of the respondents was dominated by women (76% in the Chinese group and 71% in the Czech group), which is because of their higher number in the groups of students of economics majors at these universities. All the respondents were in the 18–34 age group and the majority of them was not professionally active (87% in the Chinese group and 67% in the Czech group).

3 Research Results

Harmony was defined by the respondents of both of the groups mainly as *balance* and social *order*. The two categories dominated both aggregate choices and in the form of the first choice – Figure 1 and 2. A distinct difference in interpretation was visible in the category of *cooperation*, which was chosen by 58% of the students from China and only 24% of the students from the Czech Republic. A large difference between the choices occurred also in the categories of *order* (the sum of 3 indications: China – 2% and the Czech Republic – 22%), *peacefulness* (respectively: China 12% and the Czech Republic – 24%) and *nature* (31%, 20%).

The representatives of both of the groups expressed their opinion that harmony is a basic value in interpersonal communication, as evidenced by 79% of the sum of positive responses among the Czech students and 87% among Chinese students. In the Chinese group, however, the certainty regarding the significance of this issue was more visible, in this group *firm yes* answers were dominant, whereas in the Czech group – *rather yes* was prevalent. Details can be seen in the Figure 3.

According to both groups of the respondents *knowing one's place in society* has an impact on achieving interpersonal harmony (the sum of positive answers: the Czechs – 78%, the Chinese – 84). Similarly, *settling*

rules of conduct within a given community (the Czechs – 92%, the Chinese – 88%), and *showing respect towards people with greater knowledge and experience* (75% and 83% respectively) – Figure 6; *justice* (90%, 72%) and *courtesy* (90%, 85%) – Figures 4–8.

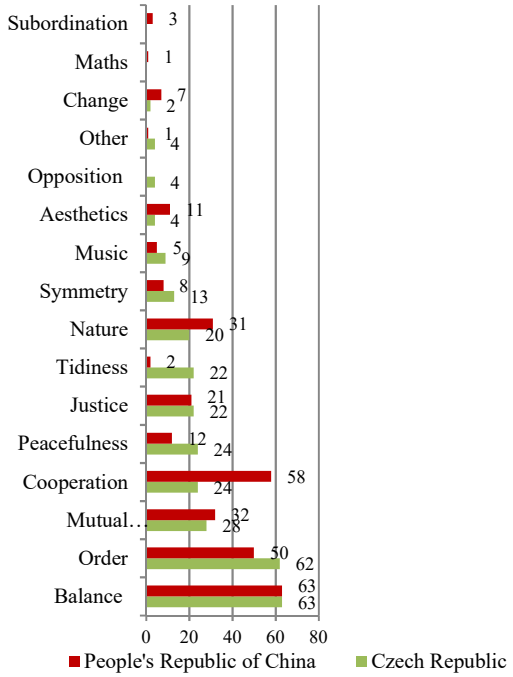
Behaviours not conducive to harmony included: *not showing respect towards the older* (the sum of positive answers: the Czechs – 80%, the Chinese – 76%) and *excessive standing out against the group*, both in the positive and negative sense (61% and 73% respectively) – Figure 9 and 10.

According to the respondents from both of the groups, giving wrong information on purpose does not really exclude the pursuit of harmonious interpersonal relations (the sum of positive answers: the Czechs – 35%, the Chinese – 54%) – Figure 11. It is in line with respondents' next statement that harmony in interpersonal relations is more important than getting to know the truth (the Czechs – 23%, the Chinese – 33% respectively) – Figure 12. However, in the case of the two questions above, the certainty about these issues more often concerned the Chinese group, rather than the Czech one (the sum of negative answers: the Czechs – 27% and 45, whereas the Chinese – 18% and 43%).

Moreover, in the respondents' opinion, both the representatives of their own social group and people outside of it strive for harmony. In view of that, belonging to other group is not really a factor that would shatter harmony (the sum of negative answers: the Czechs – 34%, the Chinese – 42%) – Figure 13. Similarly, public expression of one's opinion that is different than the opinion of the group, does not have a particularly big impact on striving for interpersonal harmony (the Czechs – 31%, the Chinese – 41%) – Figure 14.

Figure 1 (left) – Defining the category of harmony by representatives of the Czech Republic and People's Republic of China – the sum of three choices [%]

Figure 2 (right) – Defining the category of harmony by representatives of the Czech Republic and People's Republic of China – the first choice [%]



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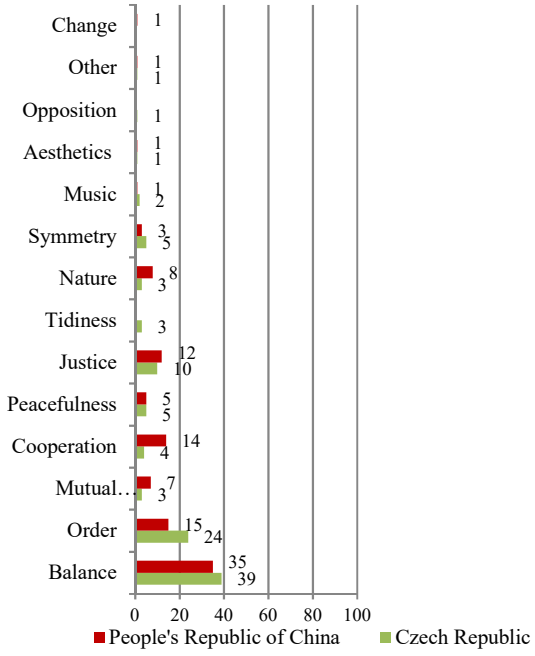

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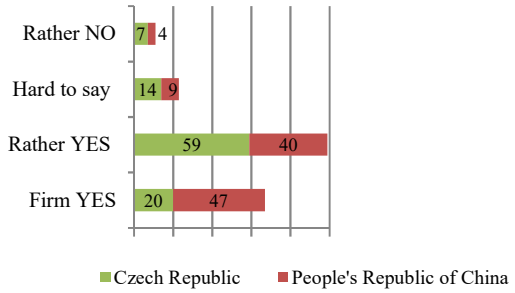
Figure 3 (left) – Harmony as the basic value of interpersonal-communication [%]

Figure 4 (right) – Elements affecting harmony – *knowledge of one's place in society* [%]



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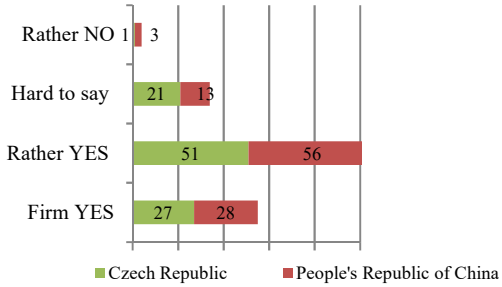

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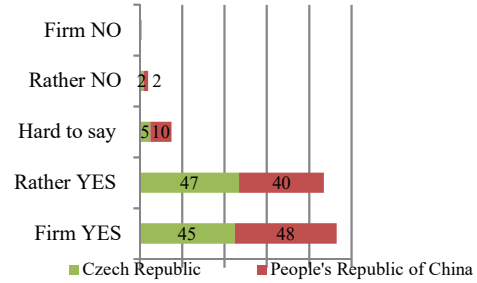
Figure 5 (left) – Elements affecting harmony – *settling rules of conduct* [%]

Figure 6 (right) – Elements affecting harmony – *showing respect towards people with greater knowledge and experience* [%]



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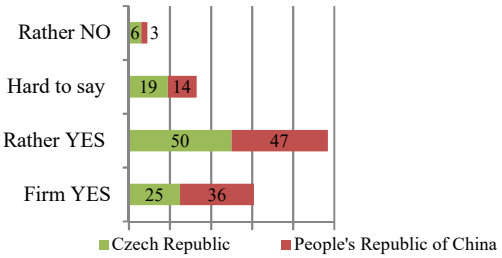

Source: own elaboration.

Figure 7 (left) – Elements affecting harmony – *justice* [%]

Figure 8 (right) – Elements affecting harmony – *courtesy* [%]

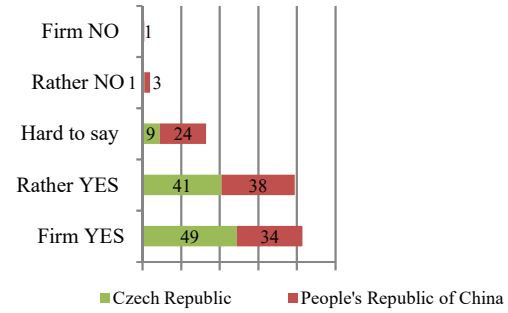

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Figure 9 (left) - Elements affecting harmony – *not showing respect towards the older* [%]

Figure 10 (right) - Elements affecting harmony – *excessive standing out against the group* [%]

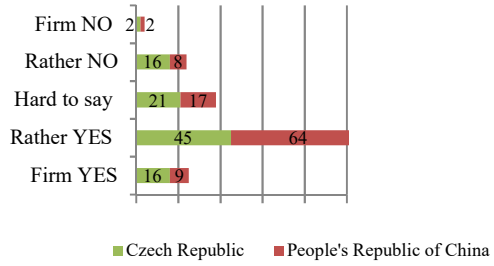

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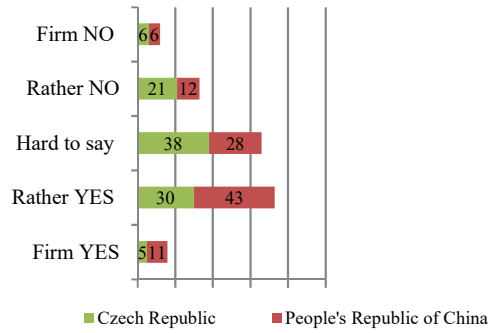
Figure 11 (left) - Elements affecting harmony – giving wrong information on purpose does not really exclude the pursuit of harmonious interpersonal relations [%]

Figure 12 (right) - Elements affecting harmony – harmony in interpersonal relations is more important than getting to know the truth [%]



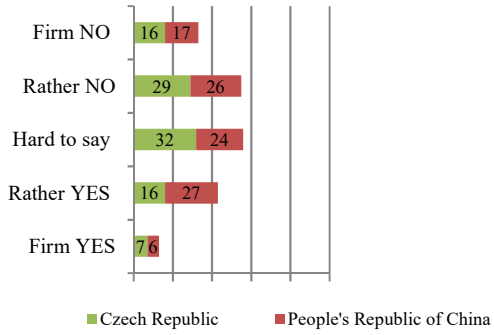


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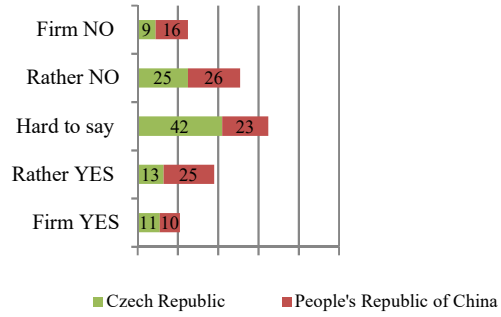
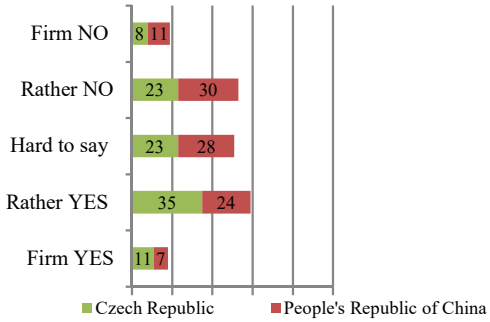
Figure 13 (left) - Elements affecting harmony – *belonging to another group* (being an outsider) [%]

Figure 14 (right) - Elements affecting harmony – *public expression of one's opinion that is different than the opinion of the group* [%]





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4 Conclusion

Effective communication in business space determines the work of an effective manager [Illes, Mathews, 2015, p.13, after: Barrett, 2006], However, communication between the representatives from culturally different countries requires additional understanding of intercultural differences, which might be of particular importance in future trade, both in the case of running small and large joint projects. In the view of bilateral possibility of cooperation between the residents of the Czech Republic and the People's Republic of China within strategic partnership signed for the Belt and Road Initiative, the perception of the category of *harmony* by the residents of the abovementioned countries and its role in social relations and interpersonal communication is worth noting.

A comparison of the results of research carried out in the groups of Chinese and Czech students of economic majors allows to draw the following conclusions:

- The category of *harmony* is interpreted by the respondents in most of the cases as *balance* and *order*. The first of the terms is of a very broad application, often going beyond the field of interpersonal communication. The latter is related directly to a group of people – community, within which there are plenty of interpersonal interactions. Linking harmony with social relations and interpersonal communication was also confirmed in the opinion expressed by the representatives of the two groups, which states that harmony is a basic value in interpersonal communication. However, due to the fact that the category is present in Chinese culture in a much wider spectrum than in the Czech culture, the Chinese respondents were more certain of their assessment (they more frequently chose *firm yes* answers) than the Czech respondents (more often *rather yes*).
- Additional categories that were associated with harmony by the respondents, within which there were the largest differences in points, were: *cooperation, order, peacefulness* and *nature.* China is considered to be a *collectivist* country, whereas the Czech Republic is considered to be *individualistic*, it might be the reason why more than twice as many people from China chose *cooperation* in connection with harmonious behaviour. On the other hand, the bigger percentage of the Czechs than the Chinese defined harmony as *order.* This sort of ordering might be manifested in the actual, frequent occurrence of this category in European space, in combination with numbers, sense of beauty/art, and even theory of music. This fact might also be connected with different perception of what is considered clean or segregated – arranged according to fixed pattern, by the representatives of geographically distant countries. Additionally, *peacefulness* is more often related to harmonious relations according to the Czech respondents, rather than the Chinese ones. Harmony might occur when one person does not come into conflict with the other, namely when one person does not compete with the other, does not aspire to be better, does not strive for success – victory. *Masculinity* index is slightly lower in the Czech Republic than in China, which might also result in differences in opinions in this category.
- According to the respondents of both of the groups, *knowing one's place in society, rules of conduct, showing respect towards people with greater knowledge and experience, showing respect towards the older, justice* and *courtesy/goodwill* are, among others, conducive to pro-harmonious behaviour in interpersonal interactions. This finds justification in the fact that both Chinese and Czech societies belong to the group with high *power distance* index. Those are hierarchical societies with a strictly defined place on the social ladder. However, their members have specific rights and obligations, due to their held position (social, professional).
- Behaviours that clearly are not conducive to harmony are: *not showing respect towards the elderly* and *excessive standing out against the group*. The first term is a result of a high *power distance* index, whereas the latter, in the case of China results from *collectivism* and *masculinity*, and in the case of the Czech Republic – only from *masculinity.*
- According to the respondents from both of the student groups, giving wrong information does not really exclude aspiration for harmonious interpersonal relations. Similarly, achieving harmonious interpersonal relations is rather more important than getting to know the truth. The two categories of answers may be associated with the high *long term orientation* index, thus perceiving truth as something that is dependable on situation, context and time [Compare countries, Hofstede Insights]. Nevertheless, in view of the fact that the *uncertainty avoidance* index is much higher for the Czech Republic than for China, certainty concerning a more relative, polysemous and relatively flexible attitude toward the truth category more frequently concerns the Chinese group than the Czech group.

Independently from the division into *collectivist* and *individualist* countries, it turned out that classification, both by the Czechs and the Chinese, of the statement that belonging to other group is not really a factor unfavourable to harmony. Also, in the opinion of the respondents, public expression of one's opinion that is different from the opinion of the group does not really have a big impact on aspiration for interpersonal harmony. It might be

connected with the constantly changing external environment and creation of new social norms and habits, developed by the young generation, especially by the Generation Y (millennials), so people born in the 1990s.

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Appendix 1

Photo 1 (left) - A social poster in the form of a wall painting depicting the slogan: *Happiness is like a tree, harmony is like a fertile soil* [幸福是棵树和谐是沃土], Kunming 2019.

Photo 2 (right) - *Harmony* [和谐] mentioned as one of the basic foundations of socialist society, shown on the billboard decorating the main building of Beijing Language and Culture University, Beijing 2018.

Source: Natalia Brede, picture posted with the permission of the author.

Source: Katarzyna Mazur-Włodarczyk

The Issue of Deinstitutionalization of Psychiatric Care: The Effect of Criteria Weighting on the Results of Multicriteria Analysis

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Abstract

Deinstitutionalization of psychiatric care is an important element for the whole society to make the burden of this care as small and effective as possible. The aim of the article was, in particular, to determine the development of the deinstitutionalization of psychiatric care, based on the selected variables. Next, assess the effect of the value of the criteria's weights on the change in the order of the variants. The thesis is divided into 2 parts, namely the theoretical and practical part. Within the theoretical part the TOPSIS method is described, the methods of determining the weights of the criteria are described and the selected criteria for deinstitutionalization of psychiatric care are listed. In the practical part, the TOPSIS method is then applied to the Czech and Slovak Republics, where the influence of the criteria weights is examined. Model A deals with equal weights of criteria and model B focuses on different weights of criteria determined by Fuller's triangle. The Slovak Republic performs better than the Czech Republic in both cases. Thanks to the results found, it can be presented that although the Slovak Republic performs better than the Czech Republic in the TOPSIS method, the Czech Republic is moving forward in the deinstitutionalization of psychiatric care, whereas Slovakia is going back in time, as it has much better results in 2012 than, for example, in 2017.

Keywords: *Czech Republic, deinstitutionalization, psychiatric care, Slovak Republic*

JEL Classification: *H44, I11, I15, H75*

1 Introduction

Criteria are part of the decision-making process, which is intended to lead to an optimal choice or to an objective evaluation of the matter. According to various authors, e.g., Hálek (2022), the decision-making process is to be divided into certain logical blocks (stages), using six stages, including identification of the decision problem, analysis and formulation of the problem, creation of solution options, determination of criteria for evaluating the options, evaluation, and selection, and finally implementation of the selected option. Korviny (2022) argues that when both a list of criteria and a list of decision options are available, it is necessary to consider in more detail what form the final decision should take and whether it is necessary to select a single optimal option for implementation.

The subject of the paper is selected criteria that have some relation to the deinstitutionalization of psychiatric care, especially at its development, character and, if necessary, influence on the issue. The selection of the criteria was guided by the findings and recommendations of previous foreign and czech professional works (Haug. Rössler, 1999, Garcia et al., 1999, Winkler et al., Hudson, 2016, Broulíková et al., 2020).

The deinstitutionalisation of psychiatric care is a process requiring a series of interrelated and often complex changes in society. Winkler at al. (2013) argue that deinstitutionalisation should only be understood as a transformation of a sub-segment of the psychiatric care system, with the primary goal of deinstitutionalisation being to shift the focus from long-term institutional care towards community-based care.

Deinstitutionalisation of psychiatric care is a topical issue in the EU. This is being addressed through the Operational Programme Employment through the project Deinstitutionalisation of services for the mentally ill. In essence, this project aims to move patients from psychiatric hospitals to community mental health care centres, thereby alleviating overcrowding in psychiatric hospitals.

The issue of deinstitutionalization of psychiatric care has been addressed by many authors in addition to those already mentioned above. For example, from the Canadian environment Sealy and Whitehead, (2004), and from the Russian environment authors have dealt with the current problems of inpatient psychiatric care (Yastebov, et al., 2013). Lima, et al. (2020) focused on deinstitutionalization and the mental health service network, where their article analyzed the deinstitutionalization of psychiatric care due to the closure of the Colonia Psychiatric Hospital. Within the Czech Republic, the deinstitutionalization of psychiatric care is then addressed by Dvořáková, Kondrátová, (2020), where the authors focus on the opportunities, risks of deinstitutionalization of psychiatric care and its prerequisites for successful implementation.

According to research in the USA, a person has up to a 50 % chance of developing a mental disorder at least once in their lifetime (Kessler et al., 2005). Mental health is also threatening to be the leading cause of health problems in wealthy countries by 2030 (Roberts, Grimes, 2011). For this reason, it is important to focus on and give increased attention to the overall reform of mental health care.

The aim of the article is, in particular, to determine the development of the deinstitutionalization of psychiatric care, based on the selected variables. Next, assess the effect of the value of the criteria's weights on the change in the order of the variants.

This objective will be applied to the issue of deinstitutionalization of psychiatric care in the Czech and Slovak Republics for the period 2010-2020.

The deinstitutionalisation of psychiatric care in Slovakia began in the 1990s. The Slovak Republic was one of the first 3 countries in Europe to seek reform. As far as the Czech Republic is concerned, the reform of psychiatric care in this country was approved by the Ministry of Health in 2013.

The structure of the article consists of four parts. The first part is an introduction that introduces the issue of deinstitutionalization of psychiatric care and mentions the research. The second part deals with the TOPSIS method, determining the weights of the criteria and also includes selected criteria for deinstitutionalization of psychiatric care. The third part is devoted to research that evaluates the results of the TOPSIS method when applying the same and different criteria weights. The fourth part is devoted to the conclusion, where the findings are summarized.

2 Material and Methods

The research of this paper is based on the TOPSIS method. This method is based on selecting the variant that is closest to the so-called optimal variant. The optimal or ideal variant is the one that is characterised by a vector of best criterion values and at the same time is furthest from the so-called basal variant, which is characterised as a vector of worst criterion values. Thus, the TOPSIS method provides a complete ordering of the set of all variants and is designed to select the best variant (Fiala, 2013).

Within the description of this method, the assumption that all criteria are of maximization type is taken. The TOPSIS method can be described in the following steps:

1. The original criterion values y_{ij} are transformed into r_{ij} values according to the following relation:

$$r_{ij} = \frac{y_{ij}}{(\sum_{i=1}^{n} y_{ij}^2)^{1/2}}^3 \quad (1)$$

2. The following is the calculation of the elements of the weighted criterion matrix W = (w_{ij}) as $w_{ij} = v_j r_{ij}$, where v_j is the weight of the j-th criterion.

3. From the elements of the criterion matrix W the optimal variant with the criterion values ($H_1, H_2, \ldots, H_k$) and the basal variant are determined ($D_1, D_2, \ldots D_k$), where $H_j = \max_i (w_{ij})$ a $D_j = \min_i (w_{ij})$.

4. The next step is to calculate the distance of the variants from the ideal and basal variants according to:7

$$d_i^+ = [\sum_{j=1}^{k}(w_{ij} - H_j)^2]^{1/2}, \; i = 1, 2, \ldots, n. \quad (2)$$

$$d_i^- = [\sum_{j=1}^{k}(w_{ij} - D_j)^2]^{1/2}, \; i = 1, 2, \ldots, n. \quad (3)$$

[3] $i = 1, 2, \ldots, n, j = 1, 2, \ldots, k$

5. The following is the calculation of c_i as the relative distance of the variants from the basal variant:

$$c_i = \frac{d_i^+}{d_i^- + d_i^+}, \; i = 1,2,\ldots, n \qquad (4)$$

The c_i values are in the interval <0,1>. A value of 0 is for the basal variant and a value of 1 for the ideal variant. The overall arrangement of variants can be obtained by decreasing values of the c_i indicator (Jablonsky,Dlouhý, 2015).

2.1 Methods of Estimating Weights

An important rule for the choice of weights is that the weights are chosen so that the sum of the weights over all criteria gives 1. The weights for the i-th criterion can be denoted by the symbol vi, for i = 1,...,k, where k is the number of criteria, then the weights are chosen so that:

$$\sum_{i=1}^{k} \boldsymbol{v_i} = \mathbf{1}, \boldsymbol{v_i} \geq \mathbf{0} \qquad (5)$$

Another important rule is that the more important a criterion is, the more weight must be given to it (Kalcev, 2022).

When it comes to the choice of weights there are two possibilities. The first one is that the weights are set "hard", that is, it is determined how important each criterion is e.g., criterion 1 will have a weight of 0.2, the second one will have a weight of 0.3 and the third one will have a weight of 0.5. Alternatively, the weights can be determined by methods.

2.1.1 The Ranking Method

The criteria are listed here in order from most important to least important. Thus, it will be assumed that we have k criteria, where the most important criterion is rated with *k* points ($b_i = k$), the second most important with *k* - 1 points ($b_i = k$-1) to the last least important with one point ($b_i = 1$). It may happen that some criteria are equally important and therefore will be scored by the respective average.

The weight of the respective criterion can then be obtained using the following relation:

$$v_i = b_i / \sum_{i=1}^{k} b_i \qquad (6)$$

where $\sum_{i=1}^{k} b_i$ is the sum of the points distributed among the individual criteria. For this sum:

$$\sum_{i=1}^{k} b_i = k(k+1)/2 \qquad (7)$$

2.1.2 The Scoring Method

As far as the calculation of weights in the scoring method is concerned, it is identical to the procedure given in the ranking method, where the only difference is in the allocation of points b_i. The scoring method assumes that the solver or decision maker is able to quantitatively evaluate the importance of the criteria in some pre-selected scoring scale from a pre-defined interval e.g., b_i in <0,10>. The rule of thumb here is the more important the criterion the higher the score it receives. The weight of the respective criterion can then be obtained from the relation:

$$v_i = b_i / \sum_{i=1}^{k} b_i \qquad (8)$$

2.1.3 Pairwise comparison method (Fuller method)

This method is called the Fuller method because in its application the weights are constructed using the so-called Fuller triangle.

The principle of pairwise comparisons is that two criteria are always compared, and from each such pair of criteria the more important one for the research is selected. If every two criteria are compared from a total of *k* criteria, all combinations of elements from *k* are selected:

$$N = \binom{k}{2} = \frac{k(k-1)(k-2)!}{2!(k-2)!} = \frac{k(k-1)}{2} \qquad (9)$$

For better clarity of the criteria, a so-called Fuller triangle is constructed, which always has k-1 double rows. The first row contains all the combinations for comparison with the first criterion, the second row contains the

combinations for comparison with the second criterion, except the one from the previous row. Each subsequent row then contains the combinations for comparison with the next criterion that are not in the previous rows. This implies that each subsequent row always has one less criterion than the previous row. After constructing the Fuller's triangle, the experts then compare the criteria with each other to determine which is more important for the problem. Then the weights are compiled according to the relation:

$$v_i = \frac{n_i}{\sum_{i=1}^{k} n_i} = \frac{n_i}{N} \tag{10}$$

2.2 Data and Criteria

Data for the Czech Republic were obtained from the Institute of Health Information and Statistics of the Czech Republic (www.uzis.cz) and for the Slovak Republic from the National Centre of Health Information (www.nczi.sk). These data were collected for the period from 2010 to 2020. The Czech and Slovak Republics were chosen for the analysis because of similarities in the quality of healthcare.

Within the theme of deinstitutionalization of psychiatric care, the following criteria were examined and further calculated per 1,000 inhabitants:

- K1 number of outpatients. This is a criterion that reflects the number of patients treated in psychiatric outpatient clinics (see K5) each year.
- K2 number of completed hospital admissions. This is a measure of how many patients completed inpatient treatment in hospitals/treatment centres in a given year. The termination of treatment is based on the decision of both the doctor and the patient. The reason for termination can also be the transfer of the patient to another hospital care unit (e.g., internal medicine, neurology), to outpatient care, but also the death of the patient.
- K3 number of beds. These are the number of beds in hospitals (special wards) and hospitals.
- K4 number of doctors. This is a criterion that expresses the converted number of doctors (psychiatrists) per working hours working in hospitals and psychiatric outpatient clinics combined (most physicians work part of their time in hospitals/treatments and part in outpatient clinics).
- K5 number of ambulances. This is a criterion that reflects the number of psychiatric outpatient clinics that provided services in a given year in a given state. This includes outpatient psychiatry, child, and adolescent psychiatry, gerontopsychiatry, addictive diseases, and sexology.

All of these criteria apply to psychiatric care. The selection of the criteria was guided by the findings and recommendations of previous international and Czech papers (Haug. Rössler, 1999, Winkler at al. 2013, Hudson, 2016, Broulíková et al., 2020)

Table 1 – Basic statistics on criteria, period 2010-2020

	Max	**year**	**Min**	**year**	**average**	**SD**
K1_CZ	59.625	2019	48.416	2010	55.008	3.542
K1_SR	89.162	2012	78.852	2020	83.947	3.219
K2_CZ	5.449	2014	4.570	2020	5.220	0.221
K2_SR	7.635	2014	6.406	2020	7.370	0.341
K3_CZ	1.015	2010	0.934	2020	0.966	0.026
K3_SR	0.817	2014	0.769	2011	0.803	0.015
K4_CZ	0.102	2019	0.074	2010	0.087	0.010
K4_SR	0.075	2020	0.057	2011	0.068	0.005
K5_CZ	0.100	2010	0.094	2018	0.096	0.002
K5_SR	0.082	2019	0.070	2010	0.078	0.003

Source: Author

Table 1 shows for each criterion the cut-off values (max. and min.) and the year in which this cut-off value was recorded, the average values and the standard deviation (SD) of the criterion for each country (CZ and SR) separately. The table shows apparent interesting differences and similarities between countries (CZ and SR) that

can be observed for the criteria (K1-K5) in the period under review, with regard to the year in which they reached the maximum/minimum value of the criterion. Furthermore, the table shows that CZ achieves higher average values than SR in criteria K3 (number of beds), K4 (number of doctors) and K5 (number of outpatient clinics). Conversely, SK has higher average values than CZ in criteria K1 (number of patients in outpatient clinics) and K2 (number of completed hospital admissions).

2.2.1 Weights of Criteria

In terms of determining the weights for the TOPSIS method analysis, Fuller's triangle was used. This Fuller's triangle was given to five experts who, according to their discretion and knowledge, determined which criterion was more important for the deinstitutionalization of psychiatric care (9,10).

Table 2 – Fuller's triangle

Number of outpatients	**Number of outpatients**	**Number of outpatients**	**Number of outpatients**
Number if completed hospitalisation	Number of beds	Number of doctors	Number of ambulances
	Number if completed hospitalisation	**Number if completed hospitalisation**	**Number if completed hospitalisation**
	Number of beds	Number of doctors	Number of ambulances
		Number of beds	**Number of beds**
		Number of doctors	Number of ambulances
			Number of doctors
			Number of ambulances

Source: Author

Table 2 shows the Fuller's triangle that was presented to the five experts. Based on these criteria, the experts compared the criteria with each other and highlighted the criterion that they found more important for the deinstitutionalization of psychiatric care. Based on their discretion, the weights of each criterion were then determined.

In the first case (Model A), weights of 0.2 were chosen for each criterion. In the second case (Model B), using the Fuller's triangle method, the weights were as follows: 0.21 for the number of outpatients; 0.14 for the number of completed inpatient admissions; 0.15 for the number of inpatient beds; 0.27 for the number of doctors in psychiatric care; and 0.23 for the number of ambulances. Investigating the impact of changes in the values of the weights using the TOPSIS method was addressed, for example, by Vavrek (2017), who assessed this change in the municipalities of the Slovak Republic.

3 Results of the TOPSIS Method

Two countries were selected to compare the process and status of deinstitutionalisation of psychiatric care. The results of the calculations according to the TOPSIS method are divided according to how the weights of the selected criteria were determined. Therefore, two models were calculated:

- Model A: the criteria have the same weight;
- Model B: the criteria have different weights (Fuller's triangle).

3.1 Results of Model A

Table 3 – Results of the TOPSIS method Model A

Ranking	**Variant name**	**TOPSIS results**
1	SR2012	0.7575
2	SR2019	0.7533
3	SR2015	0.7350
4	SR2020	0.7345

5	SR2018	0.7344
6	SR2011	0.7295
7	SR2013	0.7184
8	SR2017	0.7155
9	SR2016	0.7132
10	SR2014	0.7083
11	SR2010	0.6995
12	CZ2019	0.4124
13	CZ2018	0.3968
14	CZ2020	0.3843
15	CZ2016	0.3214
16	CZ2017	0.3212
17	CZ2015	0.2949
18	CZ2014	0.2899
19	CZ2013	0.2632
20	CZ2012	0.2226
21	CZ2011	0.2068
22	CZ2010	0.1926

Source: Author

If the results of the TOPSIS method are observed under the same weights per criteria, i.e., 0.2 weight per criterion, the Slovak Republic is better off in terms of deinstitutionalisation of psychiatric care. The average value of the TOPSIS results is 0.5139, so it can be said that the Czech Republic is below the average of the sample studied and does not show satisfactory results in this evaluation. However, what is interesting is that the Czech Republic has improved from 2010 to 2020 in terms of deinstitutionalization of psychiatric care, although the best values are shown in 2019, so it is better off than the Slovak Republic for which 2012 is the best year and 2020 is only in fourth position. These results tell us that in the Slovak Republic the reform of psychiatric care is returning to the old values, while in the Czech Republic it is trying to improve this care (see table 3). (1,2,3,4).

3.2 Results of Model B

Table 4 – Results of the TOPSIS method Model B

Ranking	**Variant name**	**TOPSIS results**
1	SR2019	0.6717
2	SR2020	0.6644
3	SR2012	0.6556
4	SR2015	0.6482
5	SR2018	0.6468
6	SR2013	0.6335
7	SR2017	0.6315
8	SR2016	0.6221
9	SR2014	0.6217
10	SR2011	0.6176
11	SR2010	0.5951

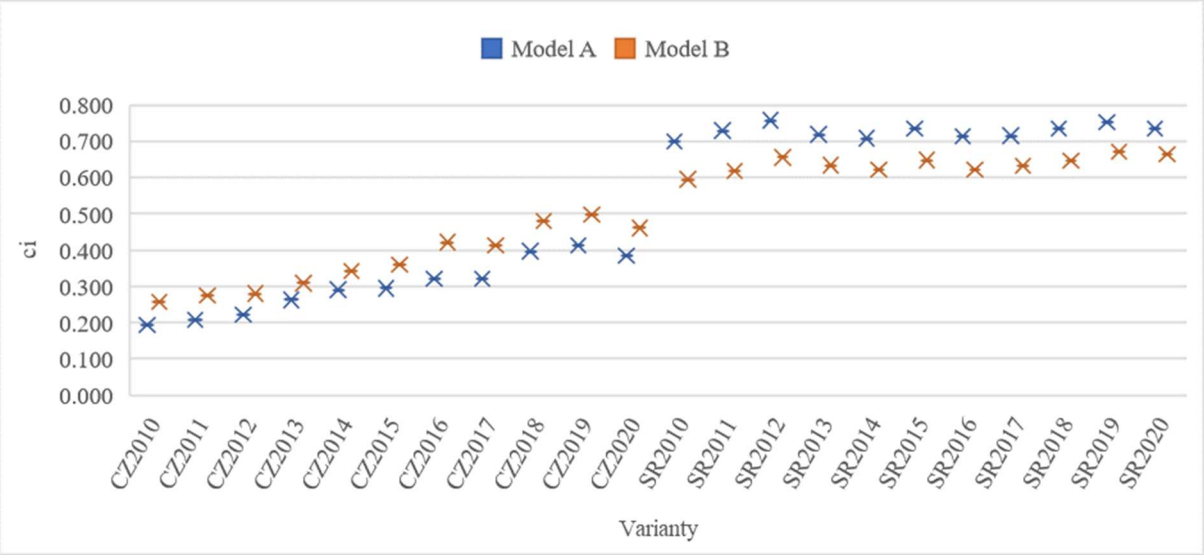
12	CZ2019	0.4978
13	CZ2018	0.4796
14	CZ2020	0.4607
15	CZ2016	0.4210
16	CZ2017	0.4128
17	CZ2015	0.3597
18	CZ2014	0.3417
19	CZ2013	0.3092
20	CZ2012	0.2798
21	CZ2011	0.2744
22	CZ2010	0.2571

Source: Author

It is clear from Table 4 that the Slovak Republic is also better off than the Czech Republic in determining the different weights of the criteria. If we look at the average value of the results of the TOPSIS method, it is 0.5046 points, i.e., the Czech Republic is still below the average of this value, but it is much better off than it was for the same weights of the variants. The Czech Republic is closest to this average value in 2019 with a value of 0.4978. It can be seen here that both the Czech Republic and the Slovak Republic have the worst values in the first year under study, 2010, which is a good thing from the point of view of research, because the deinstitutionalization is moving in some direction towards better results. Also, both countries show the best values in 2019. It is interesting to observe the differences in the comparison of years between each other, where the Czech Republic goes from 2010 to 2015 consecutively, the fact that 2019 came out better than 2020 may be due to the global pandemic COVID-19. For the Slovak Republic, we cannot see any correlation of years, although it has the worst year 2010 followed by 2011, as well as 3. The worst value of this country is shown by the year 2014. What is interesting is that the year 2012 is taken as the 3rd best result within the TOPSIS method, this reflects the fact that the Slovak Republic is reverting to its old result of deinstitutionalization of psychiatric care, and the situation in the Slovak Republic is deteriorating. (1,2,3,4).

3.3 Evaluation of the TOPSIS Model

Figure 1 – Evaluation of variants of model A and model B



Source: Author

Figure 1 shows that model B is better for the CZ2010-CZ2020 variants, whereas model A is better for the SR2010-SR2020 variants. The number of variants for which a change was recorded is 9 and only 2 variants (SR2018 and SR2010) remained in the same position. For the Czech Republic and its variants (CZ2010-2020),

Model B is more favourable than Model A. Within Model B, these variants perform better, whether it is an increase in the ensemble minimum, or the fact that the Czech Republic is closer to the ensemble average and performs better overall than in Model A. On average, the CZ2010-CZ2020 variants showed an increase in Model B of about 24.5% compared to Model A. The highest increase was recorded for the CZ2010 variant (33.5%) and the lowest increase for CZ2013 (13.5%). For the Slovak Republic and its variants SR2010-2020, Model A is more favourable than Model B. Due to the change in the weights, there was a decrease in the TOPSIS method values within these variants, by an average of 12.4% per variant. Thus, it can be said that the Slovak Republic performed much better when dividing the same weights for all criteria than when using different weights using Fuller's triangle. The absolute values of the variants under Model A and Model B and their percentage changes can be seen in Appendix 1.

4 Conclusion

The aim of the article was, in particular, to determine the development of the deinstitutionalization of psychiatric care, based on the selected variables. Next, assess the effect of the value of the criteria's weights on the change in the order of the variants. This objective was applied to the issue of deinstitutionalization of psychiatric care in the Czech and Slovak Republics for the period 2010-2020. The criteria that were examined were: number of patients in outpatient care, number of completed hospitalizations, number of beds, number of ambulances and number of doctors. These criteria were then converted per 1,000 inhabitants to compare countries with each other.

Deinstitutionalization of psychiatric care is not an easy topic. This is because there can be conflicting interests of different medical and social disciplines that complicate the deinstitutionalisation process and obscure the interests of patients. The deinstitutionalisation of psychiatric care is illustrated above all by the quality of care.

The document was divided into four parts. The first part was devoted to the introduction, where the literature search, the aim of the paper and the introduction to the topic were carried out. The second part dealt with the methods and data that were part of the thesis and its research part. The third part of the thesis was practical and outlined the results of deinstitutionalization of psychiatric care in the Czech and Slovak Republics for model A and model B. This part described the results of deinstitutionalization of psychiatric care in the Czech Republic and Slovakia. The last part was the conclusion, where the work was summarized as a whole.

The average value of ci within the examined set of 22 variants in model B decreased by 1.8% compared to model A. The decrease in the average value in model B was mainly influenced by the values of variants SR2010-SR2020, where a decrease in the TOPSIS value was observed for these variants. The ideal value of ci within the examined set of 22 variants decreased by 11.3% in model B compared to model A, this decrease was caused by a large decrease of variant SR2013 in model B compared to model A, by about 13.5%. In contrast, the baseline value of ci within the set of variants studied showed an increase of 33.5%, with the minimum value of CZ2010 increasing by this 33.5%. There was also a change in the value of the standard deviation of ci within the set of variants examined, with a decrease of 33.7%. This decrease was due to the fact that the values of the CZ2010-CZ2020 variants in model B started to become closer to the mean value of all the variants studied compared to model A. In terms of the models, Model B is the more favourable model for the Czech Republic, with the CZ2010-2020 variants showing an increase, on average, of about 25% per variant. For the Slovak Republic, Model A was more favourable, as when converted to Model B, the SR2010-2020 variants showed a decrease compared to Model A. This reduction was on average 12.4% per variant, with the highest reduction in the SR2011 variant and the lowest in the SR2020 variant.

Comparing the results of deinstitutionalisation of psychiatric care Czech Republic and the Slovak Republic, both in terms of equal weights of criteria and in terms of different weights of criteria, the Slovak Republic is better off. These results may be due to the fact that deinstitutionalisation of psychiatric care started much earlier in the Slovak Republic than in the Czech Republic. However, what is interesting to note from the results is that the Czech Republic has been performing better and better over the years, whereas the Slovak Republic, on the other hand, is reverting to its old results over time. Thanks to these findings, it can be said that the Czech Republic is slightly better off than the Slovak Republic in terms of deinstitutionalisation of psychiatric care in the period 2010-2020.

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Appendix 1 - Result of TOPSIS method - Model A, Model B

Variant name	Model A	Model B	% Change
CZ2010	0.1926	0.2571	33.49
CZ2011	0.2068	0.2744	32.69
CZ2012	0.2226	0.2798	25.70
CZ2013	0.2632	0.3092	17.48
CZ2014	0.2899	0.3417	17.87
CZ2015	0.2949	0.3597	21.97
CZ2016	0.3214	0.4210	30.99
CZ2017	0.3212	0.4128	28.52
CZ2018	0.3968	0.4796	20.87
CZ2019	0.4124	0.4978	20.71
CZ2020	0.3843	0.4607	19.88
SR2010	0.6995	0.5951	-14.,92
SR2011	0.7295	0.6176	-15.34
SR2012	0.7575	0.6556	-13.45
SR2013	0.7184	0.6335	-11.82
SR2014	0.7083	0.6217	-12.23
SR2015	0.7350	0.6482	-1181
SR2016	0.7132	0.6221	-12.77
SR2017	0.7155	0.6315	-11.74
SR2018	0.7344	0.6468	-11.93
SR2019	0.7533	0.6717	-10.83
SR2020	0.7345	0.6644	-9.54

Source: Author

Mediation as a Form of Conflict Resolution for the Development of the Border Area of the Czech Republic and Poland

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Abstract

Mediation is a way of resolving disputes and conflicts peacefully with the aim of reaching an agreement. It is applied both in and out of law, involving not only legal but always psychological or social specificities. The basis of mediation is that a third, independent person, called a mediator, comes between the disputing parties and mediates an amicable, compromise solution to the issues at stake. The condition is that the mediator must be impartial, and cannot be a person associated with one of the parties to the dispute, as the mediator would then unfairly influence the other party and could, for example, make it accept as a compromise a solution that would be disadvantageous to it. The aim of this article is to present mediation as a form of conflict resolution for the development, with a comparison to the legal and economic basis for the activity of mediation in the Czech Republic and Poland. The article also presents a concrete example of the course of mediation in the Czech Republic, including the termination of the case. For the practical treatment, the methods of comparison, description and secondary analysis were selected and applied.

Keywords: *costs of mediation, mediation, mediation proceedings, mediator*

JEL Classification: *J52, L26, M10*

1 Introduction

No In the course of life, a person gets into many situations that he has a problem to solve and becomes helpless. Often, people are faced with disputes that they cannot resolve on their own and therefore turn to various institutions, including the courts, as a last resort to resolve the dispute.

In the 1990s, mediation began to be used as an alternative dispute resolution. In the Czech Republic, mediation is not a very widespread form of dispute resolution, although it is a softer form for settling differences between two entities that are in dispute over a particular matter. In the Czech Republic, mediation is mainly used to resolve personal disputes, but its use is also expanding in employment law. In Poland, mediation is used not only in private but also in business disputes.

Mediation refers to the out-of-court resolution of a dispute using an independent person as a third party to the dispute, called a mediator. The mediator must be able to communicate progressively with the parties involved in order to reach the goal of mutual understanding and, above all, to resolve the dispute amicably to the satisfaction of the parties involved. The aim of this article is to present mediation as a form of conflict resolution for the development, with a partial goal of comparison to the legal and economic basis for the activity of mediation in the Czech Republic and Poland. The article also presents a concrete example of the course of mediation in the Czech Republic, including the termination of the case.

2 Material and Methods

For practical processing, the method of comparison, description and secondary analysis are applied. The method of description belongs to the basic tasks of statistical data analysis, where it is a description of the data set. The set of units is characterized in terms of individual features and their combinations. The method of analogy (comparison) is based on the method of comparison and is used in case inference, when instead of general rules we use a set of typical cases, previously (both successfully and unsuccessfully) solved. It is about drawing conclusions based on similarities with another system or situation. Secondary document analysis involves the study and analysis of data and documents that have been collected by someone else, and perhaps for a different purpose, but from which important new, previously unassessed information can also be extracted.

2.1 Resolving Conflict Cases

The success rate of conflict resolution is very high, around 75% according to global statistics. Mediation first began to take hold in civil and commercial matters, and then, in the late 1970s and early 1980s, on a larger scale in criminal proceedings. It is widespread in the US, but also in the UK and Australia, where it is used in up to 60% of disputes, mainly in commercial (economic), family or public sphere (usually environmental) matters, with about two thirds of disputes being resolved by agreement. In the Czech legal system, mediation is enshrined in Act No 202/2012 Coll., on Mediation and on Amendments to Certain Acts (Act on Mediation). In the Republic of Poland, the legal regulation of mediation is not contained in a special law, but is part of the Polish Code of Civil Procedure (Kodeks postępowania cywilnego). The Code of Civil Procedure is used in the Republic of Poland for private law proceedings.

There are two options for resolving disputes, one is voluntary dispute resolution and the other is through the courts. However, the courts are overwhelmed with various disputes and it is often a long run. Therefore, it is advisable to use an alternative method of dispute resolution, which is out of court dispute resolution, which can be referred to as ADR - alternative dispute resolution.

There are a number of definitions of alternative dispute resolution, of which Zahradníková's definition can be cited: "such legal dispute resolution that is alternative to judicial dispute resolution, i.e. that uses different methods, methods and procedures from those used by the courts or other state institutions in court proceedings." (Zahradníková, 2013)

Alternative dispute resolution methods must fulfil the following characteristics (Rozehnalová, 2013):

1. The proceedings are conducted between the parties involved, without any state intervention. The initiation, conduct and termination of the proceedings in question have no substantive or procedural legal effects. The third parties involved have no decision-making or enforcement powers.

2. The parties shall voluntarily decide on this form of proceedings and shall designate a person to accompany them throughout the proceedings. Voluntariness is an important factor, which means that neither party can be forced to act.

3. The result of the procedure can only be an agreement of the parties involved.

2.2 Mediation

Mediation is based on the Latin word "medius" or "mediare", which in Czech means centre, mediator, being in the middle, but also impartiality, indecision and indeterminacy. Mediation is a discipline applied in the out-of-court settlement of disputes, where it involves communication and a certain intervention in the dispute by a third impartial person called a mediator. According to Scanlon, "Mediation is a flexible, voluntary method of conflict resolution that uses a third neutral party - a mediator - to facilitate negotiation and resolution of the parties' problem." (Holá, 2011, p. 86)

Each mediation involves a specific conflict between two or more parties using a mediator who uses communication to try to resolve the conflict to the satisfaction of both parties. Resolving the conflict of the parties involved is a major problem because people often behave in a hostile manner and try to harm the other party in order to win. When there is conflict (dispute), people tend to become aggressive, resigned, isolated or run away from the problem. It can also be deliberate, where the subjects do not want to agree and thus find themselves in an intractable situation. Therefore, the way out is to turn to a third impartial person for help.

The mediator should meet certain qualifications and have the necessary competences, which include communication skills, intuition, empathy, expertise and skills, as well as the necessary experience. The mediator should be able to listen to the parties involved and seek a suitable solution that is acceptable to both parties.

2.2.1 Mediation Process

Communication is the foundation of any mediation. The process of mediation was previously understood as psycho-social assistance, with psychologists, social workers and educators working primarily in mediation. Gradually, legal elements were introduced into the mediation process (Winterová and Macková, 2014).

Governance - Regulation - Management

The mediation process is managed by the mediator, who is an impartial person and must follow certain rules associated with the mediation process. Governance - Regulation - Management: every activity is important in the mediation process. The mediator carries out these activities in each mediation process. By governance, we mean a formalised procedure by which the behaviour of the parties is determined. Regulation can be understood as a control activity that is implemented by the mediator in the feedback of the parties. In this process, emotions play a significant role, which are the most regulated characteristics that the mediator influences in conflict resolution. By leadership, we understand a certain control over the parties in question to provide certainty in the balance between mediation and leadership.

2.2.2 Negotiations and Bargaining

Negotiation is a process where each party has its own goals that it wants to pursue, but the solution in the mediation process should be to pursue its views and goals in a way that is acceptable to all parties to the dispute.

Negotiating positionally

Positional negotiation can be hard and soft negotiation. In hard bargaining, the parties involved meet as adversaries whose goal is to win, neither side wants to give up, there is intransigence, mistrust and each side wants to achieve its own goals. There is pressure and threats, and each side seeks a solution that suits only itself. The opposite is soft bargaining, where the parties involved act in a friendly manner and try to push for a mutually satisfactory agreement.

Constructive negotiation

In this type of negotiation, the participants act as friends, where the aim is to find a solution in a friendly and effective manner. In constructive negotiation, different strategies are developed and the outcome is based on facts rather than wishes. Here, well-founded arguments are crucial.

Cooperative negotiation

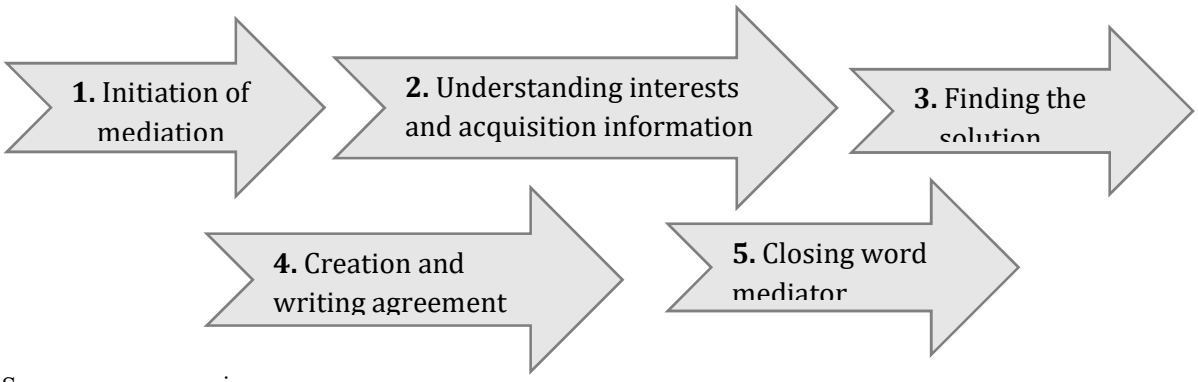
The aim of cooperative negotiation is to find a way to satisfy all parties involved, where the emphasis is on cooperation. This process of negotiation is not simple, it can lead to a solution that is stable over time. If both parties work together to reach an agreement, then they can have a sense of shared responsibility for implementation.

2.2.3 Stages of Mediation

Stages of mediation

Celadník (2010) states that "the mediation process is very flexible and fully corresponds to the direction the mediator takes". The mediation process has certain phases and procedures that are always used.

Figure 1 - Mediation phase



Source: own processing.

1. Initiation of mediation

Before mediation can begin, the consent of the parties to the dispute must be obtained. It is a voluntary decision by the parties to resolve the dispute through mediation and a mediator must be approached and agree to mediation. Pursuant to the provisions of Section 3(4) of the Mediation Act, the mediator is obliged to instruct the parties to the conflict on the principles of mediation, the conduct of the mediation and the mediation agreement, and the possibility of terminating the mediation at any time. The mediator's remuneration and the costs of the mediation are also discussed (Celadnik, 2010; Genis, 2019).

The mediator starts the mediation with an introduction, where he/she should create a pleasant atmosphere for the parties involved in the dispute, create a feeling of trust and confidence and then introduce the dispute with an explanation of his/her role. The role of the mediator is to determine the rules of conduct, which include principles of decorum and orientation to the problem, but also what powers the clients have.

2. Understanding interests and obtaining information

At this stage, the parties involved in the dispute are given space to state their own perceptions of the conflict. The mediator should listen carefully to the statements given, encourage the subjects to be open and transparent, and try to obtain as much relevant information as possible to understand the conflict. Obtaining as much information as possible is essential to the mediation process. Both verbal and non-verbal communication, such as empathy, body language and eye contact, play an important role here. The mediator tries to encourage the subjects, paraphrases, mirrors feelings and creates a natural attitude for conflict resolution. This should leave the subjects in an adversarial position and the mediator should achieve an appropriate understanding of the opposing parties Čeladnik, 2010; Bond, 2013).

3. Finding a solution

This stage refers to the search for an appropriate solution based on the identified interests and needs of the clients. The mediator must not be swayed by emotions and must give room for creative solutions to the parties involved. The mediator's task is to get both parties to understand each other. In the process of finding a solution, one moves from simpler points to more complex ones. The parties involved search for suitable solutions and suggest options that could be used to resolve the conflict (Genis, 2019).

4. Creating and writing an agreement

The development and drafting of the agreement builds on the previous phase and includes all possible solutions to the conflict. The conclusion of this phase should be the creation of an agreement, which should be the basis for the final agreement. The agreement should include the points of contention and positions with an explanation of the proposed solutions. Rules such as realism, concreteness, balance, achievability, measurability and time limits must apply to the agreement reached. The final agreement must include the signatures of the parties and the mediator (Celadnik, 2010).

5. Final word from the mediator

The last stage is the final word of the mediator, who should summarise the whole process and the results that have been reached. The mediator will then provide feedback (Genis, 2019).

2.2.4 Forms of Mediation

There are a number of forms of mediation, for example, as Holá states, three basic forms of mediation, namely statutory, judicial and at-will mediation (Holá, 2011).

Statutory mediation - sometimes referred to as compulsory mediation, where certain types of disputes are defined by law to be resolved through mediation in order to provide a quicker, simpler, more efficient and economically advantageous solution (Bond, 2013).

Judicial mediation - in this form of mediation, the judge himself proposes or orders mediation to the parties to the dispute to resolve the dispute. This form of mediation is enshrined in the legal order of the Czech Republic (Holá, 2011).

Voluntary mediation - in this form of mediation, the parties to the dispute agree to mediate voluntarily and freely (Holá, 2011; Bond, 2013).

If the parties involved in a dispute within the Czech Republic agree on an alternative dispute resolution, a mediation agreement is drawn up, which is in writing and is required by the Mediation Act in Section 2(f).

The content of the mediation agreement is laid down by law in Section 7 of the Mediation Act. Here it is stipulated that the parties to the dispute must sign the agreement and that the date of conclusion of the mediation agreement, including the signature of the mediator, must not be missing. The parties to the dispute confirm by their signature that they agree to the agreement. The mediator is obliged to issue a certificate stating that the mediation process has been concluded in the form of an agreement, in accordance with the provisions of Section 8(1)(g) of the Mediation Act.

3 Results and Discussion

The mediator plays an important and indispensable role in the mediation process. Just as each person is unique, each mediator has specific characteristics. In addition to the obvious differences in the form of psychological, intellectual and emotional predispositions, each mediator possesses different strengths in conjunction with mediation. The mediator's main focus during meetings with the parties is to facilitate communication between the parties in creating a resolution to their dispute. Generally, the mediator is not expected to give legal advice to the parties.

The legal regulation of the person of a mediator in the Czech Republic refers to the activity that is carried out by a mediator listed in the list of mediators, called a registered mediator, who must pass a professional examination. These examinations, which are a mandatory prerequisite for registration on the list of mediators, serve to verify the professional knowledge and skills required to perform the activity of a mediator and focus not only on the field of mediation but also on other methods of out-of-court dispute resolution. A participant in the mediation examinations must have sufficient knowledge of mediation techniques, selected areas of law (e.g. fundamental human rights and freedoms, civil, commercial and labour law) and knowledge of basic psychology and sociology is also important.

3.1 Legal Regulation of the Person of the Mediator in Poland

The Polish government's memorandum on the legal regulation of mediation states that the mediator's skills are not based on his knowledge, but on his personal qualities. In order to facilitate the initiation of mediation proceedings for the disputing parties, no specific requirements are required regarding the mediator's educational background. According to the provisions of Art. 1832(1) of the ODR, any natural person with the capacity to exercise his or her public rights may provide mediation services. The only exception in this case is a judge in active service who cannot act as a mediator. The Polish legislator has chosen to respect the principle of informality of mediation to such an extent that it has not established any system of verification of qualification through examinations or the obligation to register mediators in public registers. Only in the case of family mediation is it necessary for the mediator to have experience in this type of mediation.

3.2 Costs of the Procedure

The costs of mediation play an important role both from the point of view of the parties to the mediation and from the point of view of the public authorities. In the long term, it is particularly dependent on them whether mediation becomes a used alternative dispute resolution method to court proceedings. There are four different approaches to regulating the costs of mediation. Most often, the amount of costs is determined in a market-based manner. However, in certain cases this approach may lead to fixed fees, e.g. if the mediator is a member of a mediation service organisation. The amount of the fee, which is usually set on the basis of the number of hours spent in the proceedings, depends on both the complexity of the dispute and the mediator's experience. The second way is through state-regulated remuneration. The main argument in favour of this approach is the easier economic accessibility of mediation compared to court proceedings, as the total costs of mediation for the disputants are in principle an order of magnitude lower than the costs of court proceedings. A third option to regulate the payment of the mediator's fee is for the parties not to pay the fee, but for the costs of the proceedings to be borne by the State. This may be the case where a mediator is appointed by a public authority to resolve a specific type of case, e.g. a custody dispute. Another variant of the mediator's remuneration is the so-called success fee, where the mediator is paid a fee if a mediation agreement is concluded or if all the funds allocated for the costs of the proceedings are not used within the predefined budget. This method can very easily run counter to the principles of independence and neutrality, as the mediator could gain an interest in the outcome of the mediation. This would then lead to a breach of the ethical rules of mediation and compromise the outcome of the proceedings.

3.3 Czech Legislation

Pursuant to the provisions of Section 10 of the Act, the mediator is entitled to a fee for the mediation and to reimbursement of his/her expenses. The mediator and the parties agree on the amount or method of calculation.

Expenses are considered to be in particular travel expenses, postage and possible expenses for renting premises for the mediation proceedings. The usual methods of valuation of services - hourly, flat-rate or performance fee - are offered as a possible way of determining the mediator's remuneration. However, all parties to the Agreement must bear in mind the provisions of the Act and the basic principles of mediation, in particular the principles of impartiality and independence. It is presumed by the Law that the costs of the proceedings shall be borne equally by the parties. At the same time, the possibility of agreeing on a different way of dividing the costs between the parties is not excluded. The Decree sets the mediator's fee for each hour commenced at CZK 400. This amount is paid equally by the parties. The law does not preclude an agreement between the parties and the mediator consisting in an increase or decrease of the fixed fee. The total length of the meetings ordered is usually three hours. If the parties decide to continue the mediation after these hours, the amount of the fee depends solely on their agreement with the mediator. The state pays the costs of the ordered meeting on behalf of the party exempt from court fees.

3.4 Polish Legislation

Pursuant to Art. 1835 of the OPL, the mediator is entitled to receive a fee and reimbursement of expenses for conducting the mediation, unless he agrees to provide his services free of charge. The fee and reimbursement are always paid by the disputing parties even if the party is relieved of the obligation to pay court fees. In the case of mediation initiated by the parties without the involvement of the court, the amount of the fee shall not be limited in any way. Polish mediation legislation uses, as far as possible, a flat-rate method of determining the mediator's fees and expenses for mediation conducted in connection with court proceedings. The amount of the fee and reimbursement is regulated by the Decree of the Ministry of Justice of 30 November 2005 (Journal of Laws 2005.239, 2005). If the value of the dispute is determinable, the costs, i.e. the fee and reimbursement together, are equal to 1 % of its value, with the proviso that they may not be less than PLN 30 (approx. CZK 200) and more than PLN 1 000 (approx. CZK 6 700). In other cases, the calculation of the remuneration is based on the number of mediation meetings. For the first meeting, the mediator is entitled to a remuneration of PLN 60 (approximately CZK 400) and for each subsequent meeting PLN 25 (approximately CZK 170). The amount of this remuneration has been strongly criticised as low by the professional community.

3.5 Success Rate of Mediation

The success of mediation is significantly influenced by the nature of the dispute and its suitability for mediation, the correct timing of the moment when it is appropriate to proceed to mediation and, last but not least, the conduct of the mediation by a specialist mediator. The way in which the parties approached the mediation also has an impact on the success of the mediation - a mediation initiated by both parties will have a greater chance of success than one ordered by a court. According to surveys and statistics from abroad, the success rate of mediation is above 80%.

In order to compare the requirements for the performance of mediation services, criteria were selected to assess the consistency of mediation as a form of conflict resolution in the Czech Republic and Poland, see. Table 1.

Table 1 – Comparison of selected mediators of mediation in the Czech Republic and Poland

Criterion	Czech Republic	Poland
Requirements for mediator's qualification	Higher education and examination passed with the Ministry of Justice	Not specified
Cost of mediation	16 EUR/hour	42-212 EUR/hour
Mediation success rate	80 %	80 %
Legal standards for mediation	Act No. 202/2012 Coll. on mediation and on amendments to certain acts. Natural person registered in the list of mediators.	Art. 1835 POSŘ (POSŘ is Kodeks posteppowania cywilnego). Any natural person with the right to exercise his/her public rights.
Mediation process	Same procedure	Same procedure
Average length of mediation	Several hours or days	42 days
Age of mediator-at least	18 years	26 years

Price of the mediator's exam	200 EUR	Not specified
Code of ethics of the mediator	Must take	Must take

Source: own processing according to legislation in 2021

3.5.1 Practical Example of Mediation in the Czech Republic

An important role in the management environment is played by the manager's or HR manager's ability to find and hire an experienced mediator or facilitator equipped with mediation skills and knowledge.

Dispute for 4,065 EUR between companies. Alpha, a small company in the construction industry, needed formwork for a construction project that was in a great hurry. The construction company was represented by the managing director, Mr. Old, already an elderly and experienced builder who was choleric under time stress. The company Beta, which rented the formwork, was represented by a sales representative, Mr. Black, who was young, very ambitious, focused mainly on large contracts, and was often under time pressure.

Mr. Old handed over the requirements and drawings to Beta for the project. After a week, Mr. Young submitted a formwork rental agreement. However, Mr. Old commented on the contract that the quantity and size of the formwork were inflated. However, he was assured by Mr. Black that the final billing would be based on the actual goods delivered. Mr. Old signed the contract after this verbal assurance because the building was already under construction and he was under time pressure.

When the formwork was delivered to the site, Alpha discovered certain deficiencies, namely that they had been supplied with 1,3 m of formwork instead of 65 cm. This caused them great complications during construction. Alpha also discovered that they had been supplied with much more formwork than they needed. They immediately complained about this situation. However, on the subsequent invoice, the price quoted was for the large formwork that was in the contract. Mr. Old only paid for the formwork as a deposit and therefore complained about the invoice. Mr. Black agreed that some amount would be deducted from the price and that the price would be compensated on the next job when the borrowed formwork would be given at a substantial discount. However, the condition was that Alpha should first pay the invoice (debt). However, this was refused by Alpha as it was not planning any orders in the foreseeable future.

The two companies' representatives reached an impasse, which was further complicated by the different communication styles of Mr. Old and Mr. Black. Beta Company referred the whole matter to its accounts receivable department and pursued Alpha Company. The matter escalated to such an extent that both parties began to contemplate going to court.

For the purpose of comparison, it is necessary to evaluate the cost aspect, in 2021 one Act of legal services costs EUR 207 according to the Decree on the prices of legal services (lawyer's tariff) in a dispute for EUR 4,065. The lawyer performed 3, so the total non-contractual fee is EUR 621 (excluding VAT), plus 3 overhead costs of EUR 12. In total, the costs of legal representation amount to EUR 657, if the lawyer has not charged anything else, such as travel expenses, etc. In addition, a court fee of EUR 203 must be taken into account. If the applicant had been awarded the full EUR 4,065, he would have had full (100 %) success and the unsuccessful defendant would have had to pay the full EUR 860.

A mediator stepped in at this stage of the dispute and conducted many separate meetings to define the interests of each party. Subsequently, the mediator succeeded in bringing the representatives of both companies, Mr. Old and Mr. Black, to the same table. The mediator summarised the situation and described the current situation. After a two-hour session, the two parties were able to "break the impasse" and an agreement was reached between them. Here could be seen the difference in the cost of mediation for 12 hours of the mediator's time – EUR 192. Both parties agreed to drop the lawsuit and terminate their business relationship. Mr. Black agreed to issue a credit note for a certain amount of EUR and the mediator would submit it against receipt of payment from Mr. Old. Both parties agreed to the agreed payment amount. In this case, the company has saved at least EUR 668.

3.5.2 Result of Mediation

It was interesting to note that the human relations factor played a role in the inability of both parties to reach agreement. Two very different types of representatives met, characterised by stubbornness, unwillingness to admit error, broken trust, failure to keep promises and sensitivity to unfairness. Yet this was a purely commercial case.

If this dispute could not be resolved through mediation, it would affect the good relations between the companies, but could lead to a court settlement. This would probably involve the employees - the managing

directors of both companies - being reprimanded for their inability to reach an agreement in resolving their business relations, and in the worst case, the possibility of the employee in question being dismissed. In connection with this, the companies would have associated legal costs and would have to pay their legal representatives in the court proceedings. The court could rule and award the truth to one party, which would have to pay the other entity's legal costs, as well as certain contractual penalties, as a material breach of contract.

The whole situation would thus cast a bad impression on both entities, as both parties to the dispute would be looking for arguments to damage the other party. This could also damage the reputation of the company in question. The financial costs of travelling to court hearings, allowing possible investigations into companies, and the loss of time are also significant. The article provides a comprehensive overview of the conditions and functioning of mediation services in the Czech Republic and Poland.

4 Conclusion

Mediation is a more efficient, quicker and cheaper way to resolve disputes between entrepreneurs and, very importantly, it does not damage the reputation of the companies.

The most significant differences between Czech and Polish mediation are in the legislative conditions for obtaining position as a mediator. On the other hand, in Poland, a person over 26 years of age can be a mediator, which can be seen as positive, as more experience can be expected.

Mediation is an alternative dispute resolution method that has a justified place in the dispute resolution system. Mediation can be used in different areas of disputes. The basic principles include the principles of voluntariness, confidentiality and non-bindingness. The interest of the parties involved in finding an amicable solution to the dispute is essential. The person of the mediator plays an important role in the mediation process. The mediator must be impartial, independent and able to communicate with the parties involved in the dispute. His main objective is to find an effective solution to the problem. The mediation process is less expensive than court proceedings, but it is also quicker and often more effective.

Mediation as such came to prominence about twenty years ago, initially it was only applied in the criminal justice sector, where it was used regularly. Over time, private law regulation has also evolved and in May 2012 the Act on Mediation in Non-Criminal Matters was adopted. This fulfilled the requirements of the European Union Directive on the incorporation of mediation legislation into the Czech legal system. The Act defines the concept of mediation in general terms, further regulates its course, such as the basic requirements for a mediator, the elements of the process, the conditions of performance and the activities of the mediators in question. The law is a certain guide for the uninitiated in the performance of mediation.

Mediation is an elegant approach to resolving commercial disputes that would culminate in either a lawsuit or a purchase of the receivables. The cost of mediation in the Czech Republic is about 16 EUR per hour. And the resolution time is about 10 hours (depending on the complexity of the dispute). The initiation of court proceedings, filing a lawsuit, lawyer's costs, court hearings and subsequent damages will amount to at least 1 620 EUR. Mediation is therefore a more efficient and cheaper solution.

The aim of the article was to explain the alternative dispute resolution methods, namely the mediation process. A specific example of mediation in resolving a conflict between two companies was also given to illustrate that not everything has to be resolved only through the courts.

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Evaluation of Housing Affordability in Czech and Polish Regions

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Abstract

Housing affordability is an important aspect of the socio-economic development of any society. However, there are large differences within the European countries in terms of size, kind and quality of housing. The shares of rental and owner-occupied housing also differ in individual countries significantly, including the evolution of house prices and rents. The paper is focused on the evaluation of housing affordability in the Czech and Polish regions. The aim is the comparison of Czech and Polish regions according to the selected housing indicators and calculated housing affordability index SAI. The result of the research is an evaluation of housing availability in a total of thirty Czech and Polish regions and a comparison of the development of housing availability in 2020 and 2022 in these regions.

Keywords: *affordability, Czech Republic, housing, ownership, Poland, real estate market, regions*

JEL Classification: *R30, P50*

1 Introduction

The availability of housing is an important topic of the present time (Baker, Mason and Bentley, 2015; Wetzstein, 2017; Ryšavý, 2021; Kašík and Slavata, 2018). Housing affordability broadly refers to the housing costs, both for renters and owner occupiers, relative to a given individual's or household's disposable income, mainly in the percentage (Bieri, 2014, CECODHAS, 2012). The most common notion of affordable housing implies that households that spend more than 30% of their gross income to obtain adequate and appropriate housing have an affordability problem, see Paris (2007). According to definition of Eurostat (Eurostat, 2021), a household is considered "overburdened" when the total housing costs represent more than 40 % of disposable income, where housing costs include mortgage or housing loans interest payments for owners and rent payments for tenants. For example, in 2020, 7.8 % of the EU population spent 40 % or more of their household disposable income on housing (Eurostat, 2020). Over the past couple of decades, housing affordability has become one of the most pressing challenges, especially in cities, where house prices have often outpaced national averages (OECD, 2021). Despite constant efforts from the governments to meet the increasing need for housing, many low- and middle-income households are getting priced out of cities (Czischke and van Bortel, 2018).

The paper is focused on the evaluation of housing affordability in the Czech and Polish regions. The aim is the comparison of Czech and Polish regions according to the selected housing indicators and calculated housing affordability index SAI. The affordability of housing in the Czech Republic has long been one of the worst in comparison with European countries. The Czech Republic also leaves the United Kingdom behind, even though nominal real estate prices are the most expensive here. This follows from the scientific study "Property Index -

Overview of European Residential Markets", see Deloitte (2021). Property index analyses factors shaping the residential real estate markets in Europe and compares residential property prices across selected European countries and cities. This index has been monitored annually for the last ten years. The analysis in the presented paper will be made with regard to regional differences with a distinction into regions. In addition to the regions in the Czech Republic, regions in Poland were selected for comparison. While the Czech Republic was evaluated as the worst among European countries in terms of the availability of new housing, a new apartment in the Czech Republic costs in 2021 12.2 of average gross annual salary, in Poland it was only 7.6 of average gross annual salary. The paper is focusing the issue at the regional level and is comparing the housing affordability in total of thirty Czech and Polish regions.

1.1 Housing in the Czech Republic and Poland

The situation on the housing market is different in many respects in the Czech Republic and Poland, see Eurostat (2020) or Ardielli and Ardielli (2018). The size of the construction sector measured through the gross value added (GVA) generated by this economic activity (as a share of total GVA) was in 2020 7.2 % in Poland. The value in the Czech Republic reached only 5.7 %. Investment in housing was in Poland 1.9 % of GDP in 2020, while in the Czech Republic it reached value 4.8 % of GDP. Looking at the trend of house prices between 2010 and 2020, there has been a steady upwards trend on both countries since 2013. However, in the Czech Republic, the growth was more significant.

The housing costs compared to the EU average differs significantly between EU countries. The Czech Republic and Poland reach below average values. The Czech Republic reaches 27 % lower value than the EU average, Poland even by 60% in 2020. With house prices and rents rising, the cost of housing can be a burden. This can be measured by the housing cost overburden rate, which shows the share of the population living in a household where total housing costs represent more than 40 % of disposable income. In the EU in 2020, 12.3 % of the population in cities lived in such a household, while the corresponding rate for rural areas was 7.0 %. The highert housing cost overburden rates in cities were observed in the Czech Republic (10.2 %) than Poland (5.4%), while in rural areas they were 3.6 % in the Czech Republic and 4.4 % in Poland.

Another way of seeing whether housing is affordable is by the share of housing cost in total disposable income. On average in the EU in 2020, 20.1 % of disposable income was dedicated to housing costs. The Czech Republic is below this average with a value of 19.3 %, also Poland with 17.1 %.

1.1.1 Housing in the Czech Republic

As shown by the above statistics, there is problem for many Czech households with access to affordable housing (Eurostat, 2020). Real estate prices in the Czech Republic are growing faster than household disposable income (OECD, 2021). This applies especially to Czech cities, where real estate prices often rise faster than the national average (Deloitte, 2021). Although rising real estate prices can be beneficial for a large part of their Czech owners, it is increasingly difficult for new entrants to the housing market, especially young people (Ryšavý, 2021). Due to the fact that rental prices are also rising and their offer is relatively limited, the market of private rental housing offers few alternatives for people who are struggling to find affordable housing.

Owned housing is currently the predominant type of property ownership in the Czech Republic (79% of households vs. 70 % of the EU countries average). The private rental housing market is relatively limited (21% of households vs. 30 % of the OECD average) see Eurostat (2020). In the conditions of the Czech Republic, a real estate bubble has been discussed in recent years. Czech real estate prices are inflated, by about 20 % - 30 %. In 2022, real estate continues to rise in price and their price has risen to such a value that it is no longer worthwhile to buy real estate for investment.

An important aspect in terms of housing affordability was the period of the corona crisis in 2020 and 2021 (Rogers and Power, 2020). The conditions on the Czech market led to further price increases in real estate (Ryšavý, 2021). However, demand for real estate has grown. It was reinforced by low mortgage interest rates, the perception of real estate as a safe form of investment, the abolition of real estate acquisition tax and other factors. The economic condition of Czech households deteriorated during the lockdown and the prolongation of the pandemic (Klimovsky, Nemec and Bouckaert, 2021). In order to prevent people from starting to leave their homes, the Czech government has taken a number of emergency measures in the context of the ongoing covid-19 pandemic. For example, it introduced mortgage deferrals, one of the most common support measures in OECD countries, which has helped alleviate urgent housing affordability problems. The pandemic so far has had a very different impact on owner-occupied and rental segments. In terms of owner-occupied segment, the pandemic has triggered even stronger demand, which in combination with limited supply and favourable financing conditions sent average transaction prices to a new record high in almost every larger city. (Deloitte, 2021) When the tourism industry came to a halt, the short-stay segment practically collapsed which meant that

owners of such dwellings were willing to compromise and offered these units for regular longer-term rental at a discount. Due to this, the overall asking rental level in the Czech capital Prague decreased by some 10 % during the course of 2020. The overall impact of the covid crisis on housing affordability is not yet known, but it is clear that the pandemic has reinforced the need to address existing problems in the area, such as insufficient housing supply and increased housing insecurity in many households (OECD, 2021).

1.1.2 Housing in Poland

Poles live mainly in detached houses – 50.2% and then in flats – 44.3% (Eurostat, 2020), which is not so common in EU. Average distribution of the population by type of dwelling in EU is 35.8 and 46.2% respectively. 17% live in semi-detached or terraced houses and 0.9% in other types of housing (Eurostat, 2020). This sounds quite positive for Poland considering the quality of living. There is also one of the highest ratios of housing ownership, because 72.5% inhabitants live in owner-occupied houses, without a mortgage or housing loan and only 13.1% in owner-occupied, with a mortgage or housing loan. Tenants are only 14.4%. This data can be confronted with overcrowding rate, which describes percentage of the population living in an overcrowded household, i.e. a household that does not have at its disposal a minimum number of rooms available, depending on the household's size, family situation and the ages of its members. In Poland this ratio is pretty high – 36.9%, while an average in EU is 17.5%. This shows that houses owned by Poles don't guarantee good housing conditions.

This corresponds also with level of housing costs, which often make up the largest component of expenditure for many households. Increases in housing costs can potentially lead to other expenditure being deferred or cancelled. In Poland housing cost overburden rate is quite low – 4.9% comparing with average for EU 7.8% and very low while looking at Greece (33.3%), Bulgaria (14.4%) or Denmark (14.1%). Housing cost overburden rate, analyzed by tenure status is high only for tenants who rent at market prices. Its value is 26.4%, while for EU it is 25.1% (Eurostat, 2018).

In Poland severe housing deprivation rate is one of the highest within EU. Only Romania, Latvia and Bulgaria note higher values. Comparing 2019 and 2020 there is observed a constant level at 7.9% (Eurostat, 2020). This means that almost 8% of population don't have an access to housing. Moreover, there is also a part of the population unable to keep home adequately warm. In 2017-2020 this share was 6; 5.1; 4.2 and 3.2% respectively (Eurostat, 2020). Positive changes were observed, but current energy situation will probably diverse this trend.

Concluding this description of housing conditions in Poland it can be stated that housing condition in Poland are satisfactory from quantitative point of view, but leave much to be desired from qualitative point of view. Although citizens have their own properties, they are not large enough to provide all households' members good conditions for living. And still there is a group of people who can't afford housing at all or need to rent at market prices that are too high for them (Willmann and Maciejasz, 2020).

2 Material and Methods

The aim of this paper is the comparison of Czech and Polish regions according to the selected housing indicators and evaluation of the level of housing affordability by usage of calculated housing affordability index SAI. The comparison is made at the level of the highest regional administrative units in the Czech Republic and Poland.

Two hypotheses were established as part of the presented research. Hypothesis H1 is as follows: *Housing availability in Czech regions is on average lower than in Polish regions.* Hypothesis H2 is as follows: *Housing availability is on average decreasing in Czech and Polish regions.* H1 is based on the claim that the availability of housing in the Czech Republic is one of the worst in European countries (Deloitte, 2021). H2 is based on the claim that the availability of housing in European countries has been decreasing in recent years (OECD, 2021). On the basis of these two presented hypotheses, it will be verified whether similar tendencies as at the state level are also observed in the regions.

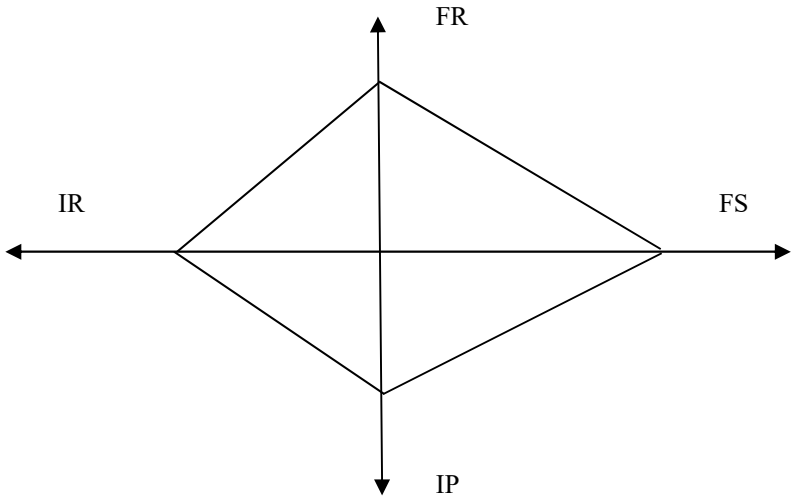
The Czech Republic is divided into 14 self-governing regions and 6,253 municipalities**.** The territory outside Prague is divided into 76 districts. Regions of the Czech Republic are higher-level territorial self-governing units of the Czech Republic. The administrative division of Poland is based also on three levels of subdivision. The territory of Poland is divided into voivodeships (provinces); these are further divided into powiats (counties or districts), and these are divided into gminas (communes or municipalities). Poland currently has 16 voivodeships, 380 powiats (including 66 cities with powiat status), and 2,478 gminas. The analysis is carried out in a total of 30 regions of the Czech Republic and Poland.

2.1 Model and Data

There are several approaches how to measure the housing affordability (Anacker, 2019 or Czischke and van Bortel, 2018). The main stream compares financial housing affordability. It simply compares ratios of financial index numbers. The most used indicator is income to price ratio or income to rent ratio (Bieri, 2014). The second stream of measuring housing affordability compares physical affordability. Generally, it answers the question how many flats are built or how many flats there are in the economy (URI, 2022). To use separate indicators of housing affordability it may not provide the objective view for the problem. We will try to develop new methodology in the field of housing affordability.

The new evaluation methodology which is presented in this paper valuates the housing affordability more complexly. It includes four basic indicators financial and physical. The indicators are IR (income to rent), IP (income to price), FS (flats for sale per 1000 inhabitants) and FR (flats for rent per 1000 inhabitants). Individual indicators are compared with each other when they are plotted on the axes, where the inner surface defines the level of housing affordability. Mutual interaction between indicators is clearly shown on the next Figure 1.

Figure 1 - The methodology of linking housing affordability indicators



Source: Own methodology

The indicators are set logical. The higher the value of the indicator, the better the affordability of the housing. The surface between the indicators (SAI) express complex level of housing affordability in region. The larger area bounded by indicators indicates better the level of housing affordability. The calculation of SAI is made according to the formula (1):

$$SAI = \frac{(FR*FS)+(FS*PI)+(PI*FR)+(IR*FR)}{2} \quad (1)$$

where

FR…….. Flats for rent per 1000 inhabitants

FS…… Flats for sale per 1000 inhabitants

PI…….. Price to income ratio

IR…….. Income to rent ratio

The calculation of FR, FR, PI and IR ratio is summarised in following formulas (2), (3), (4) and (5):

$$FR\ ratio = \frac{Fr}{Inh} \quad (2)$$

where

Fr…….. Flats for rent in the housing market

Inh. …… Population of region

$$FS\ ratio = \frac{Fs}{Inh} \quad (3)$$

where

Fs…….. Flats for sale in the housing market

Inh. …… Population of region

$$IP\ ratio = \frac{I}{P} \quad (4)$$

where

P…… Average flat price per m^2

I…… Average year personal income

$$IR\ ratio = \frac{I}{R} \quad (5)$$

where

R…… Average year rent per 67 m^2 flat

I…… Average year personal income

The above indicators will be compared in the presented research of 30 Czech and Polish regions.

As the main source of data describing Czech real estate market was used the internet analytical portal www.trzniceny.cz (Trzniceny, 2022). The data describing Polish real estate market were obtained from portal www.otodom.pl (Otodom, 2022). The data included the information about flat prices, rent prices and share of flats for sale. The other needed data were obtained from official national statistical offices www.czso.cz (CZSO, 2022) and www.stat.gov.pl. (STAT.GOV, 2022). Especially the information describing the level of salaries in Czech and Polish regions. The analysis corresponds to the situation on real estate market as of June 2022.

3 Results and Discussion

The basic data of housing market from the point of regions is shown in Table 1. Comparing the regional data, the highest prices of flats are indicated in the region Prague. Both the price of flats and the rents are higher in Prague. In Prague there are even the highest number of flats offered on the housing market for sale and for rent. In Prague there is the highest level of average year salary. The lowest price of flats is indicated in Usti region (33 000 CZK/m2). The lowest level of flats for sale is seen in Highlands region (248). The same the number flats for rent is indicated in Highlands region (121). The lowest rent is indicated in Moravian – Silesian region (170 CZK/m2/month). The lowest year salary is indicated in Karlovy vary region (39 1260 CZK).

Table 1 – Czech market basic data (June 2022)

Region	Population	Price per m^2 in CZK	Flats for sale	Month Rent per m^2 in CZK	Flats for Rent	Gross Year Salary in CZK
Prague	1275406	126500	3808	396	1912	581976
South-Moravian region	1184568	82100	1291	267	702	446052
Karlovy Vary region	283210	52500	800	179	152	391260
Central Bohemian Region	1386824	71900	1341	226	378	450984
Pilsen region	578707	58000	525	193	256	428724
Liberec region	437570	58100	589	212	230	410880
South Bohemian region	637047	57400	706	190	243	408156
Highlands region	504025	53500	248	202	121	416916
Hradec Kralove region	542583	65100	506	211	232	417756
Pardubice region	514518	60000	473	199	160	399600
Zlín Region	572432	55000	373	209	193	399624
Olomouc region	622930	52600	561	199	384	404640
Moravian-Silesian Region	1177989	42800	1548	170	1065	407772
Usti Region	798898	33000	1598	173	756	419448

Source: CZSO (2022), Trzniceny (2022), own calculations

The basic data of Polish housing market from the point of regions are shown in Table 2. Comparing the regional data, the highest prices of flats are indicated in Masovia region (75 141 CZK). Both the price of flats and the rents (346 CZK) are higher in Masovia region. In Masovia region there are even the highest number of flats offered on the housing market for sale (14 496) and for rent (3 394). In Masovia region there is the highest level of average year salary (46 6432 CZK).

The lowest prices of flats are indicated in Opole region (30 543 CZK/m2). The lowest level of flats for sale is seen in Opole region as well (851). The lowest number of flats for rent is indicated in Podlaski region (149). The lowest rent is indicated in Warmia-Masuria region (167 CZK/m2/month). The lowest year salary is indicated in Holy Cross Province (34 4785 CZK). CZK exchange rate is calculated to 28th June 2022.

Table 2 – Polish market basic data (June 2022)

Region	Population	Price per m^2 in CZK	Flats for sale	Month Rent per m^2 in CZK	Flats for Rent	Gross Year Salary in CZK
Lesser Poland	3410901	57394	6762	283	1415	402433
Masovia	5423168	75141	14496	346	3394	466432
Pomerania	2343928	68218	7046	316	574	407992
Podlaskie	1178353	42296	1413	238	149	369009
Greater Poland	3498733	47819	4016	226	1064	358826
Holy Cross Province	1233961	37040	1104	215	1819	344785
West Pomerania	1696193	43231	4155	269	2167	375743
Lublin	2108270	43725	2303	264	1923	359447
Kuyavia-Pomerania	2072373	36235	5341	226	2483	360173
Subcarpathia	2127164	43426	1361	209	1989	346907
Warmia-Masuria	1422737	33150	1460	167	1800	346755
Lower Silesia	2900163	45815	9385	321	2970	426967
Opole	982626	30543	851	200	1780	372229
Lubusz	1011592	31454	1401	223	1838	356199
Łódź	2454779	42532	3216	244	2201	385475
Silesia	4517635	35311	8330	238	1679	404234

Source: Otodom (2022), STAT.GOV (2022), own calculations

In Table 3 are shown the basic housing indicators in Czech Republic including the result value of SAI for the regions in the Czech Republic. The values show the lowest housing affordability in South Moravian region with its value of SAI 9.54. On the other hand the region with the highest value of SAI is indicated in Usti region. The housing affordability is the highest there. It is surprising that the Prague region is not the region with lowest housing affordability. The value of SAI is 14.68. The housing affordability in Prague is the fourth the best in the Czech Republic according to SAI indicator. The average SAI value of Czech regions is 15.62.

Table 3 – Affordability index SAI in the Czech regions (June 2022)

Region	Flats for rent/1000 inh.	Flats for sale/1000 inh.	IP	IR	FRxFS	FSxIP	IPxIR	IRxFR	SAI
Prague	1.50	2.99	4.60	1.83	2.24	6.87	4.20	1.37	14.68
South-Moravian region	0.59	1.09	5.43	2.08	0.32	2.96	5.64	0.62	9.54
Karlovy Vary region	0.54	2.82	7.45	2.72	0.76	10.53	10.13	0.73	22.14
Central Bohemian Region	0.27	0.97	6.27	2.48	0.13	3.03	7.78	0.34	11.29
Pilsen region	0.44	0.91	7.39	2.76	0.20	3.35	10.21	0.61	14.38
Liberec region	0.53	1.35	7.07	2.41	0.35	4.76	8.52	0.63	14.27
South Bohemian region	0.38	1.11	7.11	2.67	0.21	3.94	9.50	0.51	14.16
Highlands region	0.24	0.49	7.79	2.57	0.06	1.92	10.00	0.31	12.29
Hradec Kralove region	0.43	0.93	6.42	2.46	0.20	2.99	7.90	0.53	11.62

Pardubice region	0.31	0.92	6.66	2.50	0.14	3.06	8.32	0.39	11.91
Zlín Region	0.34	0.65	7.27	2.38	0.11	2.37	8.64	0.40	11.52
Olomouc region	0.62	0.90	7.69	2.53	0.28	3.46	9.73	0.78	14.25
Moravian-Silesian Region	0.90	1.31	9.53	2.98	0.59	6.26	14.21	1.35	22.41
Úsli Region	0.95	2.00	12.71	3.02	0.95	12.71	19.17	1.43	34.25

Source: CZSO (2022), Trzniceny (2022), own calculations

In Table 4 are shown the basic housing indicators in Poland including the result value of SAI for the regions in Poland. The values show the lowest housing affordability in Subcarpathia region with its value of SAI 12.07. On the other hand, the region with the highest value of SAI is indicated in Kuyavia-Pomerania region. The housing affordability is the highest there (SAI = 25.39). The average SAI value of Polish regions is 17.82.

Table 4 – Affordability index SAI in the Polish regions (June 2022)

Region	**Flats for rent/1000 inh.**	**Flats for sale/1000 inh.**	**IP**	**IR**	**FRxFS**	**FSxIP**	**IPxIR**	**IRxFR**	**SAI**
Lesser Poland	0.41	1.98	7.01	1.77	0.41	6.95	6.20	0.37	13.93
Masovia	0.63	2.67	6.21	1.68	0.84	8.30	5.20	0.52	14.86
Pomerania	0.24	3.01	5.98	1.61	0.37	8.99	4.80	0.20	14.36
Podlaskie	0.13	1.20	8.72	1.93	0.08	5.23	8.41	0.12	13.84
Greater Poland	0.30	1.15	7.50	1.97	0.17	4.31	7.41	0.30	12.19
Holy Cross Province	1.47	0.89	9.31	1.99	0.66	4.16	9.28	1.47	15.58
West Pomerania	1.28	2.45	8.69	1.74	1.56	10.65	7.55	1.11	20.87
Lublin	0.91	1.09	8.22	1.69	0.50	4.49	6.96	0.77	12.72
Kuyavia-Pomerania	1.20	2.58	9.94	1.98	1.54	12.81	9.85	1.19	25.39
Subcarpathia	0.94	0.64	7.99	2.06	0.30	2.56	8.25	0.97	12.07
Warmia-Masuria	1.27	1.03	10.46	2.58	0.65	5.37	13.51	1.63	21.16
Lower Silesia	1.02	3.24	9.32	1.65	1.66	15.08	7.71	0.85	25.29
Opole	1.81	0.87	12,19	2.31	0.78	5.28	14.11	2.10	22.26
Lubusz	1.82	1.38	11.32	1.99	1.26	7.84	11.25	1.80	22.15
Łódź	0.90	1.31	9.06	1.96	0.59	5.94	8.90	0.88	16.31
Silesia	1.82	1.38	11.32	1.99	1.26	7.84	11.25	1.80	22.15

Source: Otodom (2022), STAT.GOV (2022), own calculations

In Table 5 there are the values of SAI presented all together in Czech and Polish regions. There are compared the values of SAI in 2022 and 2020. In the third column there are presented the increases or decreases within the period. The values of SAI have decreased in most of the searched regions (26 out of 30).

The SAI indicates the most significant decrease of housing affordability in Prague region (-56,87 %). The decrease is the highest in comparison of 30 searched regions. The most significant decrease of Polish regions is shown in Pomerania (-28,25 %).

On the other hand, the increase of housing affordability is indicated only in Polish regions. The increase was found out in regions Subcarpathia, Holy Cross Province, Kuyavia-Pomerania and Warmia-Masuria. On average, between 2020 and 2022, the availability of housing in the regions of the Czech Republic and Poland decreased by 17.12 percent.

Table 5 – Evaluation of SAI Values (period 2020 - 2022)

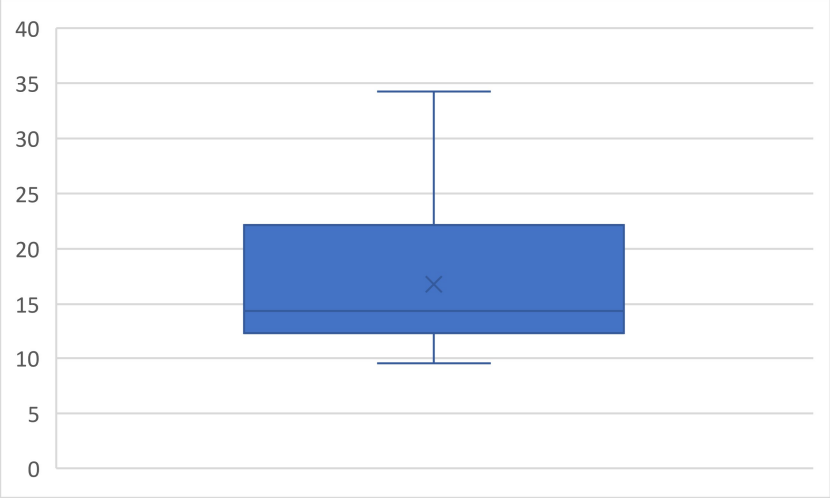
Region	**SAI 22**	**SAI 20**	**Change in % 22-20**
Prague	14.68	34.04	-56.87
Pilsen region	14.38	24.18	-40.54
Olomouc region	14.25	22.85	-37.64
Pardubice region	11.91	18.05	-34.01
Highlands region	12.29	18.18	-32.42
Karlovy Vary region	22.14	32.71	-32.30
Liberec region	14.27	21.04	-32.18

Hradec Kralove region	11.62	16.93	-31.36
Central Bohemian Region	11.29	16.37	-31.03
Zlín Region	11.52	16.56	-30.46
Usti Region	34.25	48.17	-28.90
Pomerania	14.36	20.01	-28.25
South Bohemian region	14.16	19.39	-26.97
South-Moravian region	9.54	13.05	-26.86
Moravian-Silesian Region	22.41	28.96	-22.61
Masovia	14.86	18.91	-21.43
Lesser Poland	13.93	17.23	-19.15
Lublin	22.15	24.99	-11.36
Silesia	22.15	24.99	-11.36
Lower Silesia	25.29	27.81	-9.05
Podlaskie	13.84	15.16	-8.73
Greater Poland	12.19	12.64	-3.53
West Pomerania	20.87	21.17	-1.43
Łódź	16.31	16.50	-1.16
Lubusz	12.72	12.82	-0.78
Opole	22.26	22.31	-0.22
Subcarpathia	12.07	12.00	0.56
Holy Cross Province	15.58	15.46	0.73
Kuyavia-Pomerania	25.39	24.13	5.21
Warmia-Masuria	21.16	13.18	60.55

Source: own calculations

Hypothesis H1 was confirmed. *Housing availability in Czech regions is on average lower than in Polish regions.* The average SAI value of Czech regions is 15.62 while he average SAI value of Polish regions is 17.82. As shown in Table 3 and Table 4. The greatest availability of housing was found in the Ústí Region (value of SAI 34.25), but higher values are achieved more in Polish regions (Kuyavia-Pomerania 25.39; Lower Silesia 25,29; Opole; 22.26 or Lubusz and Silesia 22.15). The average value of SAI in all thirty Czech and Polish regions is 16.79. Most of the Czech regions (except the Ústí Region, Moravian-Silesian Region and Karlovy Vary Region) are below this average. 7 Polish regions are above this average and 9 regions are below it. However, the last 5 places are occupied by Czech regions with a value lower than 12. The distribution of achieved SAI values is shown in the box diagram, see Figure 2. The median value is 14.37. The maximum value is 34.25 the minimum value is 9.54.

Figure 2 – Box diagram of achieved SAI values in Czech and Polish regions



Source: own calculations

Hypothesis H2 was confirmed. *Housing availability is on average decreasing in Czech and Polish regions.* In period 2020 - 2022, the availability of housing in the regions of the Czech Republic and Poland decreased on average by 17.12 percent. In all Czech regions, the drop in the SAI indicator was greater than 20 percent. A decrease of more than 20% was recorded only in two Polish regions Pomerania and Masovia. Other Polish

regions had values lower than 20 % and 4 Polish regions even recorded an increase in values. It is clear from this that the decline in the availability of housing between 2020 and 2022 is more pronounced in the Czech regions.

4 Conclusion

The aim of this paper was the comparison of Czech and Polish regions according to the selected housing indicators and evaluation of the level of housing affordability by usage of calculated housing affordability index SAI. The comparison is made at the level of the highest regional administrative units in the Czech Republic and Poland. Two hypotheses were established as part of the presented research. Both hypotheses were confirmed. *Housing availability in 2022 in Czech regions is on average lower than in Polish regions. Also housing availability is on average decreasing in Czech and Polish regions i*n period 2020 – 2022. The value of the decline in the monitored period is on average 17.12 %. The housing affordability has decreased since 2020 in most of the compared regions. In the Polish regions the housing affordability is more available in comparison of Czech regions. The region with the highest decrease of housing affordability is region Prague. The region with the highest increase of housing affordability is Warmia-Masuria.

Thanks to the research, it became clear that the situation in the field of housing availability is dismal in the Czech and Polish regions, while the situation in the Czech regions is worse than in the Polish regions and is still getting worse. It is necessary for the housing policy in both countries to adapt to this situation and try to facilitate the situation in the area of housing availability for people through its instruments, and above all help young people get their first housing and increase the availability of housing in large cities.

There are also some limitations of research, the selected indicators are only quantitative in nature. The methodology does not address the aspect of housing quality, which could be the subject of further research.

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The Impact of Organizational and Legal Changes in the Municipal Economy of the Effectiveness of Services Provide

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Abstract

The author of the article makes the research hypothesis that the local governments should join the restructuration programs of the municipal companies with more engagement because there are too less changes which would allow more efficient, cheaper and more competitive their management. Privatization is one of the restructuration methods recommended by the local governments which already have executed it. These are the actions which many local governments needlessly refrain and postpone them in time being afraid of sizes and scale of the changes in a company after their implementation. The local communities lose on such proceeding as they are forced to use expensive low-quality services. The purpose of the article is evaluation whether the change of the organisational and legal form from the budget unit to the limited liability company is effective. There will be used analysis of literature studies and source data concerning the Municipal Sports and Recreation Centre limited liability company in Radom to solve the created research problem. Results of the conducted research were included in the summary in points from 1 to 9, which prove that the assumed research's goal in the article's introduction has been achieved.

Keywords: *budget unit, municipal company, privatization, restructuration, services*

JEL Classification: *P43, R53*

1 Introduction

Let us quote what some contemporary researchers of services included in the literature of the subject. Thus, (Lange, 1967, p. 46) thinks that the services are activities related to satisfying of human needs and they do not serve to satisfy direct production of materials goods. While Kotler in his work *'Marketing'* writes that a service is any action which one part can offer to another, it is intangible and does not lead to any property (Kotler, 1994, p. 53). Finally, (Chmielewski, 2001, p. 13) claims that the services are the third emerging sector of business activity which aim is to satisfy growing material and non-material needs.

In summary, it can be generally stated that the term service originates from economic theories and means all useful activities related to non-productive work in contract to the activities leading to production of material goods. Taking into account non-material nature of the social services it is worth to remember about demarcation of a service from material tool of its provision (for example, swimming pool and swimming, tennis court and playing tennis, football pitch and playing a match on it). The distinction presents two essential levels of provision and consumption of the services:

- level of the services' infrastructure analysis,

- level of the services' satisfaction.

However, classical theorists coming from the property school claimed that public property of a land (or other permanent resource) inevitably means dispersion of responsibility and lack of constant aspiration to its smart using, taking care of it and keeping for further users. Aristotle, among other things, wrote about it: 'the more people are entitled to something, the less effort it can count on', that it becomes a team property (Aristoteles, 2006, p. 133). It can be confirmed by observations regarding the use of communities, which are devastated,

overexploited because they can be used for free. The opinion can be confirmed by experiences of the local government authorities with parks and recreational devices (Hardin, 1968, p. 1243).

In the 1980s, a new public management's concept appeared in the western countries' literature (Now public management – NPM), which was a kind of managerial revolution in the public economy. The model is aimed to release of the public sector's initiative by using funds from the private sector (Grzymała, 2010, p. 33). The new public management in a commune is reflected in the managerial management's model in which the NPM instruments can be used, such as for example the communal property's privatization, contracting services outside or public-private partnership. The model is based on the formula which brings benefits. It can be expressed by the equation: Privatization + Market + Competition = Efficiency + High Quality (Rosen , Gayer , 2008, p. 66).

In relation to the above mentioned, the local governments should become more involved in restructuring programs of the municipal enterprises. There are still too less changes realized which would allow to manage of the municipal enterprises in more effective, cheaper and more competitive way. One of the restructuring methods is the privatization what not only the Treasure Ministry and experts encouraged to but also the local governments which have already realized it. There are the actions which many local governments needlessly defend themselves and postpone them being afraid of extends and scales of the changes in an enterprise after its implementation. The municipal enterprises are often unprofitable and require investments. Mainly, local communities which are forced to use expensive services with low quality lose on it.

It has passed more than 30 years since the act of the local government was established and more than 20 years since the act of the municipal government. Hence, the normative regulation of economic activity which is subject of the research in this article is dispersed in numerous legal acts (mostly in the 90s of the last century). It caused that many researchers of the issue have focused on this problem trying to sort out the existing terminology in the literature. The commentary of the municipal economy act which analyses the most important issues related to its interpretation and related legal acts deserves special attention. It is based in major perspective on experiences deriving among others from practice. The study takes into account changes resulting from the act of commercialization modifying regulation relating to the municipal companies created from transformation of the municipal enterprises (Banasiński, Jarosiński, 2017, p. 103)

On the other hand, in the normative texts and the literature there are three the most common terms in this field. The terms include: 'municipal economy', 'public utility', 'economy activity'. The problematics of categorization of the concepts related to the communal property and the relation between them was dedicated the fifth chapter about the act of the municipal government (Cern, 2019, p.120) writes more about it in his monograph. However, M. Stec pays attention that a basic regulator and a factor having significant importance in consideration of the inconsistencies and incompleteness of the legal solutions is judicial decisions which must be analysed and used in the course of business research of the local government (Stec, 2017, p. 33- 46).

Taking into account the above considerations in this article and time censorship, the investigated communal entity determines up to the moment of the transformation as a budget unit being part of a legal person which is a commune and after the transformation as a municipal company having a separate legal personality.

An instrument that allows to test effectiveness and efficiency of the operation are measures which usefulness depend on correctness of their selection. The properly selected measures allow for a constructive assessment of the unit's functioning and as a consequence on increasing of the effectiveness of the incurred expenses. The measures provide information on both about degree of achievement of the assumed goals and the costs of their achievement in order to influence the decision-making process. Accordingly, the requirements for their construction become important. Emphasis on the effectiveness caused separation of the measures in terms of product, result and impact (Hałaburda, 2017, p. 18).

The product measures reflect execution of a task in the short term. They indicate on specific products (i.e., goods and services) obtained in the process of tasks' realization. Their task is evaluation of the achieved results (e.g., number of complaints about provided services, sales volume, etc.).

On the other hand, the result measures estimate direct effects obtained as a result of implementation of the tasks also in the short term (e.g., monthly number of working hours, number of employees).

Whereas, the impact measures describe long-term effects. They measure long-term consequences of the actions (Lubińska and others, 2011, 33), therefore they are the most difficult to construct because there must be considered the risk problem in them (e.g., surveying opinions of users of the goods and the services, safety of the provided services, etc.)

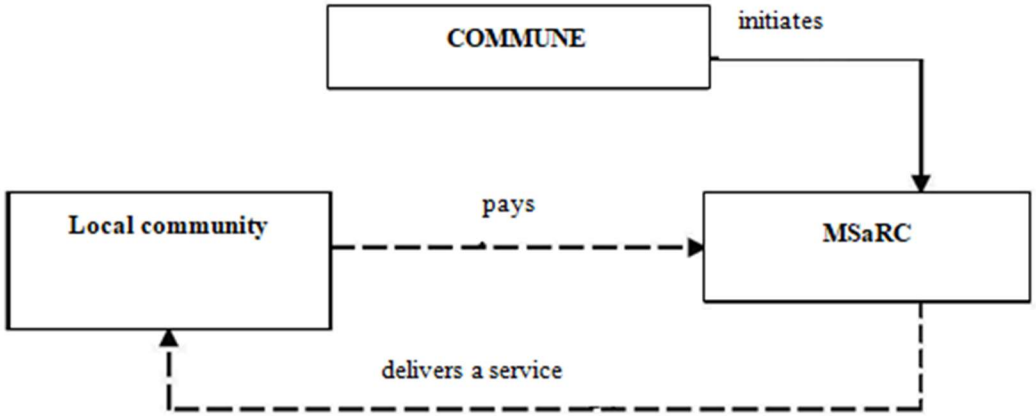
The aim of the article is to estimate whether change of the organizational and legal form of the entity from a budget unit to a limited liability company is rational and effective. Perhaps, it is according to the classical principle of economics, where it is claimed that actions will be rational if there is maximizing of an effect having

given expenses. There can be used an analysis of literature studies and analysis of the source data concerning the Municipal Sports and Recreation Centre limited liability company in Radom, hereinafter referred MSaRC to solve the mentioned research problem. The community of Radom has 100% shares in the entity's company providing physical education and tourism services as well creating organizational conditions conductive to development of sport.

2 Specifics of Communal Services Provision – Theoretical Approach

The local communities want to live in communities which are friendly and take care about them. This is usually reflected in prices and quality of the provided communal services which affect the standard of living. This is a purpose of competition which leads to lowering prices and favours increasing services quality. Changes in the municipal economy sector have just such market mechanics to be implemented in this area. It is necessary, because most of the communal companies although they act in the situation of natural monopoly, they also must take care of costs reduction and solicit of customers' satisfaction. Initiator (the commune), consumer (the local community) and manufacturer (MSaRC) are connected by some streams: reporting demand, delivering services and payments. The relations between the three participants of the services are presented on the figure 1.

Figure 1 - Relations between the initiator of the services, the local community and the manufacturer



Source: own study based on [Gruber, 2016, p. 73]

The municipal sector is a specific area of economic ac t. The services due to existence of expensive infrastructure creating often by all residences of a commune cannot be subjected of a competitive struggle. The communities' authorities providing the services through their own business entities occur in a double role – the entrepreneur who should be oriented towards profit's maximization as well to be a representative of the local communities' interests and therefore they must take care of a competitive price and good quality.

Separation of the entrepreneur's role from the market regulator's role is a solution of the situation. The community should not run a business activity but only focus on being an initiator (the regulator) making sure that the procedures and services quality which are interests of their residents are followed. The municipal economy includes mainly tasks of public utility nature which purpose is continuous and uninterrupted meeting of collective needs of the population through providing the commonly available services. The commune is responsible for ensuring adequate services supply but it does not have to realize them by themselves.

The next step after transformation into a company is decision to acquire an investor and resale of parts of its shares. The resale package usually does not exceed 49% of the company's value. There are already many solutions in Poland where the local government decided to partial resale of the existing municipal companies. Advantage of the solution is acquiring of know-how from an ordinary foreign investor specialized in a given field and also funds for future investments (Żarska, 2007, p. 72).

The public utility's services are characterized by high share of fixed costs what affects a small possibility to lower the price. On the other hand, they operate in a stable demand environment what makes possible to lead a long-term planning and realization of the investment. Providing the public utility's services through the companies established by the communes brings more effective and rational use of the own property. Comparison of the employment's efficiency in the commercial law companies and in the form of the budget institutions presents definitely more effectiveness of the companies. In the municipal enterprise work efficiency is mainly determined by factors which are independent of an employee including in particular through implementation of mechanization and automation of many activities and it is much lower in comparison with other fields. Hence, it has limited cognitive value because it is mostly determined by demand's variability (Bachor, 2009, p. 103). In

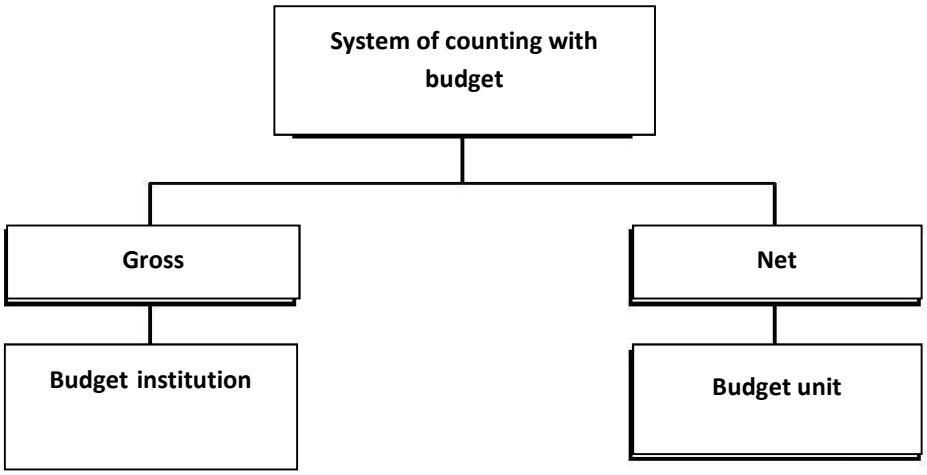
relation to the above mentioned, appears a question: whether transformation of the units and budget institutions into commercial law companies is a future of the municipal sector?

3 Organizational and Legal Changes in 1990 – 2019

In relation to the time censorship during the considered period from 27th May 1990 (the moment of the local government's reactivation in Poland) till 3rd June 1997 which is the date determined by the municipal economy's act ordering the local governments by the power of law to transformation of the municipal enterprises applying regulations concerning the state enterprises into the commune companies. The changes first of all were forced on the municipal enterprises which till 30th June 1994 did not perform the transformations by themselves what they were obliged by the regulations (The regulations putting into practice the act of the territorial local government,1990). However, it is worth to notice that there were companies which previously felt the need of transformation and they realized it, e.g. The Municipal Communication Companies, The Municipal Waterworks Companies, etc.

The functioning economic entities can be categorized from different points of view and for different purposes. One of the criteria is the method of counting (connections) with the budget. From this point of view the organizational units are divided into units connected with the budget by gross and net method.

Figure 2 - The system of counting with the institution's budget and the budget unit



Source: own study based on the (public finance act from, 2009).

The system of the net connections is divided into two types. The first is more typical and it relies on including to it the general difference between sums of the incomes from sales and sum of expenses to maintain a given unit. In case to keep a positive result, an enterprise makes payments to the budget, in the opposite case, it means a negative result the enterprise can be supplied in the form of a budget subsidy. Sometimes instead of the simple solution the connection system with the budget can be more complex, namely there are several balances including in the budget economy resulting from compensation of the sums of a different kind of incomes and expense. It should be noted, that within the net system some special resources functioned till 30th June 2005 but they did not matter too much.

The gross system is the second method of connections of the entities with the budget (full amount of the incomes and expenses). It finds usage in relation to the budget institutions.A characteristic feature of the units is that their expenses are covered by the budget; it means they are budget expenses. The obtained by them incomes are fully paid to the budget i.e., they are budget incomes. Therefore, it can be said that the budget institutions only administer incomes of a given budget institution. The method of the entities and budget's connections means that the whole sum of each income and each expense is a component part of the budget economy.

The public finance act from 27th August 2009 had one main purpose to improve the public finances, among others by limitation of the organizational and legal forms of the sector and also to strengthen of the precaution norms in the TLGU budgets. Based on the new act, as it was mentioned the auxiliary farms were liquidated and the scope of the activities of the budget units limited to a specific catalogue of the own tasks (Sońta, 2010, p. 88). The transformation procedures in the capital companies differ fundamentally from the procedures in the entities of the local government's sectors both in terms of legal regulations as well organizational and legal ones. They are focused on the fact that the newly created entities were more effective in their activity and to exclude the risk related to their future functioning. In the study concerning the privatization pilot program 150 municipal

enterprises it was claimed that majority of the municipal enterprises after the change of the organizational and legal form, mainly from the unit or the budget unit into the commercial law company – improved its profitability (Majewski, 2005, p. 66). The essence of the corporate procedure of merger of the companies comes to that fact that from two separate economic structures and wealth masses is created one entity – an acquiring company or a newly established company.

4 Effectiveness of Providing Services After the Transformation of the Municipal Sports and Recreation Center (MSaRC) into a Company

The entities providing goods and services subordinated to the local government should operate according to the principles of efficiency and effectiveness which are often marginalized in practice (Szołno, 2016, p.10). The public finance act in its content repeatedly indicates importance of the efficiency and effectiveness imposing them on the public sector entities in terms of functioning and spending of the public funds 'with respecting the rules of obtaining the best results from the given expenditures and optimal selection of methods and means aimed to achieve the set aims' (Ustawa, 2009).

The effectiveness of spending the public funds should be considered as searching for savings in terms of application of the solutions which will maximize the effects (Matwiejczuk, 2006, p. 43). However, the savings should not be perceived as a mechanical reduction of the expenses and desisting of performing of some public tasks but as spending of resources in such a way to bring the greatest benefits. The effectiveness depends on achieving the set aims having the best ration of the incurred costs to the achieved results, hence the classic input-effect relation (Kachniarz, 2012, p. 23). On the other hand, the effectiveness means achieving the set aims what somehow marginalizes the cost's side. In the public finance sector, the effectiveness should refer to direct aims, tasks and activities. Management of the effectiveness is based on monitoring of the relation between the costs and the achieving results. Precise and ongoing monitoring becomes a chance to obtain satisfactory results in realization of the entrusted tasks.

An instrument which allows to test the effectiveness and efficiency of the operations are measures, which usefulness depends on correction of their selection. Properly selected measures allow for a constructive assessment of a unit's functioning and, as a consequence, increasing of efficiency of the incurred expenses. The measures provide information both about level of the set aims' realization and costs of their achievement in order to influence on the decision-making process. Therefore, their construction's requirements become important. Emphasis on the effectiveness and efficiency resulted in separation of the measures in terms of product, result and impact. The product measures reflect execution of a task in a short time horizon. They indicate specific products (i.e., goods and services) obtained in the tasks' process execution. Their task is to evaluate the achieved results (e.g., number of complaints about the provided services, sales value). On the other hand, the result measures measure direct effects obtained as a result of the tasks realization also in a short time horizon (e.g., monthly number of working hours, employment's level). While, the impact measures describe long-term effects. They measure long-term consequences of actions (Lubińska et al., 2011, p. 50-69) therefore they are the most difficult to be constructed because the risk problem should be assessed in them (e.g., surveying opinions of users of the goods and services, safety of the provides services).

The Municipal Sports and Recreation Centre limited liability company in Radom was established in 2004 as a result of liquidation of the budget institution with the same name. Sport facilities of the MSaRC are: Orka, Delfin and Aquapark Neptun swimming pools; playground with artificial surface; athletics and football stadium; sports hall; Borki recreation centre; artificial ice rink. As it results from the above it is a significant property which assets reach 85 million PLN. Moreover, the MSaRC has many investments and among them construction of a football stadium at the Struga street which is dedicated for 15 thousand viewers. The residents of Radom can use the City Bike program since April 2017.

This part of the thesis will be focused on evaluation of effectiveness of the provided services after the transformation of the MSaRC into a company. Operational efficiency measures of the MOSiR functioning were presented in the table 1. There was performed evaluation of effectiveness and verification of the assumed research hypothesis based on them that change of the organizational and legal form from a budget unit into a limited liability company has improved functioning of the MOSiR.

The research sample consisted of 30 employees employed in the audited company and in the supervisory body of the City Hall of Radom. There were people who were well informed regarding the studied issue. Selection of the sample relied on selecting of the employees employed before and after the performed changes. The study covered period of 6 years i.e., from 2014 (the year of transformation of the budget unit into the limited liability company) till 2019. The year 2020 was excluded from the research due to the financial turbulence related to the pandemic and thus other conditions of the company's functioning.

Scale of the effectiveness' evaluation was set from -2 to +2 of each criterion included in the table 1. Next, the number of the obtained points from the survey was multiplied by a criterion factor included in the description under the table. Moreover, in the 'no-change' column there was given in brackets a number of respondents who have chosen such evaluation. It is surprisingly high amounting even 164. Taking into account too short period of the company's functioning in the new organizational and legal form; such phenomenon should be considered as normal.

Table 1 - Evaluation of the effectiveness of the provided services of the MSaRC after the transformation into a company

No.	**Evaluation in the range**	**Much better**	**Little better**	**Without changes**	**It is worse**	**Much worse**
1	Sales increase	+20	+8	0 (4)	- 6	-4
2	Increase in profitability		+5	0 (10)	- 10	-10
3	Decrease of costs			0 (15)	- 10	-10
4	Improved flow		+ 10	0 (10)	- 5	-10
5	Increase in investment expenditures	+ 30	+15	0		
6	Improvement of the services' quality	+ 10	+15	0 (5)	- 5	
7	Improvement of profitability index of the equity capital	+ 40	+ 5	0 (5)		
8	Improvement of management's effectiveness	+20	+10	0 (10)		
9	Better relations with the commune	+20	+10	0 (10)		
10	Employment growth		+5	0 (25)		
11	Increase of employees' wages		+5	0 (25)		
12	Increase of fees' tariff			0 (25)	- 5	
13	Safety of the services' provision		+ 5	0 (20)	- 5	
14	Total	+ 120	+ 93	0(164)	- 46	-34

Description: much better + 2, little better +1, without changes 0, it is worse -1, much worse - 2.
Source: own study based on the carried out survey

After the transformation of the MSaRC into the limited liability company and performing evaluation of the basis economical and financial indexes, it should be noted that the sales increased, however the fact did not cause increase of the profitability. It is also worse in terms of the cost's reduction. However, the situation in terms of quality of the provided services has been slightly improved. It was also noticed a slight improvement of the company's financial solvency. The situation is much better in terms of increase of the investment expenditures what the company has influence in terms of access to the financial resources (bank loans, leasing, aid funds from the UE). The significant improvement of the profitability index of the equity capital deserves attention. During the considered period, both the wages as well the employment's level remained unchanged. There was observed a slight increase in the wages among the least-paid people what was related to legal regulations concerning the minimum wage.

The effectiveness of the company's management has been improved what resulted better relations with the commune. Finally, another problem is a level of the tariffs. The budgetary institution did not have to charge the depreciation, so the tariffs were relatively lower in comparison with compered to the ones agreed by the MSaRC. On the one hand there is assumed that the enterprises should be profitable, on the other hand they realize a social mission to meet basic and necessary needs. They should not strive to maximize the profits what would be quite easy to implement with monopolistic position on the local market. Reconciliation of the economic function with the social one would make impossible automatic applying of the market price (Sadowy, 2010, p. 65).

It must be noted that the MSaRC was not a dominant company on the Radom market in the field of the swimming pool and artificial ice rink services and it had a competitive commercial company operating on the Slonecza Housing Estate. The swimming pool was put in service recently, so standard of its equipment is more modern and thus the provided services are diversified and at a higher level. In the initial period of its functioning the fees were comparable with the municipal company to attract the customers and next when they have been gained the prices were increased. It is worth to notice that the swimming pool is located in the city centre close to the Slonecza Housing Estate and it has a large parking as well convenient access by the public transport communication what is an additional advantage influencing usage of its services.

The conducted survey according to the age groups in different sports facilitates of the MSaRC took 100 people of the local community[**]. The respondents could give more than one possibility; hence sum of the points can be more than the surveyed population in the given age group.

Table 2 - People who used the services of the MSaRC by age

Age	Mass events*	Swimming pool	Water Sports	Winter Sports
0 - 17	25	25	16	14
18 - 30	35	20	10	15
31 - 50	20	22	5	6
50 +	15	15	2	3

* matches and sports competitions
Source: own study based on the carried out survey

It results from the survey that the greatest interest in all the age groups had the mass events and on the second position was located the swimming pool. The water and winter sports had similar interest among the age groups because they are sport which can be played in summer or winter season. The times when swimming pools were built outdoor and they were used only in summer season gone forever. The motives why the respondents used the services are willingness to spend free time actively what declared 50% of the surveyed people, improvement of physical fitness 30%, promotion of attitudes to improve health 20% (especially in the age group plus 50). There were met disabled people with their cares among the respondents what should be considered as a positive phenomenon because it prevents their social exclusion. Analysis of the effectiveness of the MSaRC services provision after the transformation into the company is presented in the table 3.

Table 3 - Evaluation of the effectiveness of the provided services of the MSaRC after the transformation into a company by the recipients

Evaluation in the range of	Much better	Little better	Without changes	It is worse	Much worse
Quality of the services	+ 58	+ 30	0 (20)	- 15	- 12
Tariff	+ 70	+ 20	0 (23)	- 12	- 20
Safety	+ 78	+ 25	0 (22)	- 10	- 8
Total	+206	+ 75	0 (65)	- 37	- 40

Description: much better + 2, little better +1, without changes 0, it is worse -1, much worse - 2.
Source: own study based on the carried out survey.

The analysis shows that quality of the services increased but there was also observed increase of the tariffs. There are also people who are sceptical about the fact. Referring to the safety on the stadiums and the swimming pools the evaluation was positive. However, after one of the lost football matches by Radomiak a group of hooligans invaded a nearby Lesniczowka park and there they released their negative emotions by destroying benches, overturning waste bins, breaking young trees. It was hard to believe that heavy concrete bins were scattered all over the park. It happened because the police had been protecting the streets while the park was unsecured. It should be noted that the occurrence was incidental, because since then passed four years and there were not observed any similar situations

5 Summary

It results from the carried out analysis that the changing legal regulations which were targeted on the forms more effective at the given time had influence on the organizational and legal changes of the MSaRC. In the studied period there was observed the changes starting from the municipal enterprise functioning on the basis of the regulations of the state enterprises' act to the commercial law companies. The situation has been changed when Poland jointed the EU. The public aid which in the EU as a rule is prohibited to the member states according to the act 107 paragraph 1 of the Treaty about functioning of the EU, the C 326/49, 2012 Official Journal of the European Union also in relation to the municipal sector what is an essential element of proceeding of the competition on the market was limited. There was implemented a new form of the internal entity for a transitional period. Whether the time will be properly utilized by the municipal enterprises and local governments, will be shown in the future?

[**]The survey was conducted by students of the UTH in Radom as a part of physical education subject.

The arguments for creation of the M.S.a R.C. limited liability company to manage the sports and recreation facilities comparing to the commune's budget institution are:

1. Running a business in the form of a company increases autonomy of the unit and motives to search additional possibilities on the market.
2. Management of the company as 'on its own' and it is interested in reduction of the costs,because the savings' effects remain in the enterprise and they are not transferred to the commune's account as it is in case of the commune's budget institution.
3. Possibility of extending the scope of the activity outside the commune and beyond the range of public utility at the same time maintaining the rules of providing the sports facilities to the commune's residents.
4. Possession of legal personality thanks to which it has possibility to individually gain capital, for example taking loans, leasing, entering into a public-law partnership or applying for aid funds; the budget institution does not have a legal personality what causes that in a certain sense it is an 'invalid' economic entity.
5. Separation of the obligations resulting from the company's operation beyond the commune's budget does not increase of the general budget debt.
6. The company offers opportunities of independent investment's activities (among others building of a sports and entertainment hall).
7. Quicker responding on the customers' needs even due to independence in management of the company's resources.
8. Possibility to calculate depreciation.
9. Possibility of further VAT deduction what with the current legal status regarding the budget institutions become impossible.

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Comparison of Approaches to Talented Employees in Border Regions of the Czech Republic and Poland in an SME Environment

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Abstract

Managers and business owners who want to maintain their position in the marketplace through competitive advantage realize that one of the ways to achieve this desired effect is by having the right and capable employees. Due to market instability characterized by radical changes in labour and product environment, a company's development and often bare survival depend on the human factor. Without a suitable, capable, but above all loyal workforce, businesses will not be able to respond to changes in the environment. This is also true for SMEs. Because of the lower financial resource base compared to large firms, a loyal workforce base is one of the fundamental success factors. This paper builds on previous research on talented workers, this time; however, the focus is narrower, the SME environment. The authors of this paper defined the basic rules and techniques used in SMEs to search for employee talent in an international comparison within the Czech Republic and Poland.

Keywords: *competitive advantage, human potential, SMEs, talented employees*

JEL Classification: *M12, M20, M53, M54*

1 Introduction

Human resources play an essential role in all organizations, especially in today's dynamically changing business environment. Human resource management must be addressed by every enterprise, as the knowledge and skills of employees are the keys to the whole company's success. The human factor contributes in no small part to the overall prosperity of an enterprise and can therefore be considered one of the most important. This proved to be particularly significant during the crisis that was the COVID-19 pandemic. In a crisis, a dedicated and talented team proves invaluable. The coronavirus pandemic forced many entrepreneurs to review and re-evaluate their approach to their own business. As it turns out, a loyal and talented employee is far more critical than financial considerations for employers, able to respond to change and come up with new and out-of-the-box ideas. Loyalty involves commitment, trust, a sense of belonging to the company, and identification with its policies and goals. Gaining such loyalty in a talented employee requires taking appropriate action in many companies and business areas. This applies more to small and medium-sized enterprises, where they cannot compete with the big players in the market from the point of view of pay or additional financial incentives. Therefore, to attract and retain such individuals, they should put in place a talent management system. Otherwise, it is often only after a valuable employee has left that a company realizes how much it has lost, especially now that labour market surveys show that half of the employees surveyed say they are prepared to give up their job if the company does not meet their requirements.

Although there are studies that, to some extent, address specific solutions for SMEs wishing to implement a strategic approach to talent management, these are only partial country-specific studies (Pauli and Pocztowski, 2019). Therefore, this paper provides room for comparison as its authors focused on analysing talent management in Poland and the Czech Republic. Although these countries have similar economic and historical development, it is also possible to define differences in approaches to talented employees. At the same time, as these countries are close to each other (often cooperating in international or cross-border cooperation), this paper can help summarise good practices operating in different environments. The authors of this paper therefore defined the basic methods and techniques used in small and medium sized companies to search for employee talent.

2 Talent Management

Regarding the notion of talent management, Boxal and Macky (2009) stress that if the company, enterprise, or any other organization to survive in the current and future challenging environment and, even better, achieve excellent results in the long term, it must recognize the need to work actively with talent and to develop a systematic approach to this work, and authors understands talent as one of the specific and essential components of human capital. In general, most people in organizations tend to be equipped with far more ingenuity, skills, talent, and creativity than their current job requires. Therefore, according to Samanta and Eleni (2021), talent management should be concerned mainly with how to identify people with significant potential in selected areas and how to ensure that they make this potential available to the organization in order to achieve the desired results better. Business managers usually think of talent as employees with potential, then employees with very high performance, and finally, employees identified for future vital positions. Talent is, therefore, usually defined as an employee who is a high performer and, at the same time, demonstrates considerable development potential for the future. In practice, this may mean working with above-standard performance, acting as a role model for others, having the potential to handle a more demanding role or job, and having an apparent aptitude for performing specific creative professional activities. Therefore, the term talent can be interpreted in several ways, which is also valid for talent management. However, the most commonly used terms are talent and aptitude, which are traditionally related to abilities and usually express an above-average development level.

Despite the ambiguity in the literature and research, the most commonly used definition here is that of Collings and Melahi (2009), whereby talent management can be defined as the totality of systematic actions and processes that are aimed at identifying critical positions in the organization, developing the competencies of employees with high potential or above-average performance, and implementing human resource management solutions that create the conditions for the use of talent and ensure their ongoing commitment to the organization.

Tureckiova (2011) emphasizes that the talent management strategy of a particular organization must always be in line with the overall strategy of that organization. He also lists the essential tools and components of talent management:

- talent assurance strategy,
- talent acquisition and stabilization policies and programs,
- a talent audit identifies people with potential and provides the basis for good career planning and development,
- creating jobs and roles for people to perform so that jobs and roles encourage responsibility, initiative, and autonomy,
- managing relationships with talent,
- performance management,
- total reward strategies,
- training and development policies and programs,
- career management consists of career planning and succession management, with particular attention given to talented people.

The implementation of talent management includes several steps (Bláha et al. (2013). The process starts with identifying critical functions, specifying the requirement to cultivate talent, recognizing key competencies, constructing an evaluation scale, recognizing talents from internal/external sources, and completing the definitive talent pool. Recognizing the critical roles (vacancy risk disrupting the company and its success) is crucial and often performed through brainstorming. It is then conceivable to analyse risks and identify critical roles (Horváthová, 2011). Crucial competencies represent competencies appropriate for employee success; their

combinations are the main factors that distinguish a company from the competition and are essential for its success.

All competencies must be considered according to their usefulness to the company. A prediction of the potential where the employee can move in particular areas should follow (Hasan and Saufie, 2021).

The talent pool means defining talented employees who are called talents, which can be further divided into top talents, talents, and possible talents (according to performance and potential).

The main benefits of a correctly set and applied talent management system in an organization can be considered to be the fact that talented employees contribute more to the fulfilment of the organization's strategy and economic goals than average employees, not to mention those below average (Horvathová, 2011). Thanks to good talent management, the costs of turnover or recruitment of new employees decrease, individual organizations become a sought-after and attractive place for talented employers, and they can identify and retain all talented employees in their workforce. Succession planning for key positions is also much more effective thanks to talent management, as is, for example, sourcing and motivating employee.

If attention is focused on talent management in the SME environment, several key characteristics can be identified based on research (Valverde, 2013). In the first instance, performance is given more weight than potential when identifying talent, but knowledge, skill, and identification with the company are highlighted when identifying key talent characteristics.

Another aspect is that those identified as talents occupy different positions, but these positions are nevertheless seen as key. It is worth mentioning that in small and medium-sized companies, there is both an inclusive and an inclusive approach to talent management, i.e. the activities carried out overlap to some extent with the standardized ones, but some companies differentiate the scope of their programs.

3 Material and Methods

This is a follow-up research of the authors, where the initial questionnaire was presented to global firms; now, the focus is on local SMEs, focusing on local markets operating in the region (Štverková, Pohludka, Czerná, 2021). Thus, the first part of the questionnaires was constructed similarly, to determine what facts led the management to develop talented employees, what approach to strategy is preferred and what benefits they expect from these steps.

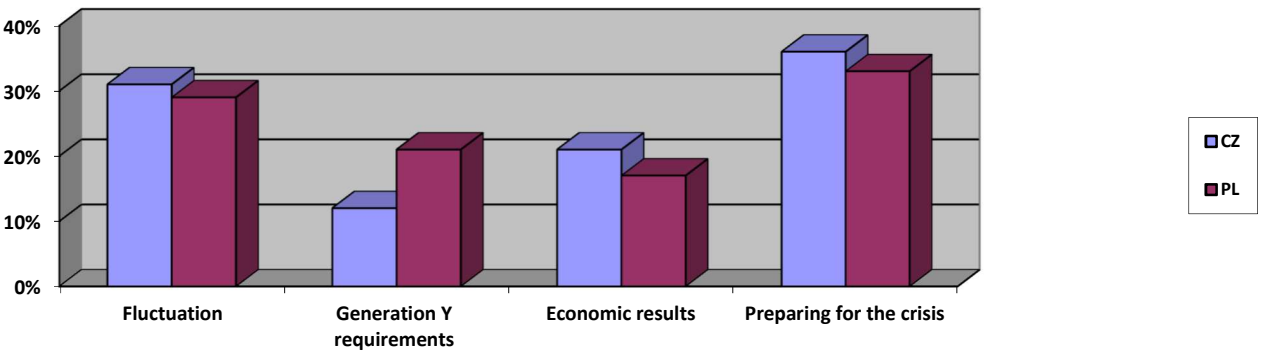
For further detailed analysis a questionnaire survey was performed among selected talents and managers or owners of selected SMEs to describe the effectiveness of specific talent management methods on a scale from 1 to 5. The rating of 1 was highly effective, and five were utterly ineffective. Respondents in the Czech Republic and Poland were contacted (60 managers or owners in each country), and 40 representatives of talented employees were also aimed.

Given that less than 1% of managerial positions are considered talents, this group of respondents is large enough, and the outputs are therefore sufficiently informative.

4 Results and Discussion

The analysis of the questionnaire survey results showed that in SMEs focused on local markets, the reasons for working differently with the specific group – talented employees - vary., see Figure 1.

Figure 1 – The reasons for work with talents.



Source: own research

Fluctuation is gaining importance, with companies trying to fight the outflow of good employees, and a new reason has emerged (compared to the previous survey), namely preparing for the crisis, which was identified by 36 % of Czech surveyed firms and 33 % of Polish surveyed firms as a reason for talent management.

The approach and perception of talent management by owners and managers of SMEs focused on local markets is also interesting. Although retaining talented employees is perceived as a priority in 79% and 84% of cases in Polish and Czech companies, respectively, Polish companies surveyed usually do not develop a talent management strategy, see Table 1.

Table 1 – Approach to strategy.

Country	**Strategy for TM**	**Individual case-by-case**
CZ	63 %	37 %
PL	21 %	79 %

Source: own research

Subsequently, a comparison was made with the results of the previous analysis, which focused on global SMEs in terms of desirable education methods and the development of talented workers, see Table 2. It was found that within local SMEs (regardless of the country studied), less traditional approaches such as home office work policies, flexibility, and work-life balance appear on the list. In the case of global enterprises, items such as coaching, rotation, mentoring, and professional lecture appeared on the list.

Table 2 – Methods of education and development of talented workers - comparison.

Global SMEs	**Local SMEs**
Coaching	HO work policies
Professional lecture	Corporate brand
Workshop	Balanced work life
Rotation	Showing appreciation
Mentoring	Internship
Internship	Health benefits
E-learning	Teamwork
Working on a project	Project-based work
Teamwork	Self-development programs
Shading of managers	Workshop
Management skills courses	Career advice
Self-study	Flexibility
Self-development programs	E-learning

Source: own research

Next, the authors surveyed and compared the responses of individual groups (i.e. talented workers themselves and managers/business owners) and asked them to rate individual talent management methods and tools, see Table 3.

Table 3 – Tools TM.

Methods/Groups	**Talents**		**Owners/managers**	
	CZ	PL	CZ	PL
HO work policies	79%	75%	45%	38%
Corporate brand	19%	22%	52%	48%
Balanced work life	88%	78%	37%	40%
Showing appreciation	65%	33%	29%	33%
Internship	29%	8%	83%	76%
Health benefits	19%	22%	55%	62%
Teamwork	78%	80%	19%	32%
Project-based work	38%	44%	12%	19%
Self-development programs	67%	52%	52%	47%

Workshop	22%	12%	34%	29%
Career advice	55%	76%	12%	13%
Flexibility	65%	55%	21%	31%
E-learning	73%	68%	78%	60%

Source: own research

Based on the responses, it is clear that the answers vary from group to group. Although talented employees themselves perceive home office policies (79 % CZ, 75 % PL), balanced work-life (88 % CZ, 78 % PL), teamwork (78 % CZ, 80 % PL), career guidance (55 % CZ, 76 % PL), and flexibility (65 % CZ, 55 % PL) - regardless of country - as key and highly desirable elements, owners/managers tend to marginalize these elements and want to focus on internships (83 % CZ, 76 % PL), health benefits (55 % CZ, 62 % PL), or improving the corporate brand (52 % CZ, 48 % PL), thus creating loyalty among talented employees.

These two groups of respondents agree on the importance of e-learning and self-development programs. Interestingly, the Czech and Polish SMEs surveyed rarely differed in their responses within countries. The most notable differences were the approach to showing appreciation, internships, and workshops in the case of talented employees. Indeed, in the case of showing appreciation, the Czech talented employees surveyed indicated this option in 65% of cases, whereas the Polish side only in 33% of cases. A similar trend is also noticeable in the case of an internship, where talented Polish employees interviewed are interested in this tool only in 8% of cases (CZ 29%) and in the case of workshops in 12% of cases (CZ 22%).

At the same time, talented employees in both countries were asked to indicate the most critical priorities for talent development within talent management, see Table 4.

Table 4– The main priorities of talent development within talent management.

Priorities	**Talents**	
	CZ	PL
Self-knowledge and changes in thinking	62%	43%
Stability and job security	59%	69%
Diverse and inclusive of all types of people organization	42%	35%
New measurement of productivity	38%	50%
Purpose	32%	52%

Source: own research

For Czech talent (if the focus is on three main priorities), these are self-knowledge and changes in thinking (62%), stability and job security (59%), and diverse and inclusive of all types of people organization (42%). In Poland, on the other hand, these are stability and job security (69%), purpose (52%), and a new measurement of productivity (50%).

5 Conclusion

At the same time, the dynamically evolving economic and business environment requires organizations to react and adapt quickly to change, but this is impossible without a base of loyal and talented employees. The employee core helps a company maintain its market position, fight competition and meet customer needs. This is particularly true for local SMEs that focus on regional markets, have closer customer relationships, are more flexible and responsive to change, but cannot compete with large enterprises in terms of financial resources. However, this shortcoming may also affect the ability to retain talented employees, as SMEs cannot offer a high level of financial incentives.

Therefore, SMEs use other instruments. However, talented employees do not always consider financial incentives the most important. Therefore, this paper aims to analyze the approach to talented employees in the environment of local SMEs in the context of a cross-national comparison of Poland and the Czech Republic. It was found that in both countries, SMEs use talent management tools because they want to prepare for the crisis. The period of the COVID-19 pandemic proved that talented and creative employees could help a company overcome the most difficult times. However, differences in strategic approaches have been noted. In Poland, it relies more on an individual approach. They do not include a unified Talent Management strategy in the corporate strategy. Instead, they treat talented employees as exceptional individuals and try to find tailor-made

solutions. While this solution may work in the SME sector (where there are fewer employees), a certain degree of formalization of the strategy could help at least in the phase of identifying talent and then creating talent pools. At the same time, detailed interviews of managers/business owners with talented employees would be appropriate. Indeed, the analysis found a split between the perception of essential tools and methods of talent management between talented employees and owners/managers.

Talented employees in an SME environment are not interested in financial incentives. Instead, they are more interested in security, flexibility, home office, and learning opportunities. Functioning within diversified teams is also an essential element, where daily work can lead to learning when different professions and personalities are included in the team. New talent in SMEs also requires a change in the measurement of productivity, i.e., a shift from the classic perception of only results but also a perception of the benefits of the work for the company or society as a whole, which is also linked to the need to perceive the purpose of the job.

This paper was limited by the data, as only 1% of employees are considered talented. At the same time, companies perceive working with their employees as sensitive know-how. However, it is the first step toward international comparison, where further research should focus on a broader range of countries, such as the V4. Such a comparison would help companies use best practice examples and get inspired to work with talented employees.

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Financing of Education in Municipalities in the Context of Pupils Number Criterion Application when Sharing Taxes

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Abstract

One of the criteria on the basis of which municipalities in the Czech Republic obtain funds from shared taxes is the criterion of the number of children and pupils in schools established by municipalities. Due to the determined share of shared taxes, according to their revenues and according to the number of children and pupils, the volume of funds that municipalities receive per child or pupil, differs. These funds are not intended for municipal schools, so the municipalities can use them at their discretion, however, the question is whether these funds are sufficient for the municipalities for education. The fund affects the overall structure of resources and costs in the field of education, established by municipalities, because the expenditures of municipalities on education make up a significant part of municipal budgets. The goal of the contribution is to evaluate the size of funds from shared taxes on education from the point of view of municipal costs for education. The methodology of this evaluation is based on the analysis of municipal expenditures on education, which is, however, connected with the problem of extracting municipal expenditures on education, paid from shared taxes, because in addition to resources from shared taxes, municipalities can obtain special subsidies from, for example, the state budget.

Keywords: *municipal budgets, pupil, shared taxes, tax*

JEL Classification: *H52, H71, H72*

1 Introduction

The resources of municipalities in the Czech Republic consist of tax revenues, non-tax revenues, capital revenues and transfers. The main part here is represented by tax revenues, which on average make up around 70% of the total revenues of municipalities. Except for the greater part of transfers, which are provided with a specific purpose, municipalities can use all resources at their own discretion for various areas of municipal development.

As part of municipal tax revenues, the decisive part of revenues is made up of revenues from shared taxes. The shared taxes here are personal income tax, corporate income tax and value added tax. The way taxes are shared is based on criteria derived from the relevant parameters of individual municipalities. Each criterion also has its own weight. The criteria for tax sharing by municipalities are thus:

- number of inhabitants of the municipality,
- the number of inhabitants of the municipality adjusted according to the size category of the municipality,
- area of the municipality,
- the number of children and pupils attending municipal kindergartens and primary schools,
- the number of employees in the municipality.

The criterion of the number of children and pupils is to create resources for municipalities, for the functioning of kindergartens and primary schools. These schools are not established by all municipalities in the Czech Republic; those municipalities that do not establish a school have access to schools in other municipalities. This form of shared taxes abolished the previous obligation between municipalities to pay non-investment expenses by municipalities that do not have a school to other municipalities (Gargulák et al., 2020).

The originally introduced sharing of education taxes in the amount of 7% did not correspond to the municipalities' costs of education (SMO CR, 2017). This share has been increased to 9% of shared taxes since 2018. Municipalities thus obtain funds for the operation of their education, which depend not only on the number of pupils in schools, but also on other circumstances, namely the volume of revenue from shared taxes collected in the relevant year and the total number of children and pupils in schools established by municipalities in the Czech Republic. It follows from this that the amounts per child or pupil change every year. On the other hand, there is the expenditure of these municipalities on education, and the question is whether these resources of the municipalities from shared taxes affect the expenditure on education. Funds for education from shared taxes are not purposefully determined, so there is not even a clear relationship to what extent these funds are sufficient to finance education. The problem of evaluating the relationship between the resources from shared taxes on education and the expenditure of municipalities on education is mainly that municipalities also obtain other resources for education in the form of transfers, and therefore the relationship between shared taxes on education and expenditure on education cannot be directly quantified.

Therefore, the aim of this contribution is to evaluate the amount of funds from shared taxes on education in terms of the costs of municipalities for education in the period from 2017 to 2021. The observed period includes both the last year of the lower share of shared taxes for education (7%) and the years with the new share (9 %).

In a broader relationship, the given issue fits into the context of fiscal federalism, which deals with the distribution of financing of public goods between different levels of public budgets. In the conditions of the Czech Republic, the financing of basic education established by municipalities is divided between two levels of public budgets. Part of the funds is provided directly to municipal schools by the state, and these funds cover the schools' costs, especially for teachers' salaries and school supplies; the other part of the costs of municipal schools is covered by resources from the municipal budget, which are provided to municipalities from shared taxes. In addition to these two majors and regularly applied sources, municipal education is supplemented by transfers mainly from the state budget, the EU budget, etc., from various programs in the form of investment and non-investment transfers, and therefore the spectrum of municipal resources for financing education is greater.

The issue of tax revenues of municipal budgets and the financing of education from municipal budgets is dealt with by a number of authors, and one can refer, for example, to the publications of the authors Sedmihradská (2015), Peková (2011), Toth (2011), Tománek (2014, 2017, 2019, 2021), Blöchliger and Campos (2011), Musgrave and Musgrave (1994), Cureton (2012), Blöchliger et al. (2007), etc.

2 Material and Methods

In order to fulfill the goal of the contribution, it is necessary to analyze the expenses of the municipal budgets. Data of the management of municipalities in the Czech Republic is monitored by the information system of the Ministry of Finance of the Czech Republic Monitor. This information system includes data of the management of all municipalities. There are points of view that can be followed for a given purpose, both the sectoral structure and type structure of expenses, the type structure of income; but the sectoral structure of income does not apply to the entire set of income, as, for example, income from transfers is not monitored by sector (Budget composition, 2021); these data are needed to perform an analysis of the management of municipalities in terms of income and expenditure on education.

On the expenditure side, it is possible to identify in detail, for example, what types of schools the funds are provided for, in what form, etc. However, the monitoring problem here are the individual resources of the municipalities. In addition to resources from shared taxes, there are a number of subsidies that municipal budgets receive for education, however, the volume of these subsidies is not monitored from a sectoral point of view, and thus only data on transfers are available, without their purposeful determination. When analyzing 6,254 municipalities in the Czech Republic, it is not possible to determine the focus of these subsidies individually. The analysis can thus be based on the mentioned available data from the Monitor system, or on other information from public budgets, from which relevant conclusions can then be derived and discussed.

2.1 Expenditure of Municipalities on Education

The total expenditure of municipalities on education (education and school services) in the years 2017 to 2021 contributed to the total expenditure of municipalities from 15.3% (2017) to 17.6% (2019). The relative reduction

in the share of municipal expenditures on education in 2020 and 2021 can have relationship with impact of Covid-19 on the management of municipalities (see Tab. 1). It thus appears that municipal expenditures on education make up a relatively large part of municipal budgets.

Table 1 - The share of municipal expenditures on education

Year	2017	2018	2019	2020	2021
Total expenses of municipalities (in million CZK)	272 796,4	322 567,8	334 934,1	349 944,9	359 079,2
Expenditure of municipalities on education (in million CZK)	41 737,5	50 185,1	58 974,4	57 228,0	58 266,8
Share of expenditure on education (%)	15,3	15,6	17,6	16,4	16,2

Source: Own processing based on Monitor.

Table 2 - Expenditures of municipalities on primary and kindergarten schools as part of education expenditures

Year	2017	2018	2019	2020	2021
Education and school services (in million CZK)	41 737,5	50 185,1	58 974,4	57 228,0	58 266,8
Primary and kindergarten schools (in million CZK)	33 420,4	40 883,5	48 700,4	45 901,0	45 918,0
Share (v %)	80,1	81,5	82,6	80,2	78,8

Source: Own processing based on Monitor.

It must be said, however, that municipal expenditures on education do not only consist of expenditures on kindergartens and primary schools, and that part of municipal expenditures on education is not registered in the municipal budget, but only in the budgets of municipal schools. Municipal expenditures on kindergartens and primary schools represent around 80% of total municipal expenditures on education (see Table 2).

2.2 Municipal Resources for Financing Education

The total resources of the municipalities, which cover the expenses of the municipalities on education, generally consist of the following parts:

- shared taxes,
- individually provided purposefully determined transfers (non-investment and investment),
- transfers from the state budget to teachers' salaries and school supplies provided directly to schools (funds are provided directly to schools without connection to municipal budgets),
- other resources from municipal budgets (which balance the difference between total expenditures and municipal resources for education).

Due to this structure of resources and due to the approach to monitoring municipal expenditures, it is not possible to determine on the basis of municipal budgets the extent to which municipal funds from shared taxes cover municipal expenditures on education. On the basis of the national system of registration of the management of municipalities (Monitor), only some information can be deduced about the extent to which funds from shared taxes, provided according to the number of pupils, cover these costs.

Funds from shared taxes per pupil are not purposefully determined, so municipalities can use them as they wish. The funds are not even defined methodically, whether they are only funds for the operation of schools (current expenses) or also for investments (capital expenses). However, in relation to the concept of criteria, these are resources for kindergartens and primary schools established by municipalities.

2.3 Expenditure by Municipalities on Mindergartens and Primary Schools

Municipal expenditures on kindergartens and primary schools can be divided into current and capital expenditures. Current expenses account for around 70% of total expenses (see Tab. 3).

Table 3 - Expenditure by municipalities on kindergartens and primary schools

Year	2017	2018	2019	2020	2021
Total (in million CZK)	33 420,4	40 883,5	48 700,4	45 901,0	45 918,0
Current expenses (in million CZK)	25 137,0	28 049,0	32 885,2	31 406,7	33 531,0
Share of current expenses (in %)	75,2	68,6	67,5	68,4	73,0

Source: Own processing based on Monitor.

Municipalities' expenses on primary and kindergarten schools are mainly spent in the form of grants to schools as contribution organizations. However, it turns out that another form of financing of education by municipalities is also used, namely that education expenses (e.g. expenses for energy, repairs, investments, etc.) are covered directly by the municipality (not a contribution organization) from its budget.

In order to evaluate the expenditure of municipalities on primary and kindergarten schools, different variants of the view on the relationship between resources and expenditure can be applied, which are based on the registered structure of income and expenditure. Two variants were specified for evaluation.

Variant 1

The methodology of variant 1 is based on the evaluation of municipal expenditures on kindergartens and primary schools, which are always paid only from their own resources. In order to be able to determine the amount of municipal expenditures on kindergartens and primary schools, which are paid from the municipalities' own resources, it is necessary to reduce the municipalities' expenditures on kindergartens and primary schools by those expenditures for which transfers can also be sources. These are the following types of municipal expenditures (budgetary items are listed in parentheses):

- non-investment transfers to non-profit and similar organizations (item 522x),
- non-investment transfers to established contributory organizations (when the municipality acts as an intermediary in the transfer of subsidies), (item 5336),
- buildings, halls and constructions (code 6121),
- investment transfers to established contributory organizations (item 6351),
- other investment transfers, where municipalities fulfill the role of an intermediary (item 6356).

Furthermore, municipal expenses can be reduced by levies from school depreciation to the municipal budget (item 2122).

It is then necessary to reduce the expenses of the municipalities on kindergartens and primary schools by these items, which makes it possible to define the resources that the municipalities always cover from their own resources (see Table 4). The calculated value of the total expenditure of municipalities on kindergartens and primary schools, reduced by the mentioned selected items (see Tab. 4), thus represents the minimum amount of expenses that municipalities cover from their own resources, which are either funds from shared taxes or other budget sources.

Table 4 - Selected items of municipal expenditure on kindergartens and primary schools (in million CZK)

Year	2017	2018	2019	2020	2021
item 522x	119,4	136,8	155,1	182,9	218,0
item 5336	9 529,4	11 105,2	14 914,1	13 136,7	15 314,6
item 6121	7 557,9	11 313,3	13 652,9	12 657,7	10 678,7
item 6351	329,6	547,6	654,6	537,2	512,0
item 6356	11,0	115,5	325,6	370,9	359,3
item 2122	409,3	416,7	448,3	473,4	535,3
Total expenses for kindergarten and primary school	33 420,4	40 883,5	48 700,4	45 901,0	45 918,0
Total expenses - selected items	15 463,8	17 248,3	18 549,8	18 542,0	18 300,1

Source: Own processing based on Monitor.

Based on the stated value and the number of pupils, the relationship between the size of the shared taxes that the municipalities receive per pupil and the actual expenditure of the municipalities per pupil can be evaluated. It turns out that in the entire observed period, the amount of expenditure per pupil was greater than the volume of

shared taxes per pupil (see Tab. 5). If we then project the above result into the share of shared taxes on education, then the share values should be higher in individual years (see Tab. 5). In this variant of the assessment, it turns out that in most years the share was higher; in 2020 it was by 0.6 percentage points (the only exception was 2021, which must be taken as specific due to the effects of Covid-19).

Table 5 - Expenditure per pupil from selected items in % (V1)

Year	2017	2018	2019	2020	2021
Total expenses - selected items (in million CZK)	15 463,8	17 248,3	18 549,8	18 542,0	18 300,1
Numbers of pupils	1 227 324	1 245 043	1 257 832	1 269 658	1 270 029
Actual expenditure per pupil (V1) (in thousand CZK/pupil)	12,6	13,9	14,7	14,6	14,4
Income per pupil from shared taxes (in thousand CZK/pupil)	9,5	13,7	14,5	13,6	15,3
Share of shared taxes according to law	7 %	9 %	9 %	9 %	9 %
Actual share of shared taxes (V1)	9,3	9,1	9,2	9,6	8,5

Source: Own processing based on Monitor, data of the Ministry of Finance of the Czech Republic.

Variant 2

In variant 1, only those expenses that the municipalities could not cover from sources other than their own were included in the municipalities' expenditures on kindergartens and primary schools from the municipalities' budgets. The mentioned variant 1 is therefore the minimum option in terms of own resources used by municipalities to finance kindergartens and primary schools. However, municipalities also spend funds on kindergartens and primary schools, for which their own resources and transfers can be sources. Due to the fact that the exact identification of transfers in the aggregate for the municipalities of the Czech Republic cannot be discoverable from the Monitor system, a certain simulation is carried out for the calculation in variant 2, based on other data on the management of territorial budgets (from the source of the Ministry of Finance of the Czech Republic, data from the final accounts of the state budget of the Czech Republic were used).

From the point of view of this variant, it is possible that investment expenses for municipal kindergartens and primary schools in item 6121 buildings, halls and constructions are covered not only from transfers, but also from the municipalities' own resources. Subsidy programs from the state budget for investments in education can be taken as a source of transfers for these expenses. Transfers to municipalities within the program to support the development and renewal of the material and technical base of education in 2020 and 2021 did not exceed the volume of CZK 3 billion, which is less than 30% of the size of item 6121; however, if we choose any other options for obtaining transfers for municipal education, then with a reserve we can use for the calculation the assumption that the expenses for buildings, halls and constructions were 50% paid by the municipalities from transfers and 50% had to be paid by the municipalities from their own resources.

In this variant 2, an increase in the original expenses of the municipalities (variant 1) by 50% of the expenses on the buildings, halls, constructions item shows the result of the simulation (see Tab. 6). This shows that the shares of municipalities in shared taxes on education should be increased by about 3 percentage points compared to the current situation, from 9% to at least 12% (with the exception of the specific year 2021).

Table 6 - Expenditure per pupil from selected items in % (V2)

Year	2017	2018	2019	2020	2021
Total expenses – selected items + 50% item 6121 (in million CZK) (V2)	19 242,8	22 904,9	25 376,3	24 870,9	23 639,4
Number of pupils (V1=V2)	1 227 324	1 245 043	1 257 832	1 269 658	1 270 029
Expenditure per pupil (in thousand CZK/pupil) (V2)	15,7	18,4	20,2	19,6	18,6
Income per pupil from shared taxes (in thousand CZK/pupil) (V1=V2)	9,5	13,7	14,5	13,6	15,3
Share of shared taxes according to law (V1=V2)	7 %	9 %	9 %	9 %	9 %
Actual share of shared taxes (V2)	11,5	12,1	12,6	12,9	10,9

Source: Own processing based on Monitor, data of the Ministry of Finance of the Czech Republic.

3 Conclusions and Discussion

The contribution deals with the issue of resources for financing kindergartens and primary schools established by municipalities. Within the framework of tax revenue systems for municipal budgets, the criterion of the number of children and pupils is applied, according to these numbers the municipality receives a share of taxes, which is set at 9% (2021). The contribution deals with the evaluation of the situation from the point of view of whether the stated share of 9% is adequate for the costs that municipalities spend on kindergartens and primary schools.

This evaluation from a macroeconomic point of view, i.e. for the set of all municipalities, based on the data of the information system monitoring the management of individual municipalities in the Czech Republic Monitor. However, this information system does not allow identifying all the necessary financial relationships within municipal budgets, especially in cases where municipal income is from subsidies, so it is appropriate to discuss different variants of the approach.

The analysis showed that the municipalities spend the main part of the resources of the municipalities on education in the form of contributions to their contribution organizations, but a certain part of the resources of the municipalities are spent on kindergartens and primary schools directly from their budget in a different form than in the form of a contribution, i.e. in such a way that the schools are paid directly by the municipality and therefore will not be reflected in the school budget. These are purchases of water, fuel and energy, repairs and maintenance, purchases of small fixed assets, etc., which in the monitored period accounted for approximately 15% of the total expenses for kindergartens and primary schools.

Given that the analysis is based on data for all municipalities in the Czech Republic, municipalities were not monitored individually, and the results thus provide an answer for the average of the Czech Republic. The 5-year analysis also showed a tendency to increase the size and share of municipal education costs in municipal budgets, when only the year 2021 marked a defection from this tendency due to various difficulties in the functioning of the economy in connection with Covid-19.

Two variants were chosen for evaluation. The first variant includes the minimum range of municipal expenditures on kindergartens and primary schools paid from their budgets. Variant 2, in a broader context, considers that a certain part of the municipalities' investment expenses in education (for which transfers can be the source) is also covered from their own resources.

Both variants showed that from the point of view of the relationship between resources from shared taxes and municipal expenditures on primary and kindergarten schools, the used share of 9% (2021) of shared taxes is small and should be increased. This increase should then result from specifying what is to be financed from these funds. If it should be current expenses (variant 1), then the increase should reach, according to the current trend (with the exception of 2021), a level of approximately 10%, assuming that resources for municipal education will be supplemented by investment resources from transfers. Or at least 13% (variant 2), if funds from shared taxes should also be used for municipal investment expenses in education.

4 Conclusion

The given contribution focused on the issue of the distribution of shared taxes within the municipal budgets. Here, one of the criteria is the number of children and pupils who attend kindergartens and primary schools established by municipalities. The relationship between these resources from shared taxes and municipal spending on primary and kindergarten schools is the subject of debate, given that it is not precisely specified what the resources from shared taxes for education should cover. The contribution analyzes the actual expenditure of municipalities on education and, given that it is not possible to clearly define all resources for financing education in municipal budgets, it works with variants. In the minimum variant 1, which evaluates only the size of current expenses, but also in variant 2, it appears that the municipalities are generally unable to cover the costs of education from resources from shared taxes.

The contribution affects the overall view of the management of municipalities in the field of education, or evaluates average values for the Czech Republic, which may differ from the average in individual municipalities. An analysis of a sample of municipalities and their expenditure on education (including resources) in the longer term could provide a more detailed view.

The contribution creates the conditions for a discussion of changes in the structure of shares in individual shared municipal taxes on the basis of exact documents.

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Mental Health of Elderly People: A Regional Perspective

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Abstract

Mental health of the population is a priority in the health policies of every developed country. Reducing the stigmatisation and discrimination of people with mental illness across the age groups has been an objective of various initiatives and strategies on the local, national, as well as international level. A good-quality and accessible psychiatric care helps improve the access by people to mental health. This paper aims to evaluate mental health of the population aged 65+ according to selected psychiatric diagnoses from 2010 to 2020 in the regions of the Czech Republic. The evaluation covered all patients aged 65+ in treatment of mental health illness, and subsequently, analyses were made of patients with diagnoses F0–F9, G30, F20–F29, and F40–F48. The largest number of patients aged 65+ in treatment for psychiatric disorders is in the Capital City of Prague, the South Moravian Region, and the Plzeň Region. Approximately 71.2% of the total number of patients treated were women. Furthermore, it was established that within the period under review (2010–2020), the highest average yearly increase in patients aged 65+ was in the case of diagnosis G30 (dementia in Alzheimer disease), specifically, by 6.86%. Ensuring good quality of life of the elderly also means supporting their mental health through targeted programmes like cognitive rehabilitation, but also by accessible and good-quality medical and social services.

Keywords: *elderly people, mental health, psychiatric disorders, regions*

JEL Classification: *C02, I12, H10*

1 Introduction

Population health is of interest in all developed countries. Health is a recognised value of the human society, the basic human right, means of achieving goals, society's priority on the national, international, as well as global level. Health is not only the physical fitness of an individual, but also the psychological and social balance that allows the individual to locate and fulfil their roles in the social and working life. The World Health Organisation defines mental health as "a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community" (WHO, 2001). Mental health is influenced by a variety of factors, for instance, individual psychological and biological factors like emotional skills, genetics, and substance use, which means that people deal with psychological problems differently. Risks associated with mental unbalance are manifested in all stages of the human life from the early childhood until old age. The support and prevention of mental health affects various areas of the national economy like public health, education, housing, social care, etc. However, the health sector that covers this area can make a significant contribution to improving mental health not just by rendering good-quality and accessible medical services, but also by supporting and initiating cross-sectoral cooperation and coordination.

The support of mental health of the population applies to all age groups, including elderly people. Dementia and Alzheimer disease are viewed as a global problem within public health. Life expectancy currently increases in both genders, a fact that, among other things, increases the pressure on ensuring both medical and social care of these persons. This fact has been brought to light by strategic documents on both the national and international

level. The Mental Health Declaration for Europe, adopted in Helsinki in 2005, states that mental health "is central to the human, social and economic capital of nations and should therefore be considered as an integral and essential part of other public policy areas such as human rights, social care, education, and employment" (WHO, 2005). Following this strategic document, the European Commission issued the Green Paper: Improving the mental health of the population: Towards a strategy on mental health for the European Union. It specifies the measures to support mental health in various target groups, and also focuses on the support of mental health in older people because older age is associated with a multitude of problems that are likely to trigger mental disorders. The highest burden is late-life depression and neuropsychiatric conditions like various aetiologies of dementia. According to Holmerová (2007, p. 9), dementia belongs to a group of mental disorders characterised by the acquired substantial loss of cognitive functions, especially memory and intellect, as a consequence of a brain disease. This results in the overall degradation of mental activities in the affected person, decrease in the capacity for the activities of daily living, and the loss of ability to live independently (Jirák, Koukolík, 2004).

The Czech Republic follows the National Mental Health Action Plan for 2020–2030. The Plan is an implementation document for three strategic documents: the Psychiatric Care Reform Strategy 2013–2030, the Strategic Framework Czech Republic 2030, and the Strategic Framework for Healthcare Development in the Czech Republic until 2030. These strategic documents aim to increase the quality of people life with mental disorders through preventive activities that should contribute to the timely diagnosis of mental disorders and development of a community system of care.

The current state of the psychiatric care system in the Czech Republic is rated as below-average. According to the National Strategy for Health Protection and Promotion and Disease Prevention (Action Plan 3: Mental Health), there are insufficient staffing levels in psychiatric care, both in the out-patient and in-patient areas. The analyses of the Czech Ministry of Health showed that out-patient psychiatrists only have 10 minutes per one patient's visit. The psychiatric hospitals are obsolete in the area of material and technology, often inaccessible for the patient in terms of time as well as territorially. Problems are also seen in the insufficient cooperation of medical and social services so that work of persons with mental disorders is respected. Likewise, analyses show the increase of patients in psychiatric out-patient clinics as well as psychiatric hospitals providing acute in-patient care.

This paper aims to evaluate mental health of the population aged 65+ according to selected psychiatric diagnoses from 2010 to 2020 in the regions of the Czech Republic.

Two research questions were formulated to support the objective:

RQ1: Are women the more treated group of patients aged 65+ for psychiatric disorders?

RQ2: Has there been a significant increase in the number of patients aged 65+ treated for diagnosis G30 in all the regions of the Czech Republic in the last decade of the period under review?

The issue of mental health of the population was tackled by a number of scientific studies and articles. Broulíková, Dlouhý, Winkler (2020) addressed the economic aspects of mental health care, inquiring into the ways of applying the methods of economic assessment in mental health care. In his article, Wahlbeck (2015) emphasised the need to support mental health of the population in the individual countries. He analysed the theoretical approaches to mental health, urging to transit from knowledge in this area to actions in the real world, and to contribute to clearly set policy objectives leading to the protection of persons with mental disorders. Shulma at al. (2021) assessed the efficiency of the community mode of care aimed at health improvement in the elderly who suffer from depression and chronic physical illnesses. The study results showed that this model is relevant and that the linking of medical psychiatric care and social services is a good way towards supporting de-institutionalisation of psychiatric care. Dham et al. (2017) made a systematic review of scientific articles addressing various psychiatric diagnoses treated in elderly people, finding out that most studies focused on depression, but only a few of them evaluated other psychiatric disorders. Based on the review, they claimed that collaborative care for the elderly was very beneficial and efficient, but further studies should also focus on other psychiatric disorders other than depression in the elderly.

2 Material and Methods

The evaluation of prevalence of the individual mental disorders in the population is made for the period from 2010 to 2020. Data was taken from the selected registers of the Institute of Health Information and Statistics of the Czech Republic ("IHIS CR"), specifically from the National Register of Reimbursed Health Services and the Register of Mental Health Disorders in the Population Aged 65+. The latter is a retrospectively created parametric database which summarises epidemiological data of treated patients aged 65+. To a certain extent, the registers are limited by the fact that they do not provide information about healthcare not reimbursed by the health insurance companies and about care provided by general medical practitioners if such care is reimbursed

by per-capita payments. Mental disorders are identified using the codes introduced in the 10th revision of the International Statistical Classification of Diseases and Related Health Problems, if the diagnosis was reported at least once during the year at the core or non-core position (IHIS CR). The prevalence of mental disorders identified is evaluated as the number of patients treated with the respective diagnosis in the given year. The source of demographic data on the individual regions of the Czech Republic is the Czech Statistical Office ("CSO").

Selected psychiatric diagnoses in the period under review were chosen for the evaluation of time series according to the dynamism. Three basic indicators were calculated: the mean absolute increase; the mean growth factor; and the mean relative increase.

The mean absolute increase is the change in value in time *t* compared to time *t-1* and it is calculated using the mathematical formula (1):

$$\bar{\Delta}=\frac{(y_2-y_1)+(y_3-y_2)+\cdots+(y_T-y_{T-1})}{T-1}=\frac{\sum_{t=2}^{T}\Delta y_t}{T-1}=\frac{y_T-y_1}{T-1}, \quad (1)$$

The mean growth factor is the mean change in the growth factors over a unit time interval and it is calculated as the geometric mean using the formula (2):

$$\bar{k}=\sqrt[T-1]{k_2\times k_3\times \ldots\times k_T}=\sqrt[T-1]{\frac{y_2}{y_1}\times\frac{y_3}{y_2}\times\ldots\times\frac{y_T}{y_{T-1}}}=\sqrt[T-1]{\frac{y_T}{y_1}}, \quad (2)$$

The mean relative increase is then calculated using (3):

$$\bar{\delta}=\bar{k}-1. \quad (3)$$

2.1 Development of the Demographic Structure of the Population in the Czech Regions

The demographic structure of the population changes significantly. According to the WHO statistics, the increasing life expectancy at birth brings about the increase of elderly people, especially in Europe (MLSA, 2022). The median age of the European population is the highest globally, and according to the statistics, at least 25% of the European population will be 65+ by 2050 (MLSA, 2022).

In the Czech Republic, just like in other countries, the elderly group of people experiences the most significant change as regards age. Their proportion in the total population in the Czech Republic was 15.2% in 2010, while in 2020, it was 20.17%. According to the population forecast issued by the Czech Statistical Office, this proportion is likely to increase to 32.3% by 2065, as documented by Table 1. The number of children in the population grew until 2020, but the following years are likely to see the drop to 13.2% by 2065. People of working age comprised 70.6% in 2010, but there was a drop to 63.76% by 2020, and it is predicted that this decline is likely to continue to 54.6% by 2065.

Table 1 – The composition of the population according to age groups in the Czech Republic between 2010 and 2020, and the forecast until 2065 [%]

Age	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2035**	**2065**
0–14	14.2	14.7	14.8	15.0	15.2	15.4	15.6	15.7	15.9	16.0	16.1	13.3	13.2
15–64	70.6	69.1	68.4	67.6	67.0	66.3	65.6	65.0	64.5	64.1	63.8	62.5	54.6
65+	15.2	16.2	16.8	17.4	17.9	18.3	19.8	19.2	19.6	19.9	20.2	24.5	32.2

Source: Czech Statistical Office. *Public database.* Own processing.

In terms of the regional comparison, it is clear that the population aged 65+ increased in all regions between 2010 and 2020 (see Table 2). The highest proportion of the elderly has long been seen in the Hradec Králové Region where the proportion of the elderly exceeded the national average by 1.8 pp in 2020. The threshold of one-fifth of the population aged 65+ was exceeded in almost all the regions except the Central Bohemian Region and the Capital City of Prague. As can be seen from Table 2, the rank in terms of the representation of the elderly in the population changed dramatically in the Capital City of Prague since 2010.

Table 2 – Proportion of persons aged 65+ in the regions of the Czech Republic as of 31 December [%]

Region	2010	2012	2014	2016	2018	2020	**Rank 2010**	**Rank 2020**
Capital City of Prague	16.4	17.6	18.2	18.6	18.9	190	**2.**	**13.**
Central Bohemian Region	14.7	15.8	16.7	17.5	18.2	18.6	**11.**	**14.**
South Bohemian	15.5	16.9	18.0	19.1	20.0	20.8	**9.**	**4.–5.**

Region								
Plzeň Region	16.0	17.3	18.4	18.2	20.0	20.6	**5.**	**7.–8.**
Karlovy Vary Region	14.4	16.0	17.5	18.9	20.0	20.7	**13.**	**6.**
Ústí nad Labem Region	14.0	15.7	17.1	18.3	19.3	19.9	**14.**	**12.**
Liberec Region	14.6	16.2	17.6	18.9	19.9	20.5	**12.**	**9.**
Hradec Králové Region	16.5	17.8	19.0	20.2	21.2	22.0	**1.**	**1.**
Pardubice Region	15.7	17.0	18.0	18.0	19.9	20.6	**8.**	**7.–8.**
Vysočina Region	15.9	17.2	18.2	18.2	20.1	20.8	**6.**	**4.–5.**
South Moravian Region	16.2	17.3	18.2	18.0	19.7	20.2	**3.–4.**	**11.**
Olomouc Region	15.8	17.1	18.2	18.3	20.2	21.0	**7.**	**3.**
Zlín Region	16.2	17.3	18.3	18.4	20.3	21.1	**3.–4.**	**2.**
Moravian-Silesian Region	15.2	16.4	17.5	18.7	19.6	20.4	**10**	**10.**
Czech Republic	**16.2**	**16.8**	**17.8**	**18.8**	**19.6**	**20.2**	**-**	**-**

Source: Czech Statistical Office. *Public database.* Own processing.

The indicator of life expectancy at birth shows the average number of years an individual is expected to live at a certain age if the mortality rates in the period under review persist. The life expectancy at birth in the Czech Republic in 2010–2020 grew in both genders. It increased by 0.9 pp in men and by 0.75 pp in women. In terms of forecast, it is evident that this growth is likely to continue. According to the mean forecast variant issued by the Czech Statistical Office, this indicator will grow to 84.2 years in men and 88.4 years in women by 2065, as documented by Table 3.

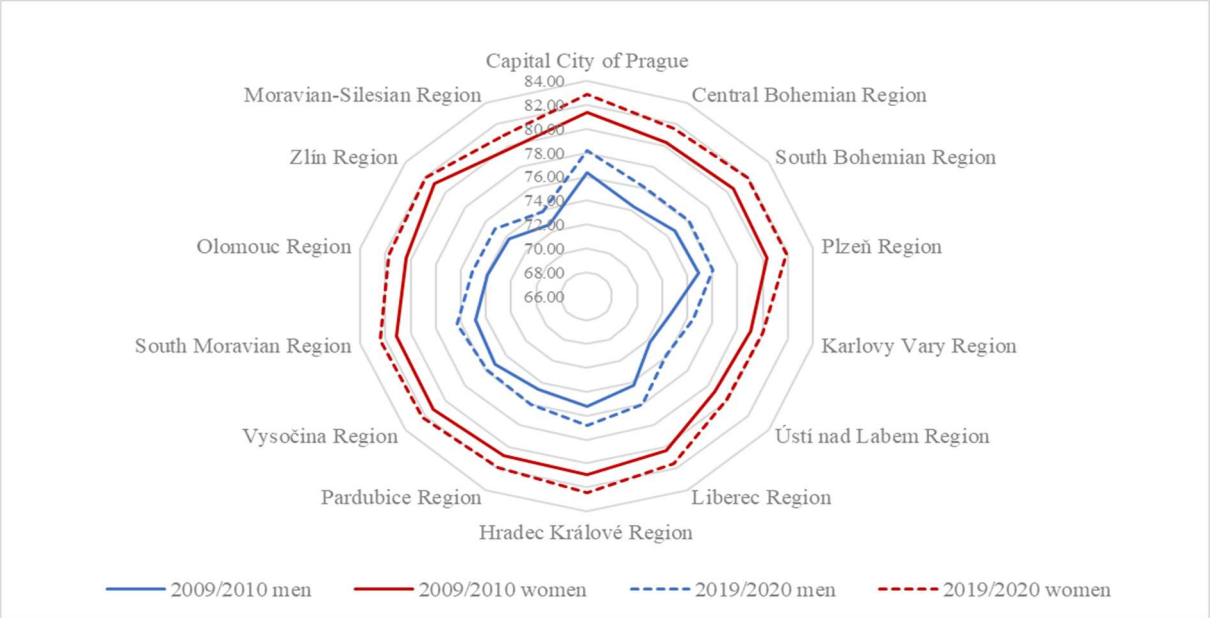
Table 3 – The development of life expectancy at birth between 2010 and 2020, and the forecast until 2065

Gender	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2035	2065
Man	74.4	74.71	74.96	75.15	75.71	75.61	76.04	76.0	76.08	76.33	75.3	79.7	84.2
Woman	80.63	80.83	80.99	81.16	81.73	81.45	81.83	81.85	81.89	72.1	81.38	84.8	88.4

Source: Czech Statistical Office. *Public database.* Own processing.

The life expectancy values for the individual regions cover two-year intervals in order to exclude random fluctuations. Within the regional comparison, the highest life expectancy at birth in both men and women in 2019–2020 was in the Capital City of Prague and in the Hradec Králové Region. In the Capital City of Prague, it was higher by 1.85 years in men and by 1.48 years in women compared to the 2009–2010 period. On the contrary, the lowest life expectancy at birth in both men and women was in the Ústí nad Labem Region and the Karlovy Vary Region in 2019–2020.

Figure 1 – Life expectancy at birth in the regions of the Czech Republic, 2009–2010 and 2019–2020.



Source: Czech Statistical Office. *Public database.* Own processing

2.2 Development of the Number of Patients Aged 65+ Treated for Psychiatric Disorders F00–F99

In the Czech Republic, there were 8821.39 patients per 100 thousand inhabitants aged 65+ in 2020. Compared to 2010, there was an increase in the patients under psychiatric care by 1540.54 patients per 100,000 inhabitants, i.e., 71,292 patients in absolute terms. The highest growth was reported between 2014 and 2015, and there was a decline in the number of patients between 2019 and 2020.

As of 31.12.2020, the total number of treated patients aged 65+ (the number of unique patients in a given year) was 190,394, amounting to 8.82% of the elderly. Of these, 71.63% were women and 28.37% were men. The average age and the average age median are shown in Table 4. The highest number of patients in treatment in the age categories 65–69 years (24.02%), 70–74 years (22.58%), and 75–79 years (22.41%).

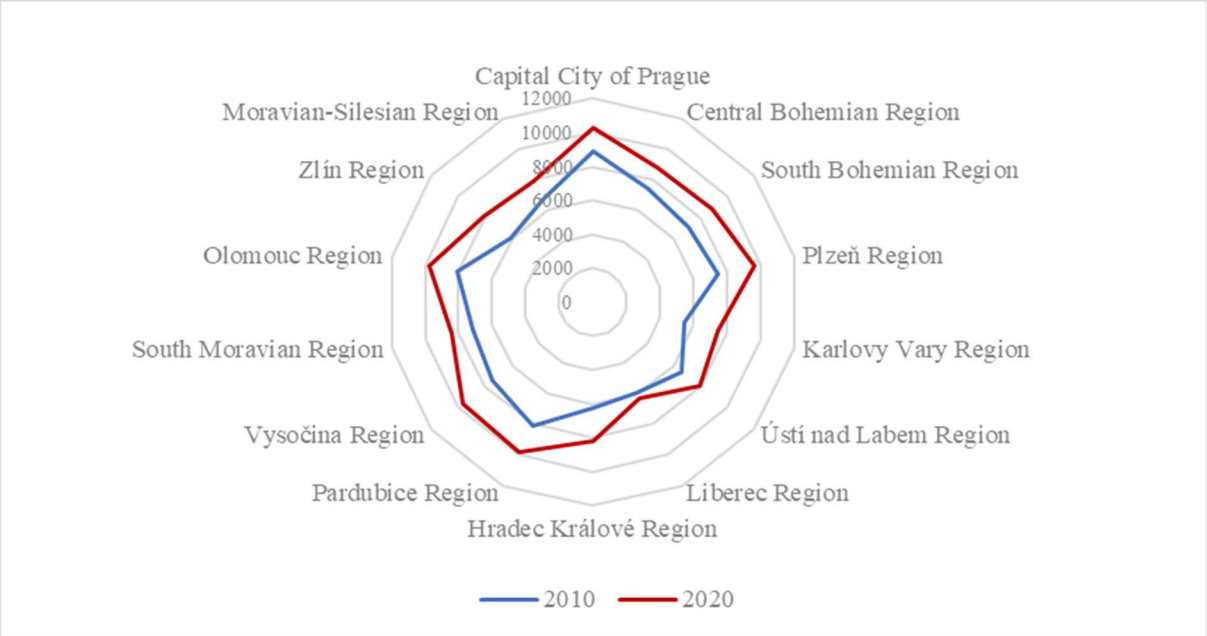
Table 4 – Gender and age of patients in treatment in 2020 in the Czech Republic

Gender	Number	Average (SD)	Median (IQR)
Men	54,011	75.30 (7.59)	74 (69.80)
Women	136,383	77.08 (8.30)	76 (70.83)

Source: IHIS CR. *National portal of psychiatric care.* Own processing.

The number of patients aged 65+ treated for psychiatric disorders per 100,000 inhabitants in the respective regions of the Czech Republic is shown in Figure 2. It makes clear that there was an increase in the psychiatrically treated patients in all regions between 2010 and 2020. The sharpest increase was in the Hradec Králové Region, the Vysočina Region, the Capital City of Prague, the Central Bohemian Region, and the Plzeň Region. By contrast, the lowest increase of treated patients aged 65+ per 100,000 inhabitants was reported in the Liberec Region.

Figure 2 – Development in the number of treated patients per 100,000 inhabitants in the regions of the Czech Republic, 2010 and 2020



Source: IHIS CR. *National portal of psychiatric care.* Own processing

2.3 Selected Mental Disorders

In terms of the objective of the paper, the research subjects were patients treated according to the following psychiatric diagnoses:

- Alzheimer disease (G30);
- Organic, including symptomatic, mental disorders (F00–F09);
- Schizophrenia, schizotypal and delusional disorders (F20–F29);
- Neurotic, stress-related and somatoform disorders (F40–F48).

G30 – Alzheimer disease – a primary degenerative brain disorder with characteristic neuropathological and neurochemical properties. There are three types of the Alzheimer disease: Alzheimer disease with early onset (F00.0; G30.0+), Alzheimer disease with late onset (F00.1*, G30.1+), Alzheimer disease, atypical or mixed type (F00.2*, G30.9+).

F00-F09 – The organic, including symptomatic, mental disorders comprise dementia of various aetiologies, such as vascular dementia, dementia in other diseases classified elsewhere (dementia in Huntington disease, dementia in Parkinson disease, dementia in Creutzfeldt-Jakob disease, etc.), unspecified dementia, organic delusional disorder, organic anxiety disorder.

F20-F29 – Schizophrenia, schizotypal and delusional disorders. These mental disorders focus on schizophrenia, schizotypal disorders, persistent delusional disorders, acute and transient psychotic disorders as well as unspecified nonorganic psychosis.

F40-F48 – The neurotic, stress-related and somatoform disorders comprise disorders like phobic anxiety disorders, other anxiety disorders, obsessive-compulsive disorder, reaction to severe stress and adjustment disorders, dissociative disorders, somatoform disorders, and other neurotic disorders.

3 Results and Discussion

Tables 5–8 document the evaluation of time trend according to the dynamism of the selected psychiatric diagnoses in the regions of the Czech Republic. The most frequent diagnoses for which patients aged 65+ were treated were organic, including symptomatic, mental disorders, and neurotic, stress-related and somatoform disorders. In 2020, organic, including symptomatic, mental disorders roughly accounted for 32.48% of the total number of psychiatric diagnoses in the Czech Republic, and neurotic, stress-related and somatoform disorders accounted for 27.20%. In terms of gender, women greatly exceed men in the number of patients aged 65+ treated for said diagnoses.

Table 5 documents the development in patients aged 65+ treated for dementia in Alzheimer disease. In 2020, the total of 21,861 patients were treated in relation with this diagnosis, an increase by 39% compared to 2010. The mean absolute increase of treated patients was reported in all regions of the Czech Republic. The highest mean absolute increase was reported in the Zlín Region and the Vysočina Region, in the mean absolute amount of 97.07 treated patients per 100,000 inhabitants and 91.16 treated patients per 100,000 inhabitants, respectively. In terms of the mean growth factor, the highest growth was reported in the Plzeň Region (1.11184), the Hradec Králové Region (1.11716), and the Zlín Region (1.11369). By contrast, the lowest growth rate in 2010–2020 was reported in the Ústí nad Labem Region where the number of patients in treatment grew with the average annual rate of 2.36%.

Table 5 – Development in the number of patients aged 65+ per 100,000 inhabitants treated for the diagnosis G30 between 2010 and 2020

Region	$\bar{\Delta}$	$\bar{k}$	$\bar{\delta}$	$\bar{\delta}$ [%]
Capital City of Prague	47.43	1.06417	0.06417	6.42
Central Bohemian Region	35.68	1.04748	0.04748	4.75
South Bohemian Region	42.42	1.06435	006435	6.44
Plzeň Region	**75.93**	**1.11184**	0.11184	11.18
Karlovy Vary Region	43.95	1.05057	0.05057	5.06
Ústí nad Labem Region	10.85	1.01363	0.02363	2.36
Liberec Region	18.16	1.03189	0.03189	3.19
Hradec Králové Region	54.55	**1.11716**	0.11713	11.71
Pardubice Region	51.93	1.07223	0.07223	7.22
Vysočina Region	**91.16**	1.07789	0.07789	7.79
South Moravian Region	40.97	1.09129	0.09129	9.13
Olomouc Region	56.03	1.05236	0.05236	5.24
Zlín Region	**97.07**	**1.11369**	0.11369	11.37
Moravian-Silesian Region	33.92	1.07646	0.07646	7.65
Czech Republic	**49.14**	**1.06863**	**0.06863**	**6.86**

Source: Own calculations.

Table 6 shows the development in patients aged 65+ treated for other types of dementia and other organic or symptomatic mental disorders (F00–F09) between 2010 and 2020. It follows that within the number of treated patients, the mean absolute increase of patients was reported in eight regions of the Czech Republic, while the remaining six regions reported a decrease between 2010 and 2020. The most significant drop is reported in the

Moravian-Silesian Region – 26.05 patients aged 65+ per 100,000 inhabitants. The highest mean absolute increase in the number of treated patients was reported in the Hradec Králové Region and the Pardubice Region where the number of treated patients grew between 2010 and 2020 with the average annual rate of 1.75% and 1.26%, respectively.

Table 6 – Development in the number of patients aged 65+ per 100,000 inhabitants treated for the diagnoses F00–F09 between 2010 and 2020

Region	$\bar{\Delta}$	$\bar{k}$	$\bar{\delta}$	$\bar{\delta}$ [%]
Capital City of Prague	-15.32	0.99483	-0.00517	-0.52
Central Bohemian Region	-18.12	0.99357	-0.00643	-0.64
South Bohemian Region	16.01	1.00544	0.00544	0.54
Plzeň Region	15.88	1.00575	0.00575	0.58
Karlovy Vary Region	36.86	1.01559	0.01559	1.56
Ústí nad Labem Region	5.64	1.00225	0.00225	0.23
Liberec Region	14.65	1.00864	0.00864	0.86
Hradec Králové Region	**42.44**	1.01852	0.01752	1.75
Pardubice Region	**43.76**	1.01255	0.01255	1.26
Vysočina Region	-0.87	0.99964	-0.00036	-0.04
South Moravian Region	-17.75	0.99386	-0.00614	-0.61
Olomouc Region	13.18	1.00489	0.00479	0.48
Zlín Region	-1.05	0.99957	-0.00043	-0.04
Moravian-Silesian Region	-26.05	0.99006	-0.00994	-0.99
Czech Republic	**1.38**	**1.00048**	**0.00048**	**0.05**

Source: Own calculations.

Schizophrenia, schizotypal disorders, and delusional disorders are among the most frequent psychiatric diagnoses found in patients aged 65+. Table 7 shows a mean absolute increase in the number of treated patients aged 65+ in ten regions of the Czech Republic. A significant growth was reported in the South Moravian Region, the Zlín Region, and the Central Bohemian Region. On the other hand, the Liberec Region reported a drop in the number of patients treated in the years under review by 3.06 patients aged 65+ per 100,000 inhabitants. The number of treated patients aged 65+ per 100,000 inhabitants of a region according to the mean growth factor grew between 2010 and 2020, save for three regions.

Table 7 – Development in the number of patients aged 65+ per 100,000 inhabitants treated for the diagnoses F20–F29 between 2010 and 2020

Region	$\bar{\Delta}$	$\bar{k}$	$\bar{\delta}$	$\bar{\delta}$ [%]
Capital City of Prague	5.42	1.01304	0.01304	1.30
Central Bohemian Region	**8.47**	1.20910	0.02091	2.09
South Bohemian Region	1.39	1.00319	0.00319	0.32
Plzeň Region	3.94	1.00933	0.00933	0.93
Karlovy Vary Region	5.25	1.01423	0.01423	1.42
Ústí nad Labem Region	2.58	1.00572	0.00572	0.57
Liberec Region	-3.06	0.99244	-0.00756	-0.76
Hradec Králové Region	-2.03	0.99517	-0.00483	-0.48
Pardubice Region	-3.11	1.99420	-0.00580	-0.58
Vysočina Region	-0.54	0.99881	-0.00119	-0.12
South Moravian Region	**9.58**	1.01927	0.01927	1.93
Olomouc Region	5.42	1.01095	0.01095	1.09
Zlín Region	**8.59**	1.01860	0.01860	1.86
Moravian-Silesian Region	6.23	1.01596	0.01593	1.59
Czech Republic	**4.53**	**1.01026**	**0.01026**	**1.03**

Source: Own calculations.

Neurotic, stress-related and somatoform disorders are among the most common mental health disorders across all age categories. It is evident from Table 8 that the highest mean absolute increase between 2010 and 2020 was reported in the Hradec Králové Region, the Capital City of Prague, and the Central Bohemian Region. The highest mean relative increase within the period under review was reported in the Moravian-Silesian Region, the Ústí nad Labem Region, the Vysočina Region and the Central Bohemian Region where the value was higher than the mean value for the Czech Republic and exceeded the 4% threshold.

Table 8 – Development in the number of patients aged 65+ per 100,000 inhabitants treated for the diagnoses F40–F48 between 2010 and 2020

Region	$\bar{\Delta}$	$\bar{k}$	$\bar{\delta}$	$\bar{\delta}$ [%]
Capital City of Prague	**87.17**	1.03345	0.03345	3.34
Central Bohemian Region	**87.16**	1.04117	0.04117	4.12
South Bohemian Region	72.30	1.03483	0.03483	3.48
Plzeň Region	83.12	1.03398	0.03398	3.40
Karlovy Vary Region	66.75	1.04823	0.04823	4.82
Ústí nad Labem Region	70.49	1.04032	0.04032	4.03
Liberec Region	36.75	1.02187	0.02187	2.19
Hradec Králové Region	**89.75**	1.04283	1.04283	4.28
Pardubice Region	55.02	1.03077	0.03077	3.08
Vysočina Region	76.38	1.04173	0.04130	4.17
South Moravian Region	70.78	1.03574	0.03574	3.57
Olomouc Region	59.81	1.02796	0.02796	2.80
Zlín Region	59.07	1.03947	0.03947	3.95
Moravian-Silesian Region	70.63	1.04887	0.04887	4.89
Czech Republic	**73.05**	**1.03697**	**0.03697**	**3.70**

Source: Own calculations.

4 Conclusion

The prevalence of all mental disorders in the inhabitants aged 65+ has been growing in the Czech Republic. In comparison with 2010, there was an increase in the number of patients aged 65+ by almost 37.4%. The average annual increase in the number of treated patients aged 65+ within the period under review is 4.8%. In terms of gender, women are very much in the majority, accounting on average for 71.9% in the total number of treated patients aged 65+. As of 31.12.2020, 71.6% of women and 28.4% of men were treated for psychiatric diagnoses. The annual mean increase in the number of women in the period under review was 4.7%. This answers the research question RQ1. The highest increase in the number of treated patients aged 65+ was reported in the Capital City of Prague, the Central Bohemian Region, the Hradec Králové Region, the Vysočina Region, and the Moravian-Silesian Region. By contrast, the lowest increase in the number of all treated patients aged 65+ without discriminating the diagnoses was in the Liberec Region.

The highest incidence of psychiatric disorders was reported within the diagnoses F40–48 and F0–F9. A significant increase of treated patients aged 65+ can also be seen in the case of diagnosis G30 Dementia in Alzheimer disease, controlled separately since 2010.

In terms of dementia in Alzheimer disease, an increase in the number of treated patients was reported in all the regions of the Czech Republic. The highest mean relative increase within the period under review was calculated in the Hradec Králové Region, the Plzeň Region, and the South Moravian Region. The lowest average growth factor was reported in the Ústí nad Labem Region. The calculations clearly show that the incidence of Alzheimer disease has been growing the fastest in the Czech population. The mean relative increase was 6.86%. These aspects answer the second research question.

Decrease was reported in the selected regions as regards the number of patients treated for other aetiologies of dementia and other organic or symptomatic mental disorders (F00–F09). These include four regions: the Capital City of Prague, the Central Bohemian Region, the South Moravian Region, and the Moravian-Silesian Region. The highest absolute increase between 2010 and 2020 was reported in the Hradec Králové Region and the Pardubice Region. The number of treated patients for the whole Czech Republic grew in the period under review with the average annual rate of 0.05%.

Diagnoses F20–F29 (Schizophrenia, schizotypal and delusional disorders) are also frequently diagnosed in the patients aged 65+. In terms of the mean growth factor, i.e., the average growth rate of patients in treatment, the highest growth between 2010 and 2020 was reported in the Central Bohemian Region (1.002091). The lowest growth rate was reported in the Pardubice Region and the Liberec Region.

The number of patients aged 65+ treated for neurotic, stress-related and somatoform disorders grew by 52.75% in the Czech Republic in comparison with 2010. The highest mean relative increase, 4.89%, was reported in the Moravian-Silesian Region within the period under review. In contrast, the lowest mean relative increase was reported in the Liberec Region.

The above makes it clear that the prevalence of the majority of mental disorders in persons aged 65+ in the population has increased in the last decade, while a slight decrease has only been reported for certain diagnoses. The highest increase of mental disorders is in dementia in Alzheimer disease, a red flag for those who implement public policies, especially on the local level, on the provision of healthcare and social services. Psychiatric care in the Czech Republic is undergoing reform, although it cannot be said that the reform measures are always targeted to the needs of the population. Mental disorders concern everyone across all the age groups. The Czech Republic as well as other countries experience ageing of the population. This means mental health of the elderly should also be supported, as they have the right to a dignified life and care ensured by the society's social system.

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The Indebtedness of Czech District Towns in the Polish Border Region: Application of TOPSIS Technique

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Abstract

The indebtedness of regional government subjects may represent one of the significant factors influencing the way these subjects cope with the effects of the COVID-19 pandemic. A high rate of indebtedness could therefore represent a major obstacle to revival of public finances, implementation of development projects or other activities by municipalities. The submitted paper assesses the indebtedness of district towns in the Czech Republic using TOPSIS technique and 9 monitored criteria in the years 2010 and 2020. The obtained results are evaluated using a system of mathematical-statistical methods, which includes the Mann-Whitney test and Kolmogorov-Smirnov test. On the basis of the results that were obtained, we can state that the border region is not a significant factor affecting the overall results, because no statistically significant differences in mean value or cumulative distribution function were proven. Negative changes in the results of the multi-criteria analysis were always accompanied by a drop within the overall order. In the case of positive absolute changes, there was also a shift in the order of district towns in the majority of cases.

Keywords: *Czech district towns, indebtedness, multi-criteria analysis, TOPSIS technique*

JEL Classification: *C19, C58, H72, H83*

1 Introduction

The indebtedness of municipalities is a current issue, which has recently become one of the frequently debated topics in the field of public finances. The indebtedness of public budgets is discussed on all levels, from states to municipalities (see also Bečica 2014). Lajtkepová (2017) states that the theory of public economics does not view indebtedness negatively. However, she recommends that current expenses be financed using current income and capital expenses using capital income. Indebtedness is normally only permissible in cases when this is for the purpose of investment. According to the viewpoints of some authors, financing investments through debt is actually recommended, because this results in assurance of intergenerational fairness. However, according to Dvořák et al. (2020), financial constraints lead to imperfections in the financial markets, which is often reflected in information asymmetries and high transaction costs. Ashworth et al. (2005) tested the weak government hypothesis, i.e. that government fragmentation leads to greater public deficits and debts from the short-term aspect. According to strategic debt models, they expected that these effects would persist over a longer time scale. They tested this hypothesis on the basis of data from 298 Flemish municipalities in the period

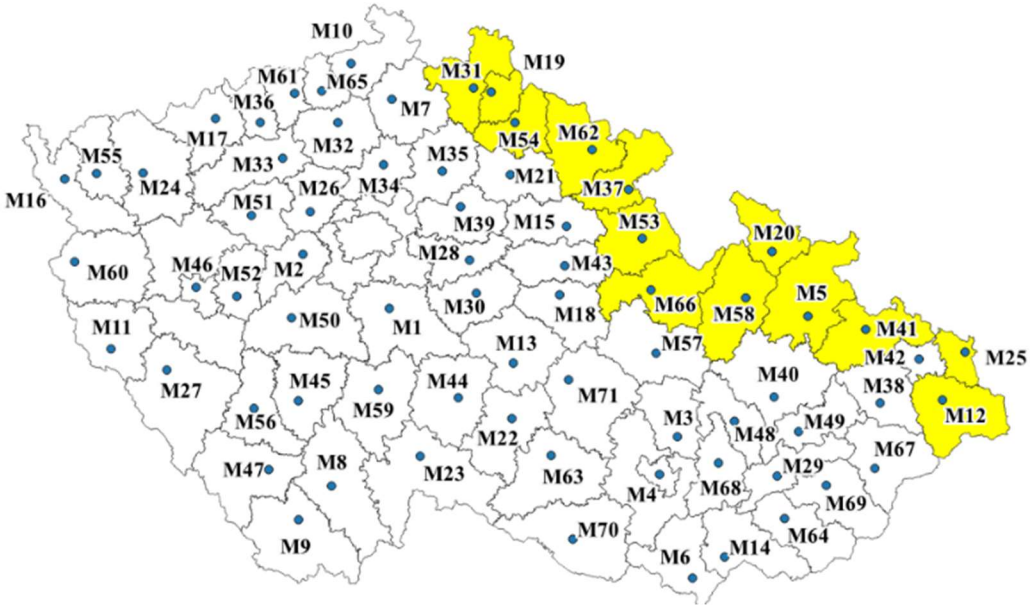
from 1977 to 2000 and found that weak governments have no long-term impact, even though there is general support of the fact that the number of parties in a coalition has a positive impact on the level of short-term debt of municipalities - in compliance with government inaction models. Cabases et al. (2007) examined the financial situations and levels of debt of Spanish municipalities from 1988 to 2000. They determined two main goals: to assess the value of compulsory restrictions imposed on municipal loans and past trends in loan policy adopted by local Spanish governments, and also to develop an econometric model utilising panel data stratified according to population size to measure the scale of indebtedness in Spanish municipalities. The data they obtained supports the effectiveness of institutional loan restrictions for the purpose of introducing financial discipline into loan policies adopted by local governments in Spain. Letelier (2011) discussed the issue of indebtedness under the conditions of municipalities in Chile. Even though Chilean municipalities are unable to take out loans, they do so by means of arrears and leasing contracts. A study was carried out on a sample of 345 municipalities with annual data from 2004 to 2007. He determined mayors closely linked to government coalitions, politically varied municipal councils, years close to elections and greater involvement of municipalities in education as factors that are positively and significantly connected to loans by means of default. Indebtedness under the conditions of Slovakian municipalities was examined by Maličká (2017). The total debt of municipalities was included in an econometric investigation with the goal of identifying its determinants. The GMM estimation for the dynamic panel model included the effects of time and revealed the significant positive effect of capital income, debt services and overdue debts. The negative effect of the unemployment rate and financial autonomy is significant. The following paper from the environment of the Czech Republic is particularly important for this paper. Šebestová et al. (2018) discussed use of the SIMU system of financial indicators defined by the Ministry of Finance of the Czech Republic. They identified a standard form of financial assessment for all municipalities and a fairly simple method of calculation on the basis of the supplied data as an indisputable advantage. they consider the main disadvantage to be the fact that municipalities receive feedback from just two indicators, which have a recommended value. This means that the municipality does not receive a clear idea of its cash position status and this approach also does not take into consideration short-term and long-term indebtedness or the size of the municipality. In cooperation with the local government in the Moravian Silesian Region, they developed and tested their own methodology for assessing the financial health of municipalities.

The aim of the submitted paper is to assess the indebtedness of district towns in the Czech Republic in the border area with Poland, using selected multi-criteria analysis methods in the years 2010 and 2020. The paper is divided into 3 sections for the purpose of achieving this goal. The first of these is the methodology describing the research sample, the monitored criteria and the system of used methods. The next section is devoted to the results of the actual analysis, i.e. multi-criteria analysis according to MW-TOPSIS technique in the specified years. The last part is the conclusion containing a summary of the obtained results, their limitations and potential continuation.

2 Material and Methods

The executed analysis is based on a basic set of 71 district towns in the Czech Republic, whose distribution throughout the area is described in the following map (the district town is depicted as the entire district for clarification, see also Appendix 1). The assessed group does not include the capital city of Prague, because a) the GDP per capita in Prague is more than twice the GDP per capita in the entire Czech Republic and b) the median gross salary was higher by approximately 20% in 2020, which could have a significant effect on the obtained results.

Figure 1 – Distribution of the assessed district towns throughout the area



Source: Own processing.

Border district towns are those where the boundaries of the district are also the state borders with Poland (marked in yellow on the map). This set of district towns is evaluated using 9 SIMU indicators in the following structure:

- K1 – interest converted to per capita (in CZK),
- K2 – bond and loan repayments converted to per capita (in CZK),
- K3 – debt service converted to per capita (in CZK),
- K4 – debt service indicator (in %),
- K5 – liabilities converted to per capita (in CZK),
- K6 – total indebtedness converted to per capita (in CZK),
- K7 – ratio of liabilities to total assets (in %),
- K8 – ratio of indebtedness to liabilities (in %),
- K9 – short-term payables converted to per capita (in CZK).

These nine criteria were chosen from the SIMU indicators that were assessed in 2010 and 2020. Only the criteria related to the indebtedness of the municipalities and also available in all the years of the monitored period were chosen. The SIMU indicators underwent changes over time. Changes were made in 2011 and 2017. This was only a small modification in 2011, when the names of some indicators were changed. The "Ratio of liabilities to total assets" indicator was also moved from informative indicators to monitoring indicators, while the "Ratio of indebtedness to liabilities" indicator was moved from monitoring indicators to information indicators. More extensive changes were made in 2017. The "Total balance in bank accounts", "Credit and communal bonds", "PNFV and other debts", "Ratio of indebtedness to liabilities" and "8-year balance" were eliminated from the SIMU indicators in this year. This means that the "Credit and communal bonds" and "PNFV and other debts" indicators were not included in the multi-criteria analysis, because this data was not available from 2017. In the case of the "Ratio of indebtedness to liabilities" indicator, this ratio indicator could be included in the analysis because it continued to be calculated from the indebtedness and liabilities indicators, which continued to be monitored as SIMU indicators. New SIMU indicators were also added in 2017. These were not monitored in the period between 2010 and 2016, so were also not included in the analysis for the purpose of this diploma paper. This concerned the following indicators: "Average income for the last 4 years", "Balance in bank accounts", "Balance in bank accounts established by LE", and "Budget responsibility rule (in %)". The last-named indicator was included in monitoring indicators, the remaining were classified as information indicators. The last change

in 2017 was division of the "Total indebtedness" indicator into "Indebtedness" and "Indebtedness of established LE". However, this change has no effect on our analysis because total indebtedness can be calculated by adding both new indicators together and can then be used to calculate criteria K6 and K8 necessary for the multi-criteria analysis. The total number of SIMU indicators remained the same (18), only the structure changed.

2.1 TOPSIS Technique as a Multi-Criteria Analysis Tool

TOPSIS is one of the basic methods for multi-criteria decision making and its primary use is for resolving various types of decision-making issues. According to Zavadskas et al. (2016), this is one of the most frequently used methods, during which time potential alternatives are for example: VIKOR - Vlse Kriterijumska Optimizacija Kompromisno Resenje or PROMETHEE - Preference Ranking Organization Method for Enrichment Evaluations. Tramarico et al. (2015), who registered a year-on-year increase in the number of research projects/papers, in which use TOPSIS technique (among others) could be found, provide a summary of its applications. TOPSIS technique was selected for the purpose of our research on the basis of its previous successful use in resolving decision-making issues of a similar nature. You can find its application in environmental (Rozentale, Blumberga, 2019), traffic (Djordjević, Krmac, 2019; Vavrek, Bečica 2020a), culture (Vavrek, Bečica 2020b) and many other fields (see also Chang et al. 2010, Behzadian et al. 2012). Seyedmohammadi et al. (2017), Dutta et al. (2021) discusses actual calculations by TOPSIS technique for example.

A wide range of methods can be used to determine the importance of the monitored criteria, e.g. Mean Weight method (Wang et al. 2020), Standard Deviation method (Ouerghi et al. 2018), Mahalanobis-Taguchi System method (Yuan, Luo 2019), λ bi-capacity model (Zhang et al. 2020), Coefficient of Variance method (Vavrek 2019) and others. The equal weight method according to the following model is used for the purpose of this paper:

$$w_i = {}^1/_n = {}^1/_9 = 0.1111 \quad (1)$$

where: w_i – criterion weight
n – number of criteria

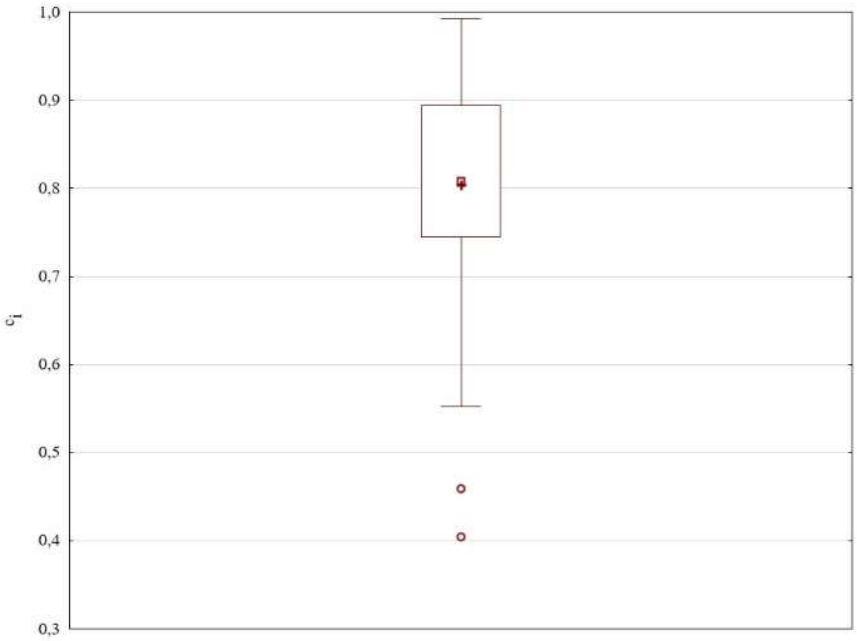
3 Results and Discussion

The executed analysis focuses separately on the years 2010 and 2020, which are analysed using the system of methods specified above. The obtained results are subsequently compared, with the goal of identifying potential differences.

3.1 Assessment of Indebtedness in 2010

The overall results of assessment in 2010 are shown in Graph 2, on the basis of which we can identify balanced mean values ($\bar{x} = 0.803$; $\tilde{x} = 0.807$) and two marginal values. These marginal values represent two district towns with an overall rating (c_i) significantly lower compared to others, during which time one of them is a district town in the Czech-Polish border area. A variation coefficient of 15.21% is also evidence of the relative uniformity of the analysis.

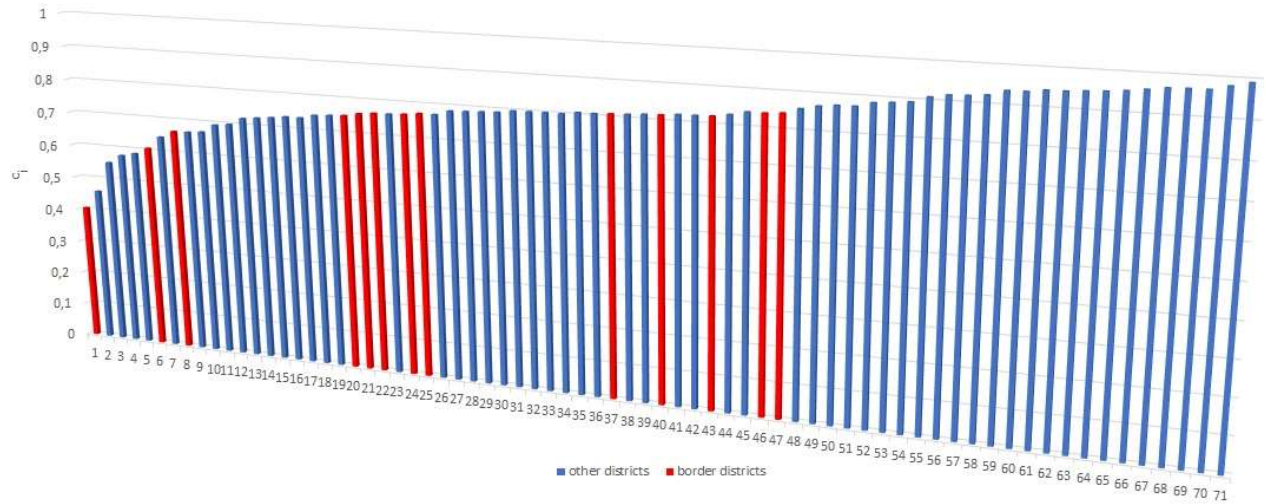
Figure 2 – Boxplot of results of the multi-criteria analysis in 2010



Source: Own processing

When examining these results in more detail, we can state that district towns in the Czech-Polish border region placed, at most, in the 3rd quartile or up to 54th place (see Figure 3) on the basis of analysis using MW-TOPSIS technique.

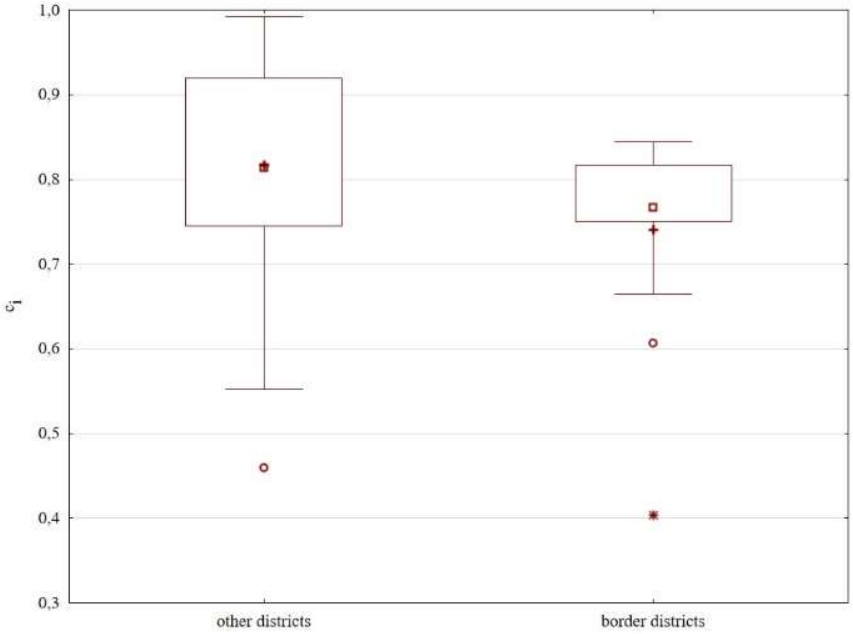
Figure 3 – Results for individual district towns in 2010



Source: Own processing

The above-mentioned standing of district towns falling into both groups was also apparent in the structure of results from their separate analysis. If the analysed group were divided into district towns in the Polish border region and other district towns, we would be able to see specific differences between these two groups (see Figure 4). In the case of other district towns, the overall lower variability of the results is linked to reduced jaggedness. We can see the opposite situation in border districts, in the case of which the results for most district towns concentrate around the mean value ($\bar{x} = 0.740$) and greater variability is caused chiefly by extreme/marginal results in the form of a few district towns.

Figure 4 – Boxplot of results of multi-criteria analysis in 2010 – by district town



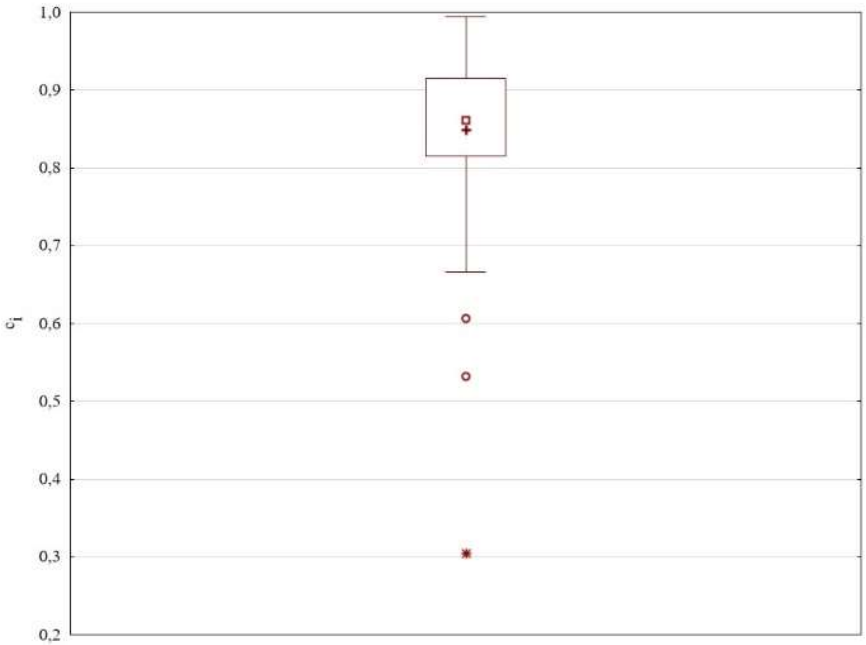
Source: Own processing

From the viewpoint of statistical verification, we can state a consensus between the mean values (U = 249; p = 0.058) and also the distribution functions (K-S: p > 0.10), i.e. there are no significant differences in assessment of indebtedness using MW-TOPSIS technique between the results of district towns in the Polish-Czech border region and other district towns in 2010.

3.2 Assessment of Indebtedness in 2020

The overall results of assessment in 2020 are shown in Figure 5, on the basis of which we can identify minimal differences in mean values ($\bar{x} = 0.849$; $\tilde{x} = 0.860$), which are the result of the occurrence of marginal observations. These represent three district towns with an overall rating (c_i) significantly lower compared to others, during which time one of them is a district town in the Czech-Polish border region, the same as in 2010. A variation coefficient on the level of 12.75% is proof of the relative uniformity of the analysis.

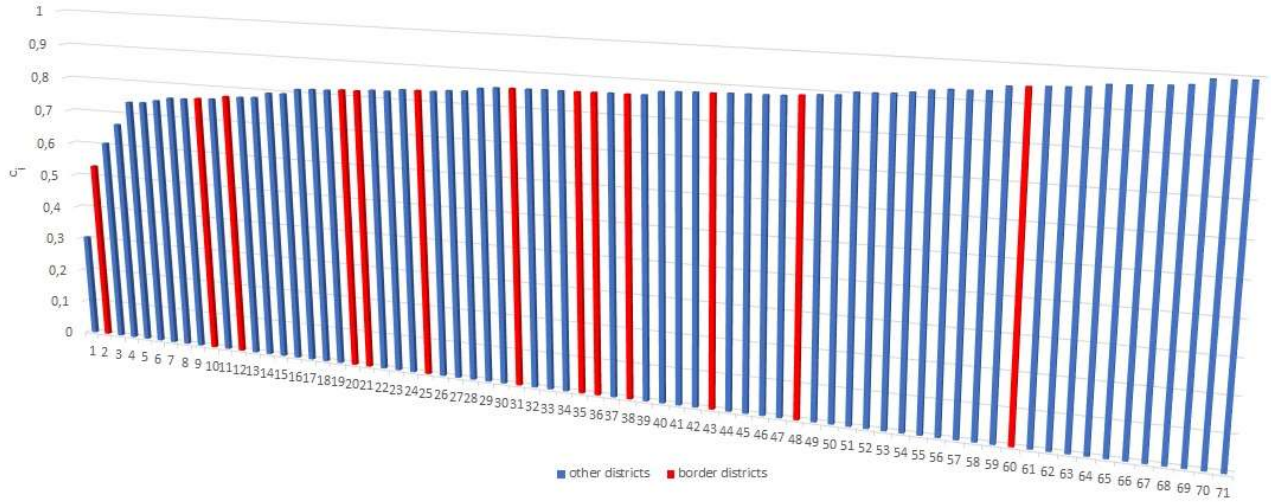
Figure 5 – Boxplot of results of multi-criteria analysis in 2020



Source: Own processing

Figure 6 offers a detailed view of these results and we can state on its basis that district towns in the Czech-Polish border region placed, at most, in the 3rd quartile or up to 54th place in this year, on the basis of analysis using MW-TOPSIS technique. One district town, which came 60th out of the total number of 71 assessed towns, is the exception.

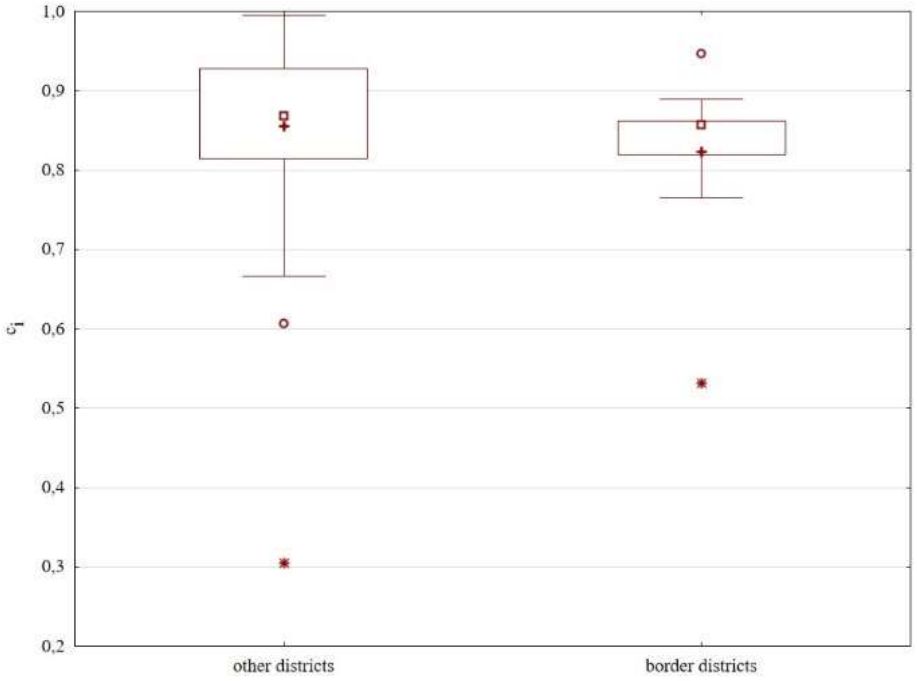
Figure 6 – Results of individual district towns in 2020



Source: Own processing

The above-mentioned standing of district towns falling into both groups was again apparent in the structure of results of their separate assessment. If the assessed group were divided into district towns in the Polish border region and other district towns, we would be able to see specific differences between these two groups (see Figure 7). We can see a visually greater variability in the case of other district towns, which is accompanied by a greater inter-quartile range and influenced by the occurrence of marginal values. In the group of district towns in the Czech-Polish border region, half the subjects have more uniform results, which influenced variability only minimally (in the case of assessment using standard deviation or the variation coefficient).

Figure 7 – Boxplot of results of multi-criteria analysis in 2020 – by district town



Source: Own processing

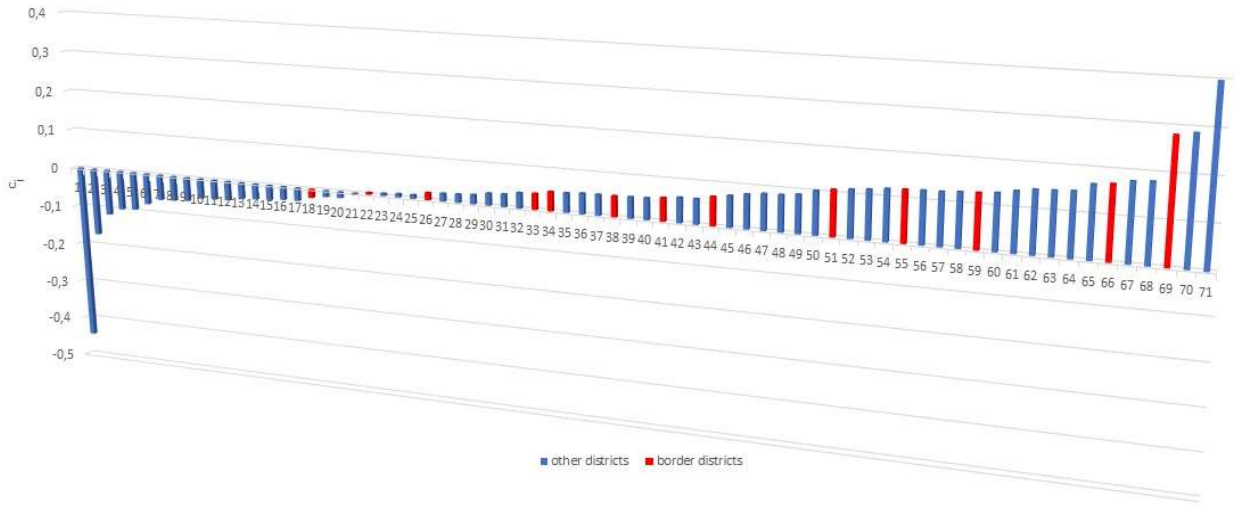
From the viewpoint of statistical verification, we can state a consensus of mean values (U = 290; p = 0.198) and distribution functions (K-S: p > 0.10), i.e. there are no significant differences in analysis of indebtedness using MW-TOPSIS technique between the results of district towns in the Polish-Czech border region and other district towns, in 2020.

3.3 Differences in Assessment of Indebtedness in 2010 and 2020

From the aspect of the entire group of assessed district towns in the Czech Republic, no changes occurred during comparison of 2010 and 2020, i.e. the consensus between mean values and distribution function was confirmed in both cases. Differences in assessment of indebtedness using MW-TOPSIS technique can be identified on the level of the individually assessed subjects.

Absolute differences in assessment (c_i) are shown on Figure 8, during which time the variation range can be defined by an interval of $c_i \in (-0.443; 0.397)$. The most significant change can be seen in the case of district towns outside the Czech-Polish border region. We can see a positive difference in most cases of district towns within the border region. Similar results can also be stated during comparison of changes to the order of the district towns.

Figure 8 – Absolute differences in assessment using MW-TOPSIS technique on the level of individual district towns (2020 vs. 2010)



Source: Own processing

One interesting fact is that negative changes in the results using MW-TOPSIS technique are always accompanied by a drop within the overall order. In the case of positive absolute changes, we can again see a shift in the order of the district towns in most cases. However, in relation to district towns in the Czech-Polish border region, the overall results improved in 12 out of 13 cases, which also manifested as both improved and worse standing in the overall order of the district towns.

Table 1 – Comparison of changes in overall assessment using MW-TOPSIS technique

		change in order		
		positive	negative	none
absolute change	positive	34	14	2
	negative	0	21	0

Source: Own processing.

4 Conclusion

The indebtedness of local government subjects will represent one of the important factors affecting management of the effects of the COVID-19 pandemic. A high rate of indebtedness may therefore represent a major obstacle to revival of public finances, implementation of development projects or other activities by municipalities. The submitted paper concerned analysis of the indebtedness of district towns in the Czech Republic using MW-TOPSIS technique and 9 monitored criteria in the years 2010 and 2020. We can state that the border area does not represent a significant factor affecting the overall results. No differences in the mean value of the results of multi-criteria analysis or in their distribution function were proven.

The results of the submitted research must also be perceived in the context of its limitations. Only the years 2010 and 2020 are analysed, which can directly affect their interpretation during quantification of differences. Within the terms of application of TOPSIS technique, only the method for determining the importance of criteria that considered them equal (Mean Weight Method), without taking into consideration their importance from the factual, content or methodological aspect, was used to determine the importance of the criteria. In subsequent research, it is therefore necessary to examine the importance of selected criteria in more detail, e.g. from the aspect of a think tank. Attention should also focus on partial results and causes of the overall results of the multi-criteria analysis.

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Appendix 1 – The list of district town evaluated in the manuscript

code	district town	code	district town	code	district town
M1	Benešov	M25	Karviná	M49	Přerov
M2	Beroun	M26	Kladno	M50	Příbram
M3	Blansko	M27	Klatovy	M51	Rakovník
M4	Brno	M28	Kolín	M52	Rokycany
M5	Bruntál	M29	Kroměříž	M53	Rychnov nad Kněžnou
M6	Břeclav	M30	Kutná Hora	M54	Semily
M7	Česká Lípa	M31	Liberec	M55	Sokolov
M8	České Budějovice	M32	Litoměřice	M56	Strakonice
M9	Český Krumlov	M33	Louny	M57	Svitavy
M10	Děčín	M34	Mělník	M58	Šumperk
M11	Domažlice	M35	Mladá Boleslav	M59	Tachov
M12	Frýdek-Místek	M36	Most	M60	Tábor
M13	Havlíčkův Brod	M37	Náchod	M61	Teplice
M14	Hodonín	M38	Nový Jičín	M62	Trutnov
M15	Hradec Králové	M39	Nymburk	M63	Třebíč
M16	Cheb	M40	Olomouc	M64	Uherské Hradiště
M17	Chomutov	M41	Opava	M65	Ústí nad Labem
M18	Chrudim	M42	Ostrava	M66	Ústí nad Orlicí
M19	Jablonec nad Nisou	M43	Pardubice	M67	Vsetín
M20	Jeseník	M44	Pelhřimov	M68	Vyškov
M21	Jičín	M45	Písek	M69	Zlín
M22	Jihlava	M46	Plzeň	M70	Znojmo
M23	Jindřichův Hradec	M47	Prachatice	M71	Žďár nad Sázavou
M24	Karlovy Vary	M48	Prostějov		

Allocative Efficiency Gaps of Building Authorities

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Abstract

The paper responds to the issue of the performance of the current model of transferred competence of building authorities. The research verifies gaps in the allocation efficiency of building authorities in 13 regions of the Czech Republic for the period 2016-2020. Allocative efficiency is analyzed using the input-oriented DEA model and its decomposition. Inputs consist of the number of building authorities and state expenditures in the form of a subsidy to the transferred performance of state administration, output consists of the number of inhabitants in the administrative district. The results show that the allocation efficiency is different between the individual types of building authorities. The most efficient are bulding authorities of type 3, as shown by the overall average allocation efficiency $BA\_3_{CRS} = 0.94$. Building authorities of type 2 and 1 show a very low average overall allocation efficiency $BA\_2_{CRS} = 0.47$ and $BA\_1_{CRS} = 0.47$. The results of the calculations of the total allocation efficiency explain its breakdown in more detail. The results confirm that the government's proposals are justified to optimize the number of building authorities in the Czech Republic.

Keywords: *allocation efficiency, building authorities, gaps, model DEA, regions*

JEL Classification: *H21, H7, C5*

1 Introduction

The need to optimize functionality and performance of public administration in the Czech Republic (CZ) is a topic that has resonated since the beginning of its reform in 1990. This phenomenon is not unique or specific only to the Czech Republic, as many studies show (Nemec, 2017, Osborne, 2018, Marišová, Lichnerová, 2019). However, in each state there are specific conditions and problems that require their own and often non-transferable solutions for improving the performance of public administration. Plaček et. al. (2021) states that the implementation of changes and innovations in public administration is complicated in post-transitional states, due to specific political-social mechanisms functioning differently than in Western European states.

The systemic problems of public administration in the Czech Republic include the efficiency of the performance of the transferred powers of the state administration at the level of small and medium-sized municipalities, including in the matter of construction management. This problem was also named in the government's concept for the development and improvement of public administration in the Czech Republic in 2014 and subsequently in the concept from 2020. In the first case, it is the "Strategic framework for the development of public administration of the Czech Republic for the period 2014-2020". This document defines the topics for the next stage of modernization and development of public administration, including eGovernment, especially towards streamlining and improving the work of public institutions in accordance with the strategic documents of the European Commission (Europe 2020) and the Czech government (International Competitiveness Strategy of the Czech Republic 2012-2020 and National Reform Program of the Czech Republic 2014). (MI, 2016) In the second case, it is the "Concept of Client-Oriented Public Administration 2030". The concept reflects essential strategic materials at the national level, such as the Strategic Framework of the Czech Republic 2030, the National Concept for the Implementation of Cohesion Policy for the period after 2020 or the annually processed

National Program of Reforms, but also at the European level, such as the White Paper on the Future of Europe. (MI, 2020)

However, the current government and the Ministry of Regional Development declare that the aforementioned law on the establishment of a new state building administration will not be put into practice. It sees the main reasons in the high investments required to build a new state administration structure in the area of construction authorities, the disapproval of local governments and the limitation of local accessibility. Is planed reduction in the number of building authorities in the transferred jurisdiction of municipalities of the first type. (MRD, 2022)

The paper responds to the issue of the performance of the current model of transferred competence in the section of all three types of municipalities with a building authority and verifies in its own way the differences and gaps in the effectiveness of building authorities in the CZ regions. The allocation efficiency of the number of building authorities and the contribution to transferred powers from the state budget to municipal building authorities is examined from a territorial point of view, namely 13 higher territorially self-governing regions (regions). Regions are considered homogeneous production units for the purposes of verifying allocation efficiency using the input-oriented DEA model.

The aim of the paper is to define the differences and gaps in the allocation efficiency of three types of construction authorities operating in the regions for the period 2016-2020. The answers to the research questions (RQ) below are being sought:

RQ1: Are differences and gaps in the allocative efficiency influcenced by the type of building authority?

RQ2: Is the size gap of the building authorities' allocative efficiency affected by variable or constant returns to scale?

The paper's structure consists of five parts. The first part – the introduction describes the motivation of the research, the aim and the research questions. The second part is devoted to a basic description of efficiency, in the context of the performance of production units and focuses on allocative efficiency. The third part is devoted to research methodology, in particular it pays attention to the definition of types of construction authorities, selected inputs and outputs, descriptive determination of the input-oriented DEA model and its decomposition. The fourth part presents the calculated results using a table and graphs. The last part is dedicated to the conclusion and summary of findings.

2 Theoretical Backgrounds: Efficiency

Performance follows on from the basic questions of the theory of economics, i.e. public economics, as well as economic postulates such as scarcity, rationality and utility. In economics, performance is related to a purposeful and organized activity, or a set of activities (processes), whose purpose without distinction is to produce value that exceeds the cost of its creation with a balanced combination of efficiency and effectiveness. (Vrabková et al., 2017).

When measuring performance, different levels of performance of the given system and their relationship to the given environment, i.e. internal and external social conditions, are taken into account. Neely et al. (2005) identify three distinct levels of performance measurement in the context of the environment. Measuring the performance of individual elements (persons, teams, organizations) of the system, measuring the performance of the system as a whole and measuring the performance and relationships between systems and the environment. In contrast, Dooren et al. (2010) distinguish the levels of system performance evaluation into micro, meso and macro environment of the given system.

Performance measurement takes into account multiple parameters (e.g. economy, effectiveness, efficiency, equity, quality), which can be assessed individually, sequentially or collectively. Most authors emphasize two parameters, namely effectiveness and efficiency. An example is the work of Pocelli (2009) dealing in his contribution with the measurement of technical efficiency, determining the evaluation framework of performance. Poccelli's performance framework is divided into two parameters, namely efficiency and effectiveness. Efficiency is further divided into allocation efficiency and technical efficiency, and in both cases it is a ratio between inputs and outputs.

Allocative efficiency is most often expressed in terms of money, especially on the input side (e.g. in the form of public expenditures), and various units are used for output, including monetary and in-kind units. Technical efficiency is associated with specific resources (personnel, technical and material) and these can be expressed in both non-monetary and monetary units. (Fried et al., 2008, Lane, 2010, Vrabková et al., 2017)

However, in general it is always true that efficiency expresses the ratio of specific inputs and outputs of the transformation process being monitored. This means that the process or production unit is efficient when the value of the outputs produced is higher than the value of the inputs necessary to achieve them. Furthermore, it is

necessary to underline that, from the point of view of total production, the production unit (economy) which is located on the border of production possibilities is efficient. (Stefko et al. 2018, Vaňková, Vrabková, 2022)

Performance in the context of the environment offers an extended view of this issue. Among the authors including the environment (environmental, political, social, legislative) in the evaluation of the performance of production units, Dooren et al. (2010).

Allocative efficiency in the public sector is related to the public expenditure programme. According to Ochrana et al. (2010) a public expenditure program is the result of the transformation of a specific goal of public policy into an organizationally integrated form in the form of a system. Individual segments (institutions) of the public sector represent production systems that transform resources with regard to set objectives. The whole process can then be expressed in the form of a production equation. The subject relations can be described in such a way that inputs are needed for production, which are transformed into outputs in the form of a product, for which costs are incurred (Vrabková, Bečica, 2021).

The above-mentioned authors also point out that in the practice of the public sector, resources are allocated to the given institutions, without the competence of these institutions (cost centers) being checked. The weakness of these institutions is insufficiently determined production goals and the very functionality of internal or external evaluation (ex ante, ex post), which would provide reliable information about the economic rationality of the resources used. At the same time, the analysis of inputs and outputs of the production system is possible from different perspectives. For these purposes, multi-criteria assessment methods are used, which include the DEA model and its numerous modifications. (Vaňková et al., 2022)

Mainly in the public sector, the DEA model is a very popular method of analyzing the efficiency and effectiveness of DMUs in micro, meso and macro form. This is shown by many professional articles and studies (Moradi-Motlagh, Emrouznejad, 2022, Kozuń-Cieślak, 2020, Kalb, 2010, Worthington, Dollery, 2000).

3 Methodology

3.1 Data: Inputs and Output

The performance of state administration in the area of decision-making and management of proceedings according to the Building Act is the responsibility of the so-called building authorities. Building authorities are administrative bodies of an official type authorized by law to perform state administration in the regime of the Building Act and related legal regulations. The system of building authorities consists of a) general building authorities; b) special construction authorities and c) military and other construction authorities.

General building authorities are the basic link of the system of building authorities. At the level of the municipalities, the building authority is:

- municipal office of municipalities with extended powers (hereinafter BA_3);
- authorized municipal authority (hereinafter BA_2);
- the municipal and municipal authority that exercised this authority as of December 31, 2012 (hereinafter BA_ I.).

Building authorities carry out state administration to the extent set by the Building Act and other legal regulations, and this is the so-called substantive jurisdiction. This is therefore a local authority in its administrative district. The administrative district consists of the municipality entrusted with the performance of the building authority (central municipality) and the municipalities listed in special legal regulations.

The main source of covering expenses for the performance of construction authorities by municipalities is the subsidy for the performance of transferred powers from the state budget. The amount of the subsidy is determined annually through the Act on the State Budget. The subsidy is allocated to municipalities on the basis of the size of the municipality determined by the number of inhabitants and the size of the administrative district of the municipality in the given jurisdiction, also expressed in the number of inhabitants. For municipalities with extended jurisdiction, the ratio of the size of the administrative district to the size of the administrative center itself in terms of population also plays a role. (MI CR, 2022) This subsidy is intended for the partial payment of expenses connected with the performance of state administration (mainly for wages and operating). The municipal budget also receives income from administrative fees and fines associated with the performance of the building authority.

A basic overview of the number and development of individual types of building authorities in the Czech Republic and the amount of subsidy for the period 2016-2020 is shown in Table 1.

Table 1 Number of individual types of BA and subsidy in thousand. CZK, 2016-2020

	2016		2017		2018		2019		2020	
	No. BA	**Subsidy**	**No. BA**	**Subsidy**	**No. BA**	**Subsidy**	**No. BA**	**Subsidy**	**No. BA**	**Subsidy**
BA_1	232	185 553	231	195 415	230	205 231	229	220 257	229	230 949
BA_2	183	235 482	183	247 356	183	259 119	183	278 821	183	291 311
BA_3	205	557 679	205	585 676	205	615 502	205	661 607	205	692 299
Total BA	620	978 714	619	1 028 447	618	1 079 852	617	1 160 686	617	1 214 559

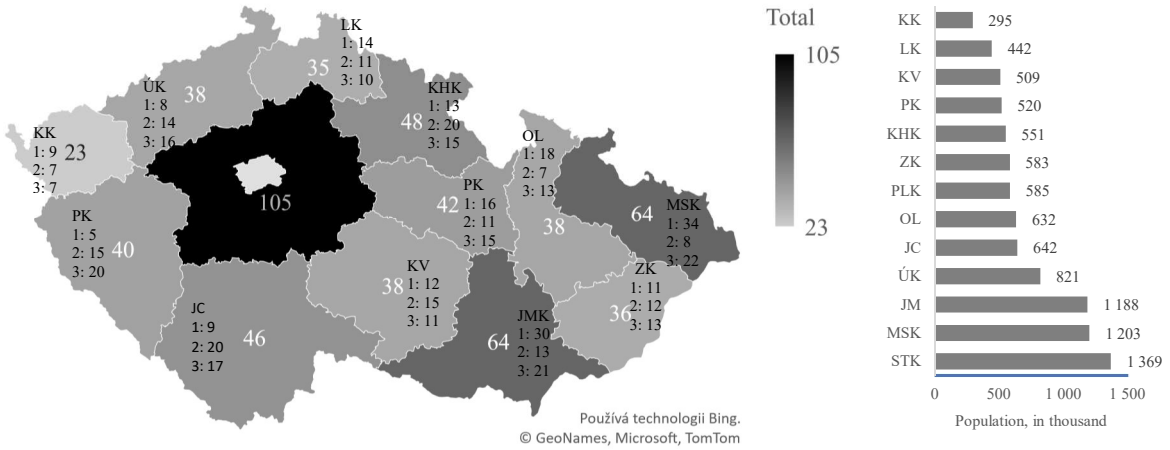
Source: Ministry of interior, 2022. Subsidy to the performance of state administration. Own processing.

The total number and the number of individual types of BA in the regions are shown in the map in Fig. 1. The highest number of 105 building authorities is in the Central Bohemian Region and the smallest number of 23 building authorities is in the Karlovy Vary Region.

The evaluated production units (DMUs) are 13 regions (the capital city of Prague was not included in the evaluation). The evaluated set includes a total of 39 DMUs (39 DMUs = 13 DMUs BA_1 + 13 DMUs BA_2 + _13 DMUs BA 3).

The number of inhabitants of the regions, the number of construction authorities and their structure valid as of 31 December 2020 is shown in Figure 1.

Figure 1 Building authorities by region, number population of regions, year 2020



Source: Ministry of interior, 2022. Subsidy to the performance of state administration. Own processing.
Note: BA_1=1; BA_2 = 2; BA_3 =3. KK Karlovy Vary, LK – Liberec, KV – Vysočina, PK – Pardubice, ZK – Zlín, PLK – Plzeň, OL – Olomouc, JC – South Bohemia, ÚK – Ústí nad Labem, JM – South Moravian, MSK – Moravian-Slesian, STK – Central Bohemian

For the purposes of analysis, two inputs (x1, x2) and one output (y1) were chosen for all three models:

- x1 number of building authorities in the administrative district (average for 2016-2020), source Ministry of the Interior of the Czech Republic;
- x2 subsidy to the performance of the state administration in total for the construction authorities of the administrative district (average for 2016-2020), source of the Ministry of the Interior of the Czech Republic.
- y1 number of inhabitants of the administrative district (mean for 2016-2020), source Ministry of the Interior of the Czech Republic.

Table 2 - Basic input and output characteristics

	x1		x1		y1	
	Max.; Min.	**Mean**	**Max.; Min.**	**Mean**	**Max., Min.**	**Mean**
Model BA_1	50; 5	17.6	293 457; 15 631	87 150.5	52 372; 2 874	15 960.1
Model BA_2	29; 7	14.1	289 667; 47 329	110 853.8	51 477; 8 797	20 186.0
Model BA_3	26; 7	15.8	953 775; 204 376	520 547.2	84 406; 19 315	47 888.7

Source: Ministry of interior, 2022. Subsidy to the performance of state administration. Own processing.

3.2 Method: Input-Oriented DEA Model and its Decomposition

From the perspective of application, the DEA model is considered to be a universal assessing tool, which means that it can be used, on condition of homogeneity of decisionmaking units, in the production sector as well as in the sector of services of profit-making and non-profit-making nature. Homogenous decision-making units (DMUs) are created by such set of units that are occupied with the production of identical or equivalent effects, which are denoted as outputs of these units, (Dlouhý et al., 2018).

Estimating efficiency using the DEA model can be implemented both in terms of input orientation and output orientation. An input-oriented model was chosen for the purposes of this investigation.

The calculation of efficiency according to the CCR model is performed using the Charnes-Cooper's transformation and converted from linear-fractional programming into a standard programming task. The CCR model assumes constant returns to scale (CRS).

The calculation of efficiency according to the BCC model has one additional variable in its objective function (in comparison with the CCR), which corresponds with the restricting condition – condition of convexity, and which will not be restricted by conditions of non-negativity. The BCC model assumes variable returns to scale (VRS).

If the z value equals one, the DMU is efficient. For inefficient units, it applies that their degree of efficiency is lower than one, i.e. e < 1.

The degree of efficiency, which is calculated according to the CCR and BCC models, is a basis for the calculation of the so-called scale efficiency (SE) according to the formula (1). Cooper et al. (2007) define the scale efficiency as the ratio of the degree of efficiency of a decision-making unit gained by the CRS θ^*_{CRS} and the VRS θ^*_{VRS} model, where the degree of the decision-making unit's SE is lower or equal to one. The formula stated below, considers the orientation on the inputs, whilst the same indicator and procedure can be applied in case of the orientation on the outputs.

$$\text{SE} = \frac{\theta^*_{CRS}}{\theta^*_{VRS}} \tag{1}$$

The decomposition of the efficiency (2) allows to express the so-called pure efficiency (PTE) and the scale efficiency (SE).

$$\text{CRS } \theta^*_{CRS} = \theta^*_{VRS} \times SE \tag{2}$$

The above-stated facts show that the degree of efficiency calculated by the CRS model is being noted as the total technical efficiency (TE), and the degree of efficiency calculated by the VRS model as the pure technical efficiency (PTE). This specific decomposition explains the sources of inefficiency, thus whether the cause of inefficiency lies in the operation (pure technical efficiency), or in unfavourable conditions (scale efficiency), or in both. (Vrabková, 2017).

4 Results

The calculation results of the allocation efficiency decomposition of 39 DMUs (includes 13 DMUs "Name of Region"_1, 13 DMUs "Name from region"_2, 13 DMUs "Name of region"_3) according to the input-oriented DEA model are shown according to individual parts of allocation efficiency (CRS, VRS and SE), as shown in Figure 2 and Figure 3.

An overview of fully efficient DMUs (e=1) and the mean level of efficiency is shown in Table 3.

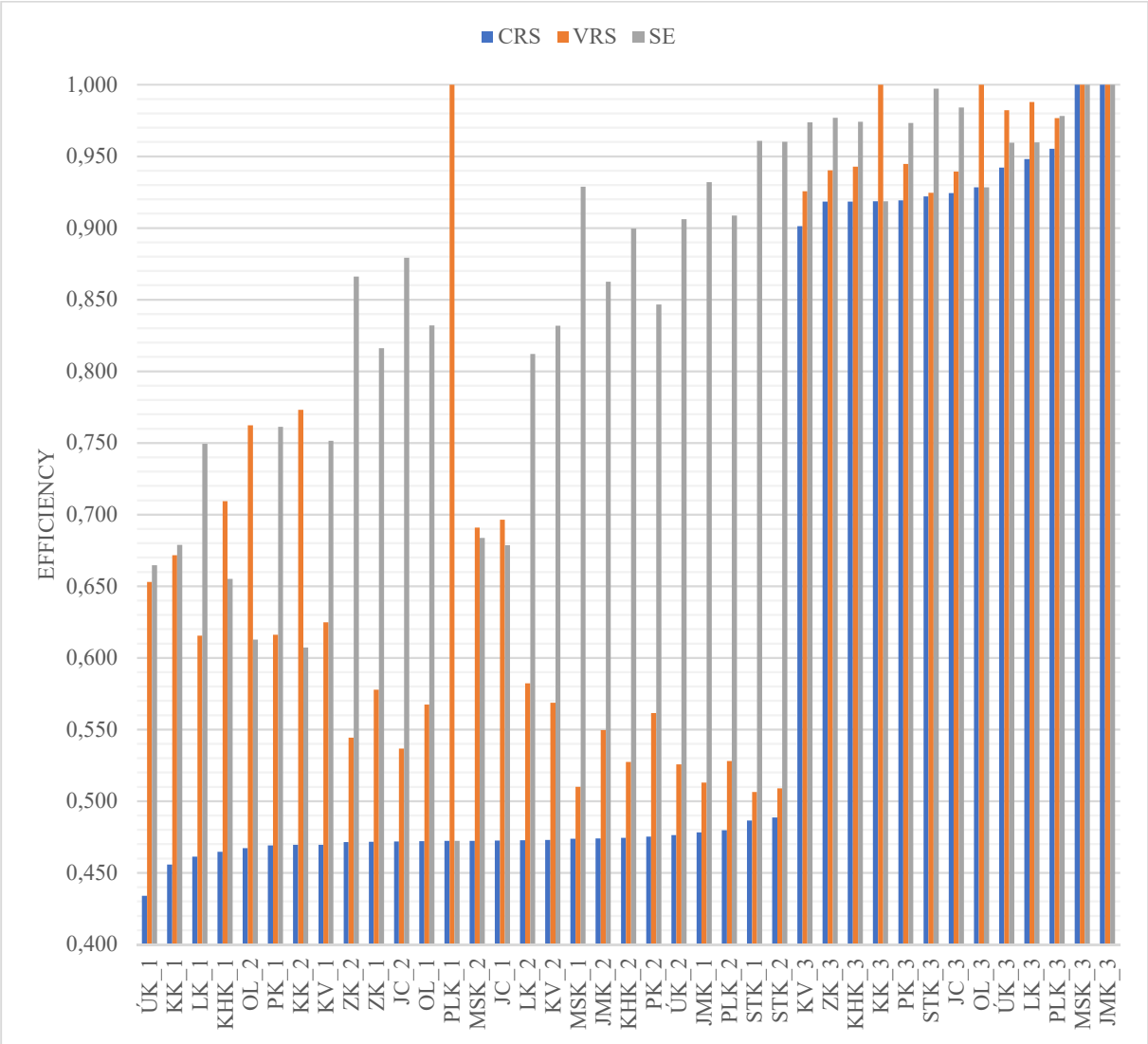
The results show that the most efficient type of BA is the third type BA_3, and this applies to all DMUs (regions) as well as overall efficiency (CRS) as well as individual efficiency components (VRS and SE). The BA_3 building authorities operate most efficiently in the Moravian-Silesian Region and the South Moravian Region. The Vysočina Region and the Zlín Region operate the least effectively in BA_3 (see Figure 2).

Table 3 - Summary results of the allocation efficiency calculation

	DMUs (e=1)	Mean Total (39 DMUs)	Mean BA_1 (13 DMUs)	Mean BA_2 (13DMUs)	Mean BA_3 (13DMUs)
CRS	2 (MSK_3, JMK_3)	0.67	0.47	0.47	0.94
VRS	5 (MSK_3, JMK_3, OL_3, KK_3, PLK_1)	0.73	0.64	0.59	0.97
SE	2 (MSK_3, JMK_3)	0.85	0.76	0.82	0.97

Source: Own processing.

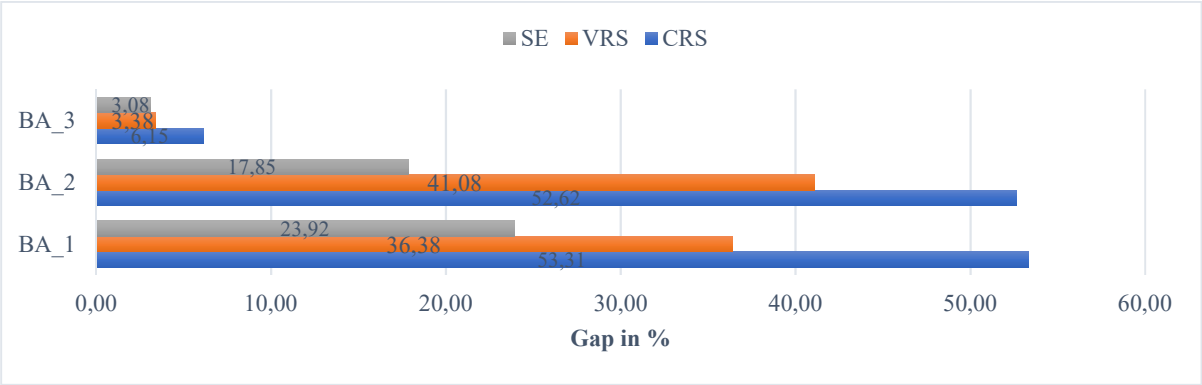
Figure 2 - Results of the efficiency decomposition



Source: Own processing.

Gaps of efficiency (EG) is expressed in percentage points. The width EG represents the difference between the calculated efficiency according to the DEA model (e) and full efficiency (full efficiency is 100 %). The mean EG (for 13 regions) according to individual types of BA of the total efficiency of CRS and their components VRS and SE is shown in Fig. 3. BA_1 and BA_2 have the largest EG. Both types of construction authorities are significantly inefficient compared to BA_3, as the graph in Fig. 2. Both graphs also show that the efficiency deficit in BA_1 and BA_2 is caused more by the pure efficiency component (VRS)

Figure 3 - Gaps of efficiency



Source: Own processing.

5 Conclusion

The paper deals with the issue of the allocation efficiency of building authorities in the Czech Republic and responds to the declared intention of the government in terms of their optimization/reduction. The estimation of allocation efficiency was realized according to the input-oriented DEA model and its decomposition. The decomposition allows to detect whether the calculated rate of inefficiency/efficiency is affected by returns to scale. The analysis works with mean input and output values for the years 2016-2020 of individual types of building authorities. Input and output values are aggregated into 13 self-governing regions. The city of Prague was not included in the analysis.

It was found that the gaps in the allocation efficiency of the subsidy are influenced by the type of building authority. A significant difference can be seen between the allocation efficiency of building authorities BA_3 and BA_1 as well as BA_2. The overall allocation efficiency gap for BA_2 is 52.6 % and BA_1 is 53.3 %. In contrast, building authorities BA_3 only show a gap of 6.2 %. (answer to RQ1)

A very large gap in allocation efficiency for BA_1 and BA_2 was revealed for all regions. The gap is due more to pure allocative inefficiency than to scale inefficiency, (answer to RQ2). This means that the majority of evaluated units use their resources unproductively (numbers of building authorities and contribution to state administration). In the territory of the regions, it is advisable, from the point of view of the calculated results, to reduce the number of construction authorities of type BA_1 and BA_2 or to abolish these construction authorities completely.

Given that building authorities are subjects of state administration and the system of material and local availability should be uniform, it is therefore necessary to apply such a solution when reducing building authorities, which will mainly comply with the principle of vertical deconcentration. This means that it is not possible to cancel BA_1 only in the Ústí Region and the Karlovy Vary Region, but it is necessary to cancel all building authorities of this type in all regions.

The results of the evaluation of allocation efficiency according to the DEA model must always be understood in the context of the limitations resulting from the construction of the DEA model (Dlouhý et al., 2018, Vaňková, Vrabková, 2022), the selection of inputs and outputs, and finally also the evaluated period. The distortion of the results can also be discussed in connection with the population of the administrative district and the size of the subsidy to the transferred performance of the state administration. To limit this bias, the input values were averaged over a five-year period and the allocative efficiency measure was calculated for a set of 39 homogeneous production units.

However, it can be assumed that the real availability of the state administration, and therefore also the building authorities, will be increasingly affected by the progressive development of technology and eGovernment (Ardielli, 2019). On the other hand, the pace of development and gaps in the efficiency of public administration are also determined by political decision-making, and this can be a problem, as pointed out by, for example, Plaček et. al. (2021).

Practice not only in the field of building administration shows that the quality and efficiency of transferred state administration performance in the conditions of small municipalities is problematic.

This is confirmed not only by the analyzes of the Ministry of the Interior of the Czech Republic, but also by research from the practice of the Slovak Republic. Marišová, Lichnerová (2019) demonstrate that small

municipalities in Slovakia are not staffed and technically equipped to solve increasingly technically complex tasks independently.

Based on the above, it can be assumed that the procedural simplification of construction management and the abolition of construction authorities type BA_1 and BA_2 appear to be a suitable solution. On the contrary, the introduction of a new system of state administration in the area of building authorities, as envisaged by the (yet ineffective) new construction law, does not need to be introduced, especially if building authorities of type BA_3, which are part of municipalities with extended powers under the administrative supervision of regional authorities, have the personnel and material technical prerequisites for managing the construction agenda in their administrative district. It is also possible for BA_3 to gradually introduce performance financing as with other agendas (documents, registry, spatial planning).

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Security and Selected Cultural and Historical Issues of Migration

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Abstract

Migration, i.e. the movement of people from one area to another, has accompanied mankind since the earliest times. The causes of human movement, the size of migration flows and the balance of movement by country are examined from a historical perspective. Internal migration, between areas within a territory or country, is also studied from the perspective of socio-demographic criteria. Each migration has its causes, which usually correspond to political, religious, cultural, economic and security criteria. Specific features of migration can be observed in border areas, between neighboring countries. Here too, language and the absence of language barriers, cultural and historical roots, economic and political development play an important role. Every migration and migration wave is accompanied by a number of security issues and risks, which can take the form of a range of threats, from the spread of infectious disease to various forms of organized crime. The intensity and nature of these threats depend on the sources of migration and the volume of migration flows. The aim of the article is to provide insight into the specifics of Czech-Polish migration waves in relation to historical contexts and interconnected cultural-historical relations. It also highlights the security risks that currently accompany all waves of global migration.

Keywords: *cultural-historical relations, migration, security, security risks*

JEL Classification: *J61, Z13, F51*

1 Introduction

The paper highlights the roots and basic foundations of Czech-Polish reciprocity as one of many examples of the development of European nation-states that began to emerge in the Middle Ages and the importance of language as a unifying communicative and political element. The cultural and historical development of even such close nations creates a number of specificities and differences manifested in a number of monitored indicators, such as migration, unemployment, crime, GDP, etc., especially in border areas where these mutual contacts occur most frequently. By analysing open sources and statistical data, the paper provides a basic analytical and comparative orientation in the field of Czech-Polish cooperation, including aspects of migration and related security risks. The paper contains a chapter on the historical beginnings of Czech-Polish reciprocity and the causes of migration, a chapter focused on security aspects of migration, chosen methodology and research methods, interpretation of statistical data and comments in relation to the theoretical part of the paper and a conclusion.

2 Historical Origins of Czech-Polish Reciprocity and Causes of Migration

The migration of Polish people to Bohemia and vice versa, especially in the border areas, has a relatively strong historical tradition. It is closely related to the territory, whose borders have historically changed in connection with the reigns of Czech and Polish rulers, whose families and territories intermingled.

These territories include in particular the Těšín Silesia, which from the 10th century onwards was still held in fief by the Czech Přemyslid dynasty and the Polish Piast dynasty. From the 13th century, the territory of Těšín was designated as Polonia, but from the 14th century it became part of the Crown of the Kingdom of Bohemia.

The final form of this territory was not settled until after the so-called Silesian War in the 18th century, but further disputes over this territory appeared later (Jež 2010).

In terms of the most significant early historical-political roots of Czech-Polish reciprocity, it is necessary to mention the reign of the monarch Vladislav II in 1471-1516, as a Czech king of Polish origin. It is also necessary to mention Queen Eliška Rejčka, daughter of the Polish king Přemysl II, who became the wife of Wenceslas II and later of Rudolf of Habsburg and finally of Henry of Lipá. She moved with him to Brno, founded a monastery and started the construction of the Church of the Assumption of the Virgin Mary, where she was buried in 1335. Two of the four wives of King Charles IV of Bohemia, Anna of Swidnica and Elisabeth of Pomerania, were also of Polish origin (Madecki 2017:331).

The monarchical changes and their interrelationships were also closely related to the local population and their numbers. The language was also specific, characterized by a number of dialects created by the intermingling of Czech, Moravian, Silesian, Polish and German. However, in historical times Polish had more common features with Czech than it does today, so there were no language barriers. It was only later that various deviations and linguistic modifications began to be reflected in it (Greň 2000).

The post-White Mountain events and persecution against non-Catholics in the early 17th century triggered one of the largest waves of migration of Czechs to Poland. At this time almost 10,000 people left for Poland, among them J.A. Komenský, who became the bishop of the Unity of Brethren in Poland. In Poland, Czech immigrants establish up to 50 Czech settlements, with Leszno becoming the most important centre of Czech immigrants (Kitta 2018). This type of migration is referred to as religious emigration.

The next major immigration waves were Czechs who migrated to the historical Polish territory and among Polish neighbours, but to other states created by the partition of Poland in the 18th century (Chmelař 1935). The most famous example from this period are the so-called Volhynian Czechs who emigrated to Tsarist Russia in the 19th century to areas that belonged to Poland before the partition of Poland and after World War I. 90% of these originally Czech inhabitants had Russian citizenship. After 1918, Volhynia became part of Poland. According to census data, there were over 25,000 Czechs living in the area and most of them used the Czech language (Nosková 2007).

The next relatively large migration wave to Těšín Silesia was related to political and cultural events and national changes, followed by the onset of industrialisation. Since the end of the 18th century, there has been a significant increase in population. The establishment of the Třinec Ironworks in 1839, the construction of the railway and the start of coal mining in the Ostrava-Karviná mines led to an intensive influx of labour. The population of the Těšín region more than tripled during this period. The construction of the railway network, the Northern Railway, the Košice-Bohumín Railway and the Mining Railway contributed to an even greater development of the metallurgical and chemical industry, which was linked to coal mining. In addition to the expansion of the population from neighboring countries, the immediate surroundings, especially the population from nearby Galicia, also contributed to the migration (Gawrecki 2003).

Czechs living in the western regions of Poland had long been exposed to German influence and spoke fluent German. They gradually integrated into the minority border society and were considered to be of German origin. In the 19th century, milder waves of Czech migration to Poland, especially to centers such as Lodz and Warsaw, are already registered. After the Second World War, as part of the ongoing repatriation activities, the Czech population moved from Poland to the Sudetenland and only 15% of the original number of Czech emigrants before the war remained in Poland. Most of the Czechs lived in Silesia and after the post-war border settlement many of them ended up in Ukraine (Tobjański 1994).

At the end of the 18th century and the beginning of the 19th century, a more extensive census was conducted according to religion and by vernacular, i.e. how ethnically distinct the inhabitants were and what language they used. Polish was the predominant official language, followed by Czech and German (Piątkowski 2018).

Today, the area of Těšín Silesia is comparable in size to Luxembourg (2,283 km²), of which approximately half belongs to the Czech Republic and approximately half to Poland. The area has over 800 000 inhabitants, of which again approximately half are Czech and half Polish (CSO).

According to the last census in 2020, there were 4 086 persons from Poland living in the Moravian-Silesian Region (14.7% of the total population of the Czech Republic). In terms of individual districts of the Moravian-Silesian Region, the largest number of persons of Polish nationality live in the Karviná district (2 184 persons), followed by Ostrava-City (649 persons), Frýdek-Místek (740 persons), Opava (25 persons), Bruntál (166 persons) and Nový Jičín (153 persons) (CSO).

According to the CSO data, the migration of Polish people to the Czech Republic is not of a significant nature and has shown an almost constant tendency in the last 10 years. The number of foreigners in the Moravian-

Silesian Region decreased by 1,174 persons in 2020, which was reflected in the decrease of persons of Polish nationality in Moravia (CSO 2020). This situation could be linked to the outbreak of the infectious disease COVID-19 and the associated restrictions on the free movement of persons.

Table 1 - Number of persons of Polish nationality in the Moravian-Silesian Region in the last 10 years

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Population	5 274	5 301	5 303	5 325	5 369	5 417	5 462	5 551	5 580	4 086

Source: CZSO (2021).

2.1 Security Aspects of Migration

Any migration, or any movement of people outside or even within a state, poses a security risk. The National Security Audit of the Czech Republic identifies several major security threats related to migration, where *"the threat may be posed in specific cases by specific immigrants or masses of them. This sub-threat may take the form of terrorism, organised crime, but also the spread of infectious diseases, cultural practices incompatible with our legal order or a reduced willingness to integrate. In addition to the type of immigration or immigrants, the volume of migration flows can also play a role in the form of a migration threat, and security can be threatened by mass uncontrolled immigration that could result in social unrest or radicalism, both on the minority and majority sides"* (MoI 2016:62).

From this perspective, monitoring the security situation in other nearby countries is also an important factor influencing security risks. An example is the current development of the political conflict in the Ukraine, which has escalated into a military conflict, giving rise to a major refugee crisis that has affected several of the nearest neighboring states, including the Czech Republic and Poland.

In all cases, the security forces of the Czech Republic are not fully capable of determining the riskiness of individuals crossing the state border to obtain political asylum, and there is a great risk that these migrants will include not only persons who are threatened by the above-mentioned military conflict, but that this situation will also be exploited by criminally disordered persons who pose a security risk to the Czech Republic, both current and possible future. After the acclimatization of these criminally addicted persons, forms of latent criminality may occur, as well as other forms, including the possibility of the entry of organized criminal structures in the field of human trafficking, counterfeiting, arms trafficking, drug crime and illegal import and export of products subject to excise duty. A preventive methodological recommendation would be to set up a Europe-wide database where all countries would supply, according to a person's document number, information on previous criminal offences, offences and other relevant information. This is currently partially substituted by the Schengen Information System, but in practice it has been found that it is basically limited to a small amount of information and is completely inadequate for the needs of the Czech Republic's security forces, where the subsequent discovery of information on persons of interest must be dealt with through international cooperation, which is not effective given the length of the entire procedure.

Through managed migration tools, security risks are mitigated and opportunities for legal integration are sought, in particular through set legislative processes. The process of integrating foreigners into mainstream society is always a long-term process. The successful integration of foreigners is perceived as a prevention of security risks and security threats. Problematic integration, on the contrary, leads to the creation of closed communities of foreigners and gives rise to excluded localities producing conflicts between foreigners and the majority, which are the causes of frustrations from the impossibility of full participation in the majority society. The cause of failed integration may be the language barrier, which does not allow full integration into social and cultural rules and does not allow proper orientation in society and adequate work integration. The failure to integrate migrants into the majority society is a cause of social isolation, which is associated with low legal awareness, manipulability and loss of legal residence, and is also a cause of increased incidence of certain types of crime, including illegal employment. Increased levels of irregular migration and lack of integration of legal migrants into society are also perceived as a significant security risk (Ministry of the Interior of the Czech Republic 2016:68).

3 Methodology, Methods and Data Description

The analysis of open sources, historical sources and available documents declaring the development of cultural, national and political aspects between these nations was used to assess the nature of mutual Czech-Polish relations and the occurrence of migration already in the early historical times. The analysis and comparison of statistical data from publicly available sources and databases highlights selected aspects of migration, assesses the security risks of illegal migration of foreigners in general, but also focuses on the Czech-Polish aspects of

migration, including specifics. At the same time, properly address the security risks that currently accompany all waves of global migration.

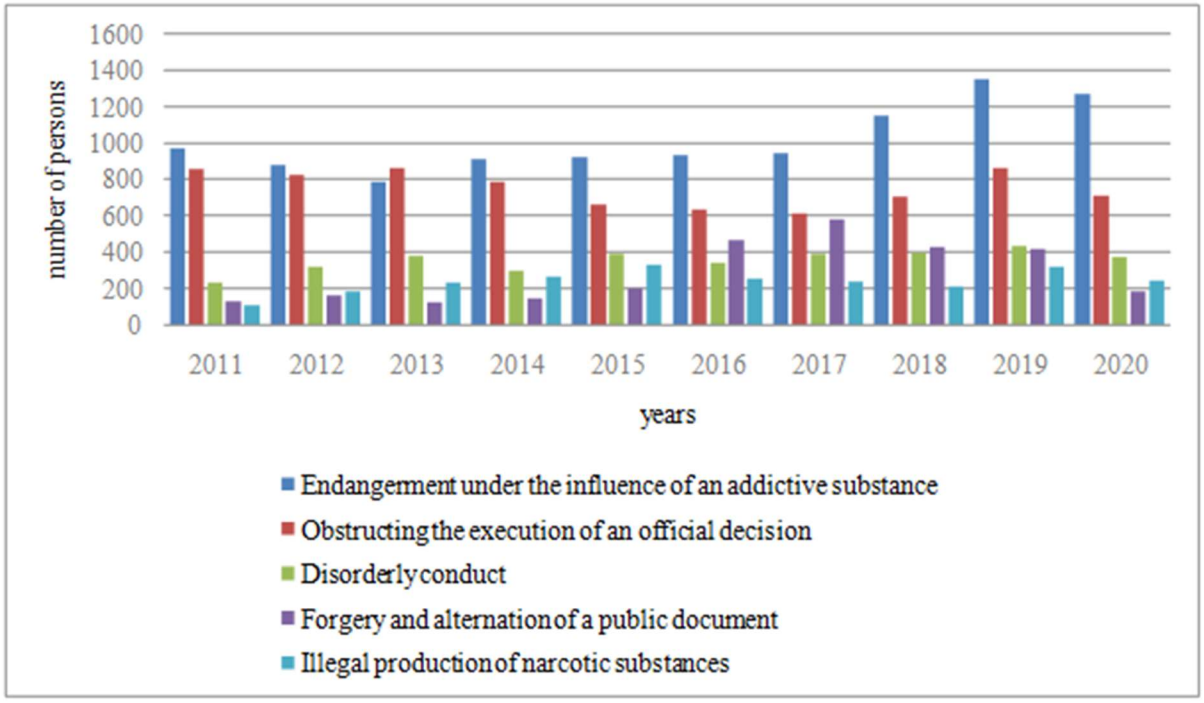
3.1 Interpretation of Statistical Data and Comments, Contexts for the Theoretical Part

According to the latest data from the Czech Statistical Office, a total of 7 093 persons were detected in the Czech Republic in 2020 as a result of illegal migration, an increase of 1416 persons compared to the previous year. The largest increase in illegal migrants in the Czech Republic was registered in 2015, when this number rose to 8 563 persons (CSO 2020). This situation was probably again related to the European migration crisis, which was referred to as the European refugee crisis and was associated with a sharp increase in the number of asylum seekers in EU countries, which peaked in 2015.

As of 23 March 2022, more than 200 thousand citizens of Ukraine have been registered as refugees and granted temporary protection on the territory of the Czech Republic (EMS 2022).

The most represented foreigners in the Czech Republic are, in order of nationality: Ukraine, Slovakia, Vietnam, Russia, Romania, Poland (CSO foreigners).

Figure 1 - Nature of criminal activities of foreigners on the territory of the Czech Republic according to the Criminal Code 40/2009 for the last 10 years

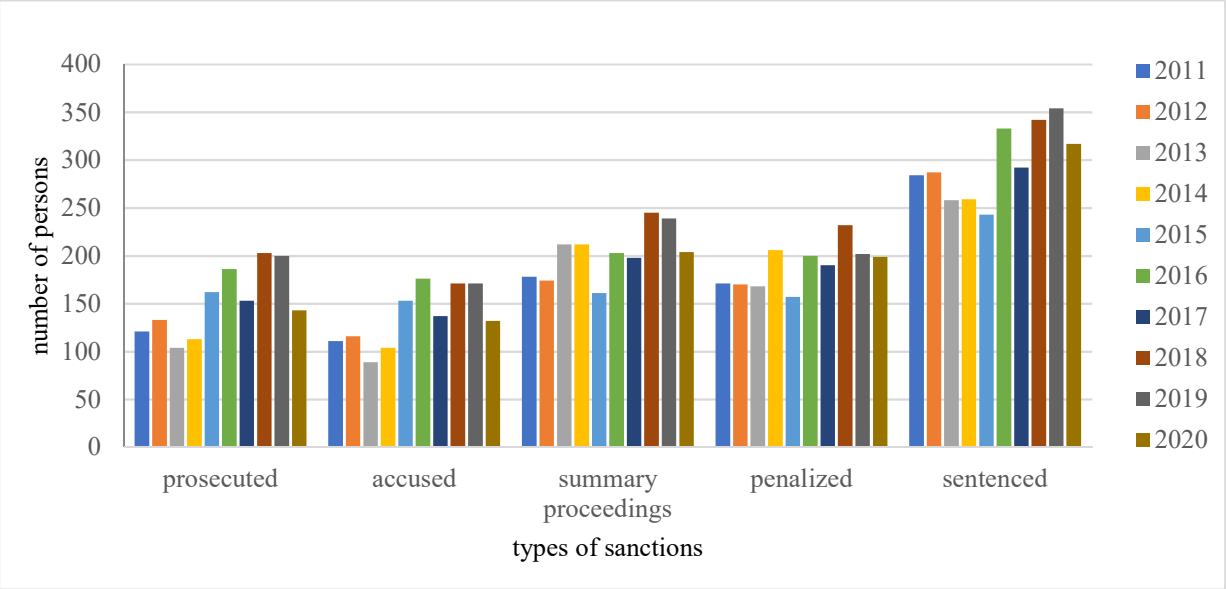


Source: CZSO (2020).

The most common crimes committed by foreigners in the last 10 years are, in order: forgery and alteration of documents, illicit production of narcotic and psychotropic substances, rioting, obstruction of the execution of an official decision, endangerment under the influence of an addictive substance and, to a lesser extent, theft of motor vehicles with subsequent transit from the territory of the Czech Republic to Poland and then to Eastern European countries. Motor vehicle theft is mostly a form of organized crime, as is the case with drug offences, where criminal groups have an established modus operandi, individual perpetrators each have their own specific role and responsibilities, with a clearly defined management structure of the criminal organization (see Criminal Procedure Code). These illegal activities constitute the basic features of a classic form of organized crime and are punishable by law. All foreigners, regardless of nationality, are included in this statistical distribution. Organized crime is part of migration and is linked to illegal residence.

The relationship between migration and crime has been the subject of a number of international studies. Consistently, they point to the incidence of crimes motivated by financial gain, such as motor vehicle theft, robbery, etc., depending on location factors and the ability of migrants to integrate into the majority society (Spenkuch 2014, Ousey, Kubrin 2018, Bell et al. 2013)).

Figure 2 - Development of criminal activities of persons of Polish nationality in the Czech Republic over the last 10 years



Source: CZSO (2020).

The border region of Těšín Silesia, where the largest number of people of Polish nationality in the whole Czech Republic is located, shows a slightly upward trend in crime, especially in the last 5 years. This increase is in all monitored categories, i.e. in persons prosecuted, accused, in summary proceedings, in those punished and convicted, thus confirming the general increase in crime overall.

4 Conclusion

According to the results of the last census, 30 096 people of Polish nationality live in the Czech Republic, which is approximately 0.4% of the total population of the Czech Republic, of which 80% live in Silesia. The Polish minority participates significantly in cultural and social life, among the best known are the civic associations Congress of Polish People in the Czech Republic and the Polish Cultural and Educational Association in the Czech Republic (Government of the Czech Republic 2020).

In terms of migration, the situation between Poland and the Czech Republic in this direction has been stable for a long time, migration is stable and tends to decrease. Although foreigners in the territory of the Czech Republic are involved in criminal activity corresponding to migration, the share of Polish people in this crime is relatively low in relation to the overall situation. Illegal employment of foreigners and the use of unregistered labor as part of the informal economy are also related to migration. The Czech Republic is a transit country for most migrants. Migrants prefer more economically developed countries offering more effective conditions for integration. In a global overview, the largest number of first asylum applications were made in Germany, followed by France, Spain, Austria, etc. (European Commission 2020).

Czech-Polish relations have a long cultural tradition, relations between Czechs and Polish people have historically closely intertwined roots and have gone through various periods of formation, but also of mutual differentiation and building of uniqueness of the nations, including differences in language. Religious, political and national influences have had a major impact on the nature of these relations and have significantly influenced the current situation. The border area of Silesian Těšín also integrates the mutual history and interconnectedness of families and industry, and therefore the natural migration of people, and all these aspects must be taken into account. Migration as a security threat also includes the various forms of crime that are part of it. Relations with Poland are governed by the Treaty between Poland and the Czech and Slovak Federal Republic, signed on 6 October 1991 by both Presidents Lech Walesa and Václav Havel. In 2008, the Czech-Polish Forum was established, whose mission is to support and develop new social initiatives. The Czech Republic is one of the largest economic and trade partners, ranking 5th in terms of trade turnover (gov.pl).

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