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Content

Continuity of sharing and shadow economy

Koubková, M.

Abstract

The aim is to find out the relation between the sharing and shadow economy and how influence each other. The partial goal is to analyse a situation in the selected countries. The partial aim is also to summarise the current state of knowledge in the sharing economy services in relation with shadow economy and to suggest possibilities for further research in this area. The partial aim is analysing situation of the shadow and sharing economy in providing accommodation services through Airbnb in the Czech Republic. The aim is also to identify the share of Airbnb accommodation in total accommodation capacity in the Czech Republic.

Several methods are used to achieve the goals, such as forming hypothesis, secondary data analysis, questionnaire survey, theoretical output in the form of proposals for further investigation and correlation analysis.

Based on the overview study, two hypotheses were established. The first hypothesis is focused on connection between sharing and shadow economy. The second hypothesis is focused on share of Airbnb accommodation in total accommodation capacity in the Czech Republic. The result of correlation analysis is that sharing, and shadow economy has strong negative correlation. These two topics has common influence. The result shows that non-payment of local tax authorities in the Czech Republic perceive as a significant problem. However, there is no communication between the city and the providers.

Keywords: sharing economy, Airbnb, shadow economy, tourism, accommodation

JEL Classification: L83, Z32, O17

1. Introduction

The aim is to find out the relation between the sharing and shadow economy and how are related and influence each other. The partial aim is to summarise the current state of knowledge in the sharing economy services in relation with shadow economy and to suggest possibilities for further research in this area. The next partial goal is to analyse a situation in the selected countries. The partial aim is analysing situation of the shadow and sharing economy in providing accommodation services through Airbnb in the Czech Republic.

In the article apply several research methods, such as the secondary data analysis, correlation analysis, and questionnaire survey.

The overview study introduces the sharing economy. The development of the sharing economy in the context of digitisation, the difficulties and concerns associated with the sharing economy, and finally, the connection and clash between the sharing economy and the shadow economy will be presented. In connection with these topics, the activities included in the shadow economy are identified and defined, the institutional conditions of the shadow economy are specified, and offshore companies are introduced. All these topics are closely related to the topic of the sharing economy.

Another important part of the work is secondary data analysis of sharing economy. To complement, there is also secondary data analysis of shadow economy. This section uses publicly available data and statistics. The chapter focusses on data related to the shadow economy in selected countries for better overall understanding and for world comparison. Individual countries are selected based on an analysis of data available on the Airbnb platform and from data available on statista.com. Both sources compiled a ranking of 30 countries based on the estimated amount of direct economic impact for 2018. From these data, three countries with the highest direct economic impact and four countries with the lowest economic impact were selected. Specifically, these are the USA, France, Spain, Indonesia, the Philippines, Colombia, and the Czech Republic. For each country, the shadow economy situation is presented in the context of particular country, including the definition of the shadow economy for each selected country. Mentioned part is included for better understanding of the problem of shadow economy in selected countries in connection with sharing economy. Following the fact that the sharing economy tends to avoid tax obligations and local tax, it is necessary to determine the number of accommodations offers on the Airbnb platform for future estimation of leakages in local tax. Non-payment of local tax by Airbnb accommodation providers will

significantly affect the budgets of individual cities, and thus indirectly other residents. For this reason, the number of Airbnb offers in the capital cities of the selected countries is shown. There is also shown the number of Airbnb accommodation in all individual regional cities of the Czech Republic according to the own research.

The next part focuses on the analysis the situation of payment of local tax by Airbnb accommodation providers in individual regional cities from point of view of the regional authorities of individual cities of the Czech Republic.

The final part is dedicated to determining the research problem and research questions based on an overview study, secondary analysis of the available data and analysis of local tax payment situation.

2. Methods

The area of investigation and the main goal of the work was determined at the beginning of the contribution. The aim is to find out the relation between the sharing and shadow economy and how influence each other. The partial goal is to analyse a situation in the selected countries. The partial aim is also to summarise the current state of knowledge in the sharing economy services in relation with shadow economy and to suggest possibilities for further research in this area. The partial aim is analysing situation of the shadow and sharing economy in providing accommodation services through Airbnb in the Czech Republic. The aim is also to identify the share of Airbnb accommodation in total accommodation capacity in the Czech Republic

The following procedure was used to achieve the objective:

1) Overview study
2) Forming hypothesis
3) Data Collection and Construction of Secondary Analysis
4) Analysis of payment of local tax in the Czech Republic - Questionnaire survey
5) Correlation analysis between the sharing and shadow economy
6) Theoretical output in the form of proposals for further investigation.

Overview study

The overview study serves to summarise the current state of the sharing economy, to describe the clash between the sharing and shadow economy, and finally, to define the shadow economy. A combination of different types of review studies was used:

- Literature review – various types of literary source are generalised. This section is based on research studies and their results.
- Scoping review – identification, analysis, and interpretation of key concepts important for the researched area. Based on this, it is possible to describe the gaps in the researched topic.

Forming hypothesis

After overview study, hypotheses are created for the practical part. The hypothesis states the expected result of the research.

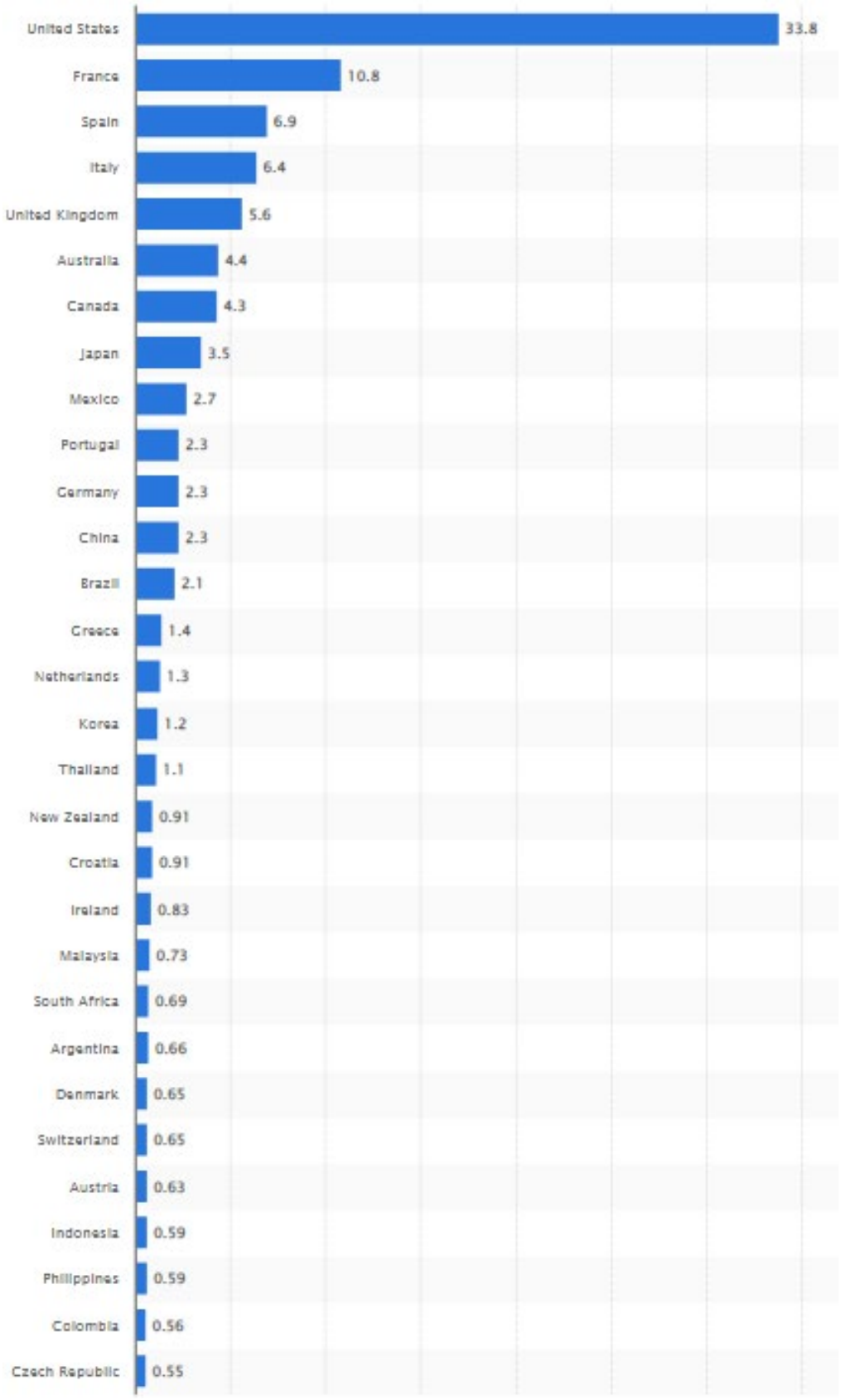
Data Collection and Creation of Secondary Analysis

Data collection and creation of secondary data analysis include the size and status of the shadow economy in the selected countries (individual countries were selected

based on the analysis of data available on the Airbnb platform) to obtain contexts in individual countries (international comparison).

Individual countries were selected based on an analysis of data available on the Airbnb platform and from data available on statista.com. Both sources compiled a ranking of 30 countries based on the estimated amount of direct economic impact for 2018 (more recent research has not yet been published). This list is based on the sum of the hosts' earnings and their guests' estimated spending, expressed in USD, during their trip (see Figure 1). The accommodation provider's earnings are based on internal data of the Airbnb platform. The estimated amount of expenses of individual guests is based on 12 thousand of responses obtained during a voluntary survey in which a sample of Airbnb guest accounts was selected, and a questionnaire was sent (Airbnb 2019, Statista 2022). Based on this research, three countries with the highest direct economic impact and four countries with the lowest economic impact were selected (the intention was to select the three countries with the lowest economic impact, but due to the same impact value of Indonesia and the Philippines, both countries were selected). For presented article, here were selected three countries with the highest economic impact of Airbnb (USA, France, and Spain) and four countries with the lowest economic impact (the Czech Republic, Colombia, Philippines, and Indonesia) for better demonstration of the differences between two sites (highest and lowest economic impact of Airbnb).

Fig. 1 Direct economic impact of Airbnb worldwide in 2018, by country (in billion U.S. dollars)*



Source: Statista (2022)

Analysis of payment of local tax in the Czech Republic - Questionnaire survey

Analysis of the situation of payment of local tax by Airbnb accommodation providers in individual regional cities from point of view of the regional authorities of individual cities of the Czech Republic was done. A questionnaire survey designed for municipal authorities of individual regional cities of the Czech Republic was created. A total of 13 city authorities were approached, specifically the Department for Tourism. The questionnaire survey focused on the city's attitude towards providing accommodation through Airbnb.

Correlation analysis

Correlation analysis was used to assess the relationship between the sharing and the shadow economy and how they influence each other. According to the Williams and Horodnic (2017) no studies have yet evaluated the impacts of the shadow economy directly on the accommodation and tourism in general. Unfortunately, there is lack of research focused on connection between the sharing and shadow economy. Based on this, it can be said that the presented research is unique, because there is not much research that deals with the interface between the shadow and the sharing economy and their interaction with each other.

For correlation are used different data. The Pearson correlation coefficient is used. The data for correlation are size of Shadow economy in 2022 (in % of GDP) and Reported incomes of Airbnb. For verification other date are used. The global revenue of Airbnb from 2015 to 2018 and the average world size of the shadow economy according to data from the World data bank (2021) are used. The size of the shadow economy is difficult to measure, there are many calculation methods, for this reason two methods were used, i.e., the DGE_p method and the MIMIC method. Average values of the size of the shadow economy in 157 (in the case of the DGE_p method) and 159 (in the case of the MIMIC method) countries of the world were used for our analysis.

Theoretical output in the form of proposals for further investigation.

Creation of a theoretical output in the form of suggestions for further investigation. These proposals will be made based on an overview study and secondary data analysis.

3. Overview study

3.1. Sharing economy

A new innovative form of economy and sustainable development is the so-called sharing economy and sharing tourism (Tescașiu, Epuran, Tecău, Chițu, and Mekinc, 2018; Genç, 2019). In today's globalised world, the sharing economy is becoming more and more widespread. Definitions, principles, attitudes, sustainability, and the legal framework are dealt with by several authors such as Schlagwein, Schoder, and Spindeldreher (2020); Donovan, Eberwine, and Woodring (2015); Na and Kang (2018); Frederik and Edeltraud (2017).

The sharing economy is a modern socioeconomic system based on the sharing of human and natural resources. The original classic sharing economy (neighbourly help, mutual free exchange of an apartment or other real estate) initially had a social character (people helped each other for free). We perceive original sharing as a social exchange taking place between people within closed social groups (neighbours, family). In this sense, the sharing economy uses goods that were not created for selfish reasons and are therefore shared by owners for free (Schor, Walker, Lee, Parigi, and Cook, 2015). If the sharing participants do not know each other, it is not sharing in the true sense of the word. However, especially at the beginning, the transactions of the sharing economy represented the sharing (pooling) or redistribution of resources between actors who shared resources without immediate (material) compensation (Corten, 2019). Increasingly, the consumer in the role of user pays a certain tax to intermediaries for enabling access to someone else's goods or services. It is therefore a model of economic exchange, where the transaction has a utilitarian, not a social, character. However, both approaches emphasise sharing underutilised assets in a way that increases efficiency and sustainability (Hossain, 2020).

According to Schor et al. (2015), sharing has developed because information, natural resources, and social relations are at the core of 21st century economies, while these resources are not sufficiently well organised and distributed through private ownership and utility maximisation, which is confirmed by economic theories. According to Puschmann and Alt (2016), the sharing economy increases and has the potential to increase the total product, especially in the sectors of travel, car sharing, finance or music and video streaming. Currently, the sharing economy is an economic model that connects suppliers with consumers through technological platforms; this connection takes place mainly through mobile applications (Office of the Government of the Czech Republic, 2016).

From a microeconomic point of view, two types of entities play an important role in the sharing economy (Puschmann and Alt, 2016):

- Start-up companies, such as Uber or Airbnb
- Established companies (called incumbents), including the world's most important ones, such as General Motors, Wal-Mart, or Ikea (Ciulli and Kolk, 2019).

Established companies have joined and continue to join the sharing economy to take advantage of emerging opportunities and thus better face the competition represented by start-up companies as the main innovation factor in the sharing economy. At the same time, the entry of established actors came at a time when the sharing economy, still in its initial stages, is a "battlefield" between actors defending the original promise of sustainability of the social economy phenomenon, based on the efficient use of resources, social ties, non-monetised relationships and the strength of communities, and those who support the need to find a compromise in principles to ensure the expansion of the sharing economy. Due to the size and strength of established operators, their entry and operation in this area is likely to significantly affect the shape and functioning of the sharing economy (Ciulli and Kolk, 2019).

The sharing economy includes two basic types of interaction (Puschmann and Alt, 2016):

- B2C – although the concept of a sharing economy is primarily based on sharing between two consumers, companies often enter this relationship as mediators of this relationship (Puschmann and Alt, 2016). The primary reason is probably the existence of so-called moral hazard, where consumers share more easily because they perceive the intervention of a corporate intermediary as a certain guarantee and thus feel less risk (Weber, 2014).
- C2C – interaction represents a situation where consumers are simultaneously in the role of creators/providers of a service and consumers of a shared product. This situation is reflected in the term 'collaborative consumption' (Puschmann and Alt, 2016).

As of 2020, Airbnb has over 150 million users worldwide, while hotels have around 1 billion guests per year. This result shows how popular Airbnb is. From the result, we can assume that Airbnb influences the whole industry, and it is a significant factor to consider. In 2018, the global market share of Airbnb in the accommodation industry was 11,3%, compared to 10,1% in 2017. Airbnb is growing popular in the accommodation area. More and more people chose

to stay on Airbnb instead of hotels. However, the global hotel industry leads the industry, because it has a larger market share than Airbnb (Gitnux, 2023). Based on these results, hypothesis number two was created, with the aim of determining the share of Airbnb in the total accommodation capacity in the Czech Republic.

3.1.1. The development of the sharing economy in the context of digitization

The use of digital technologies is entering all aspects of social and economic processes of human life at an unprecedented pace, digitisation is an accelerator of sharing economy, and therefore the world economy is at a new turning point. According to Li (2020), the global economy will reach digital dominance by 2023, that is, it will reach the point where all products and services provided by digitally transformed enterprises will account for more than half of the total global GDP.

Most services are going digital, making it easier for users to access various information. Shivakumar and Sethii (2019) or Cusumano, Gawer, and Yofie (2019) also deal with the creation of platforms and applications in their work. Several authors such as Sharafutdinov, Onishchenko, and Nakonechnyi (2020) address new platforms used in the tourism industry; Akiko and Bayu (2014). Digitisation is changing the way people live, work, and travel, and it also brings new opportunities for tourism. The impact of digitisation on tourism is discussed, for example, by Linton and Öberg (2020); Kalabukhova, Morozova, Onokoy, Chicherova, and Shadskaja (2020); Nyurenberger, Sewruikov, Luchina, and Shchetinina (2019); Grah, Dimovski, and Peterlin (2020). In relation to digitisation, it is also necessary to deal with sustainable tourism. The issue is addressed, for example, by Høyer (2000); Pamfilia et al. (2018). Sharing owned goods is certainly nothing new in human history, but the current development of digital technologies has significantly facilitated sharing and increased its potential to an unprecedented level in terms of the number of consumers involved (e.g., Constantiou, Marton, and Tuunainen, 2017).

3.1.2. Difficulties and concerns associated with the sharing economy

There are concerns and criticisms associated with the sharing economy from the business world, but also from the public administration (Arribas, Steible, and De Bondt, 2016). Discussions are held over the position of sharing economy platforms as a market entity, a potential employer, and in several other aspects (e.g., Sutherland and Jarrahi, 2018; Constantiou, Marton, and Tuunainen, 2017; Arribas, Steible, and De Bondt, 2016).

However, the issue of taxation of the sharing activities themselves seems to have raised the biggest debate (e.g., Berger, Guo, and King, 2020; Beretta, 2017; Pantazatou, 2017; Bozdoganoglu, 2017). And in this context, the term shadow economy is used. For example, Wyżnikiewicz (2019) states that the sharing economy is on the very border between the normal economy and the shadow economy.

According to Jarkovská (2021), the sharing economy is one of the reasons for the problem of over tourism. According to the author, one of the solutions to reduce the negative impacts on overcrowding of tourist destinations is to take measures limiting the number of tourists arriving to a sustainable limit or legalising the business conditions for the provision of accommodation services within the framework of the sharing economy.

3.1.3. Shadow economy in sharing services

Although it is commonly argued that the informal sector is particularly prevalent in the hospitality industry and the rise of the sharing economy leads to greater informality in the industry, no studies have yet evaluated the impacts of the informal sector directly on the hospitality industry. Based on this, hypothesis one is created. For this reason, the Williams and Horodnic (2017) contribution was created, which aims to assess the impacts of the informal sector on the hospitality industry and suggest what needs to be done to prevent further growth of the informal sector in this industry. The results show there are two approaches to tackle the shadow economy in the hospitality industry and its further growth due to the arise of the sharing economy, a direct controls approach (ensuring that the rewards of informal work are outweighed by the costs) and an indirect controls approach (sector arises when there is a low commitment to compliance).

The informal sector includes any paid activity that is not recognised by the authorities for tax, social security, and/or labour law reasons (Williams and Horodnic, 2017 in European Commission 2014, OECD 2012, Williams and Schneider, 2016).

Activities in the informal sector are therefore legal in all respects, except that they are not reported to public authorities for tax, social security, or labour law purposes. If someone rents out a room on a sharing economy platform such as Airbnb but does not declare income for tax purposes, then they are operating in the informal sector (Williams and Horodnic 2017).

Although Williams and Horodnic (2017) state that sharing is not illegal, according to Guttentag (2015), it is the opposite in terms of legality/illegality. The post states that a large

portion of Airbnb rentals are illegal. However, this research confirms the statements of other authors that Airbnb avoids its full tax obligations.

However, research by De Groen and Maselli (2016) shows that in some countries the above is not the case – in some countries, registration is required when starting an activity in the sharing economy. In three of the selected Member States (Belgium, Germany, and Italy), workers do not need to register when they start providing services through sharing platforms. In Spain, France, the Netherlands, Poland, and the United Kingdom, sharing economy workers must register with the tax authorities/social security funds or the commercial register. Even though registration is free in all selected member states (except France), registration will make it more difficult to engage in the shadow economy.

3.2. Clash of shadow and sharing economy

As already outlined, the sharing economy presents an opportunity to maximise your frozen assets. However, it should be noted that, in the case of incorrect legal anchoring and the impossibility of effectively enforcing the defined rules, there is room for the development of the shadow economy.

There are often no clearly defined rules for the further development of the sharing economy, and it is not entirely clear where the sharing economy ends, and the shadow economy begins. It is therefore clear that the two topics are closely related and that it is necessary to focus on them in the future as well. Unclear or poorly defined sharing rules create fertile ground for the shadow economy. On the contrary, even very strict regulation can mean the transfer of shared services to the zone of the shadow economy.

The informal nature of the shadow economy can easily conflict with regulations designed to ensure safety and fairness for both those who provide goods and services and those who use them. This raises the question of who benefits from sharing – and who does not (Kamenetz 2013).

In 2017, the then Minister of Industry and Trade, Jiří Havlíček, addressed the issue of the centre of the shadow and sharing economy in the Czech Republic. An analysis was developed that aimed to clarify the boundary where sharing ends and the shadow economy begins.

The analysis of available sources reveals several problems of the sharing economy, which the governments of individual states are gradually focussing on, the author of the text lists some of them:

- Hotels blame Airbnb for having to pay and remit taxes, tax to the city, and Airbnb providers can completely avoid this → however, payments on the platforms mainly take place without cash, and therefore it is easier to check whether there are no tax and other evasions.
- Racial minorities and the disabled have the right to equal access to hotel rooms, public transport, and restaurants. What happens if someone makes an allegation of discrimination when using Uber? Should sharing platforms be exempt from these rules?
- Taxi service drivers must hold a taxi driver's licence, must pass an exam (certificate) from the topography and the car must be registered in the taxi service's vehicle register → this also applies to drivers of shared taxis in the Czech Republic.
- People buy apartments in bulk to turn them into small hotels.

3.3. Shadow economy

In 2020, a study was conducted that analysed research areas related to the shadow economy (see Andrii and Terziev, 2020). The aim of the article was to analyse trends in the scientific literature on the shadow economy and to identify future research directions. VOSviewer, Scopus, and Web of Science (WoS) tools were used for the analysis. This study is based on 5361 papers from Scopus and 3773 papers from Web of Science. The time sample of the research was not limited for analysis. The results of this analysis showed that in 2014-2015, an increase in articles (research) dealing with the issue of the shadow economy began. At the same time, the focus of research shifted from general questions (estimation of the shadow sector, impact on the labour market, etc.) to the problem of the transition from the shadow economy to the formal economy. In 2019, the number of works that analysed the shadow economy, according to the Scopus database, increased by 95% compared to 2014. The results of the survey prove that the topic of the shadow economy and its transition to the formal one continues the trend in the search for possibilities and efforts to regulate ongoing trends modern regulation (Andrii and Terziev, 2020). It follows from the above that more and more authors are dealing with the topic of the shadow economy, which is also confirmed by Alarcón-García, Azorín, and Sánchez (2020).

3.3.1. Activities in the shadow economy

According to Schneider and Buehn (2018), many researchers agree that defining the term shadow economy is difficult (Fleming, Roman, and Farrell, 2000; Williams and Schneider, 2016; Frey and Pommerehne, 1984; Belev, 2003; Gerxhani, 2003; Pedersen, 2003; Schneider and Williams, 2013; Hassan and Schneider, 2016; Thomas, 1992; Feld and Schneider, 2010).

One commonly used definition includes all currently unregistered economic activities that would contribute to officially calculated (or observed) gross domestic product Dell'Anno (2003), Feige (1989), Fleming, Roman, and Farrell (2000), and Dell'Anno and Schneider (2004). Schneider and Buehn (2018) in Smith (1994, p. 18) uses the definition: „*market production of goods and services, whether legal or illegal, that escapes detection in official GDP estimates*".

One of the broadest definitions includes „those *economic activities and the income derived from them that circumvent government regulation, taxation, or surveillance*" (Dell'Anno and Schneider, 2004; Fleming, Roman, and Farrell, 2000; Feige, 1989 or Dell'Anno ,2003).

All definitions leave many unanswered questions. Table 1 shows that the broad definition of the shadow economy includes unreported income from the production of legal goods and services - whether from cash or barter transactions - and thus includes all economic activities that would generally be subject to tax if reported to the tax authorities Schneider and Buehn (2018).

Table 1 Taxonomy of types of shadow economic activity

Activity type	**Monetary transaction**		**Non-monetary transaction**	
Illegal activities	Trade in stolen goods; drug trafficking and production; prostitution; games of chance; smuggling; fraud; etc.		Barter of drugs, stolen goods, smuggling, etc. Production or smuggling of drugs for personal use. Theft for personal gain.	
	Tax evasion	**Avoidance of tax obligations**	**Tax evasion**	**Avoidance of tax obligations**
Legal activities	Unreported income from self-employment; wages, salaries and assets from undeclared work related to legal services and goods	Employee discounts, benefits	Barter of legal services and goods	All DIY jobs and help from neighbours

Source: own processing according to Schneider and Buehn (2018) in Lippert and Walker (1997)

According to Schneider and Buehn (2018), the shadow economy includes all market-based legal production of goods and services that are deliberately hidden from public authorities for the following reasons:

1. avoiding paying taxes (income tax or value added tax),
2. avoiding paying social security contributions,
3. avoiding certain legal labour market standards (minimum wages, maximum working hours, safety standards, etc.) or
4. avoiding compliance with certain administrative procedures (filling in statistical questionnaires or other administrative forms).

Alarcón-García, Azorín, and Sánchez (2020) examine the influence of Hofstedian cultural variables along with other socioeconomic factors on the shadow economy. Hofstede's work

on cultural differences represents significant and innovative research on cross-cultural comparisons in the fields of management, social psychology, anthropology, sociology, marketing, and communication. His model of five value dimensions was developed based on an extensive set of data collected from a survey conducted around the world. The goal was to find an explanation for why some concepts of work motivation did not work the same in all countries (An and Kim, 2007).

The shadow economy is the dependent variable (expressed as a percentage of GDP) in the analysis of Alarcón-García, Azorín, and Sánchez (2020). The independent variables are socioeconomic type variables (government effectiveness, rule of law, democracy, corruption, GDP per capita, tax revenue, unemployment, and population) and variables related to national cultural dimensions, including some from Hofstede's theory (power distance, individualism, masculinity, and avoidance with uncertainty).

Alarcón-García, Azorín, and Sánchez (2020) report that the average size of the shadow economies of 158 countries in the period under review (1999-2015) is a very remarkable 31.1% of GDP. The geographical distribution of the shadow economy also follows a pattern in which there is a certain tendency to cluster countries with similar levels. Countries with high levels of shadow economy have neighbouring countries with similar levels, and the same applies to countries with medium and low levels. The results suggest that there is a shadow economy interaction between neighbouring countries such that a low/high level of the shadow economy at home is associated with a low/high level of the shadow economy in the neighbouring country. This research comes with a suggestion for policy makers, who should therefore implement coordinated social awareness measures in transnational policies (e.g., social stigmatisation programmes) because the behaviour of individuals from neighbouring countries affects the behaviour of individuals in the country.

The result of the study of García, Azorín, and Sánchez (2020) brings the finding that the level of the shadow economy is positively related to the unemployment rate, so that more shadow economy is present in countries that have higher unemployment. On the contrary, the shadow economy is negatively correlated with urban population, tax revenue, gross domestic product, legal regulations, and corruption. Countries with larger agglomeration economies therefore have lower levels of the shadow economy. Tax revenues are also higher in countries characterised by a lower level of the shadow economy. According to the research results of Mazhar and Méon (2017), there is a strong negative relationship between the tax burden and the shadow economy. From an economic point of view, the basic research estimate

suggests that a one-percentage point increase in the shadow economy leads to a reduction in tax revenue as a share of GDP of 0.141 percentage point.

There is a link between shadow and formal economies. The shadow economy affects:

- Tax system through:
  - Tax evasion that affects the formal economy as well as the overall economic performance of the given country (redistributive policies to finance the improvement of public goods are disrupted - the entire economy of the state can be negatively affected by this).
  - Additional tax revenues (if the activities of the shadow economy supplement the official economy, the income generated by the shadow economy is spent on goods and services in the formal economy.
- Allocation of resources through:
  - Stronger competition and stimulation of markets that have impacts on the official economy and overall economic performance of the country through greater efficiency in the use of scarce resources, stimulation of creativity and innovation, expansion of market supply through additional goods and services, and cost advantages of entrepreneurs operating in the shadow economy can lead to destructive competition.
- Political decisions through:
  - Biases in officially published data that have impacts on the official economy and overall economic performance, and thus stabilisation, redistribution, and fiscal policy may not have the desired effects Goel, Saunoris, and Schneider (2018), Schneider and Hametner (2014), and Schneider (2005).

3.3.2. Institutional conditions of the shadow economy

To understand the shadow economy and grasp its regulation, it is necessary to define the impulses leading to the transition from the official economy to the economy hidden from state authorities. If the state or society can reveal the causes, name, and define the consequences that flow from unofficial activity, they usually do not adopt socially acceptable solutions limiting the shadow economy as such (Schneider and Klinglmair, 2004). Some experts are convinced that there are socially positive effects of the shadow economy, such as Nguyen and Duong (2021) or Florea and Şchiop (2008). Some research to date indicates that the shadow economy has both positive and negative effects, for example, on the level and quality of life, as stated by

Kireenko and Nevzorova (2015). The results of this research show that there is a positive effect on living standards when the shadow economy increases total income. In the negative sense of the word, quality of life is reduced in connection with the quality of the working environment, safety, health, etc.

The obligation to properly pay taxes and social security contributions is considered by many to be the driving force behind the shadow economy. It is obvious that taxes are necessary for the proper and efficient functioning of a modern state. However, the savings from not paying them entice some members of society to carry out economic activity in the shadow economy, where it is possible to avoid these costs. The obligation to pay taxes and other institutional burdens then leads to an increase in the supply of labour in the informal sector of the economy. The work performed in this way is one of the main manifestations of the shadow economy. It is possible to state that the higher the taxation of official income to date, the higher the percentage of people aspiring to achieve income in the shadow economy. The amount of taxes and other levies from income generated in the official economy is directly dependent on the social policy of the given country (Schneider and Klinglmair, 2004).

According to Kopylenko, Gryshova, and Diachenko (2018), in the modern globalised world, in any state, regardless of the level of its socioeconomic and legal system development, the activation of the shadow economy leads to the spread of corruption, means, and methods of criminal competition. On the contrary, according to García, Azorín, and Sánchez (2020), a higher level of economic development is related to a lower level of the shadow economy in all countries. The higher the level of perceived corruption, the lower the level of the shadow economy. In countries where there is more confidence in the functioning of the rule of law, the level of the shadow economy is lower.

According to Buehn and Schneider (2011), theoretical approaches provide different mechanisms of interaction between corruption and the shadow economy. According to Johnson, Kaufmann, Shleifer, Goldman, and Weitzman (1997), the shadow economy is a substitute for the official economy, and an increase in the shadow economy sector consequently reduces the official economy, and corruption increases the incentives of entrepreneurs to operate in the shadow economy. On the contrary, many authors state that the existence of a shadow economy reduces corruption, i.e., corruption is lower in the presence of a shadow economy (Choi and Thum, 2005; Dreher, Kotsogiannis, and McCorriston, 2009). Specifically, the research results of García, Azorín, and Sánchez (2020) indicate that the level of the shadow economy is positively related to the level of uncertainty, so that high values of this variable indicate that

citizens tend to behave riskier due to a lack of trust in their institutions and the rigidity of the legal system, which leads to more noncompliance. Therefore, countries with higher uncertainty tend to be more tolerant of corrupt activities, and thus the level of SE is higher. The coefficient of GDP per capita is also negative and significant, indicating that countries with higher levels of economic development register lower levels of the shadow economy.

Greater development is associated with greater control over illegal activities, and the opportunity costs of breaking the law are higher, meaning that the shadow economy is less attractive. According to García, Azorín, and Sánchez (2020), these results are consistent with Doupnik and Tsakumis (2004), Tsakumis et al. (2007), Dreher and Schneider (2010), Buehn and Schneider (2012), and Goel and Saunoris (2014).

The results of the research of Kopylenko, Gryshova, and Diachenko (2018) show that the reduction of the level of the shadow economy is limited by still unresolved problems that have a negative impact on the indicators of the country's economy. According to the authors, the shadow economy has well-defined socio-economic roots that are closely related to the causes of economic crime.

There are several factors causing overshadowing of national economies, Kopylenko, Gryshova, and Diachenko (2018) state:

1) Inefficient state regulation of the economy: mistrust of businesses toward the state and the state towards businesses, high bureaucratization, imperfect institutional and regulatory support.
2) Inefficient tax system (large and unfair tax burden in which the fiscal function plays a decisive role), increasing share of unprofitable enterprises, low level of payment discipline, instability and imperfection of tax legislation, ignorance of this legislation, legal uncertainty of taxpayers, etc.
3) Problems in the labour market are related to low economic motivation for official employment of employees, increasing unemployment rate, and devaluation of labour costs.
4) Inefficient monetary and credit policy that is unclear.
5) The imperfection of the budget system, low control over the use of budget funds, a chronic budget deficit that causes a constant reduction in public spending, the destruction of social, legal, and defence infrastructure, and almost continuous inflation.

6) High level of monopolisation of the domestic market.
7) The Imperfection of the Law Enforcement and Judiciary Systems.
8) Corruption of State Power Structures.
9) Nonexistence of an investment alternative to shadow capital.

Some of the above-mentioned factors are dealt with, for example, by Kelmanson, Kirabaeva, Medina, Mircheva, and Weiss (2019), who in their publication mainly deal with weak institutional quality, tax burden and tax administration. In their research, Arsić, Arandarenko, Radulović, Randđelović, and Janković (2015) focus on the tax burden, the fiscal burden of work, the social security system, and other factors of the shadow economy.

García, Azorín, and Sánchez (2020) also found that a higher (lower) rule of law is associated with a lower (higher) shadow economy. Therefore, in countries where there is more confidence in the functioning of the rule of law, the levels of the shadow economy are lower.

A solution to the situation of the development of the shadow economy is offered by Kopylenko, Gryshova, and Diachenko (2018), who came up with a methodological guide on how the state should proceed in the fight against the development of the shadow economy. In the fight against the development of the shadow economy, there is a combination of three strategic directions:

1) Public awareness strategies, which consist of a general audit and monitoring of the situation; civil education in the fight against the shadow economy; free access to information and independent media.
2) Warning strategies, the essence of which lies in creating transparency of the authorities; active involvement of society's institutions in the fight against the development of the shadow economy; limiting state interference in business and social affairs; adoption of ethical codes for bureaucrats and entrepreneurs; reducing administrative barriers.
3) The strategy of inevitable retaliation, which counts on increasing the professionalism and effectiveness of the detection of corruption crimes by the security forces; creating a strong and independent judiciary; strict application of the law; public examination of normative-legal and state decisions; citizens' access to legal aid and protection.

For example, Frey and Schneider (2015) agree with strategy number 3, who state that the main method of combating the shadow economy is increased intimidation. They question the

effectiveness of this policy, however the authors state that this policy does not always fail, however, its successes are usually only short-lived. According to several authors, another solution to the shadow economy is, for example, cashless transactions. The shadow economy is a cash economy where cash enables anonymous transactions that cannot be traced. For example, Beneš (2017) or Kearney and Schneider (2015) favour this solution.

3.3.3. Offshore companies

One of the fascinating aspects of the evolution of the tax haven strategy is that it evolved gradually and in different places, often for reasons that had nothing to do with the end use. Only during the second phase of their development, since the end of the First World War, there are indications that some countries, led by Switzerland and Liechtenstein, began to develop a comprehensive policy of becoming a tax haven (Palan, 2009; Wolters Kluwer, 2022).

Palan (2009) posits that tax haven ideas began to take shape in the late 19th century in the US states of New Jersey and Delaware – and ironically, all indications are that they are likely to be among the last to be abolished. The two mentioned states were not and still are not tax havens but can be considered the originators of the "easy incorporation" technique used by all modern tax havens. Easy incorporation rules, to the extent that it is possible to buy a company „off the shelf“ and start trading in less than 24 hours, are one of the key aspects of the tax haven strategy. On the contrary, according to Offshore Protection (2014), it is possible to see the beginnings of tax havens already at the beginning of the nineteenth century, specifically in 1815, when Switzerland declared that it was to become a neutral state. The industry developed slowly over the next 100 years and was primarily used by the European elite, remained a relatively small industry.

While the US states of New Jersey and Delaware may have invented the technique of attracting non-resident companies by offering them an acceptable regulatory environment, some Swiss cantons, initially led by the poor canton of Zug, located near Zurich, have since the 20th copied this practise and brought it to Europe (Palan, 2009).

The collusion and hidden assets of some of the world's richest and most powerful people have been exposed in the largest set of leaked offshore data in history. Millions of leaked documents and the largest journalistic partnership in history exposed the financial secrets of 35 current and former world leaders, more than 330 politicians and public officials in 91 countries and territories, and a global line-up of fugitives, fraudsters, and murderers.

Secret documents reveal the offshore businesses of the King of Jordan, the presidents of Ukraine, Kenya, and Ecuador, the Prime Minister of the Czech Republic, and former British Prime Minister Tony Blair. The files also detail the financial activities of Russian President Vladimir Putin and more than 130 billionaires from Russia, the United States, Turkey, and other countries. Specific cases are as follows:

- A $22 million mansion on the French Riviera — complete with movie theatres and two swimming pools — was bought through offshore companies by former Czech populist Prime Minister Andrej Babiš, a billionaire who fights against the corruption of economic and political elites.
- More than $13 million stashed away in a secret trust on the Great Plains of the United States by a scion of one of Guatemala's most powerful families, a dynasty that controls a soap and lipstick conglomerate that has been accused of harming workers and the earth.
- Three Malibu beachfront mansions were bought through three offshore companies for $68 million by Jordan's king in the years after Jordanians filled the streets during the Arab Spring to protest unemployment and corruption.
- Baker McKenzie, the largest law firm in the US, helped create the modern offshore system and continues to support this shadow economy.
- An English accountant in Switzerland worked with lawyers in the British Virgin Islands to help Jordan's monarch, King Abdullah II, secretly buy 14 luxury homes worth more than $106 million in the US and UK. Advisors helped him with at least 36 offshore companies from 1995 to 2017 (Pandora Papers, 2021).

Most often today, the term offshore is used in combination with a financial centre (OFC), tax haven, or jurisdiction. For many people, this term conjures up places where it is possible to hide money from the tax authorities through the establishment of companies or their branches in their territory. The registration of companies in tax havens around the world is legal and not a violation if the specified criteria are met and legal regulations are carefully followed. There are a number of resources that describe how to become an offshore company and not engage in illegal activity, that explain the reasons for becoming an offshore company (e.g., to protect your business from attacks) or provide services for a fee to help a particular company set up offshore. Such sources are, for example, International Wealth (2022), BBCIncorp Content Team (2022), Ibcagent (2022), Tax-usa (2022), Offshore Company Corp. (2022), Offshore Company (2022) and many others.

4. Hypotheses

After overview study, hypotheses are created for the practical part. The hypothesis states the expected result of the research.

H1: There is strong (0,60 - 0,79) correlation between sharing and shadow economy.

H2: The share of Airbnb accommodation in total accommodation capacity (bed capacity) in the Czech Republic is more than 5%.

5. Secondary data analysis

In this part, publicly available data and statistics will be used. The chapter focusses on data related to the shadow economy in selected countries (for the justification of the selection of individual countries, see the Methods chapter).

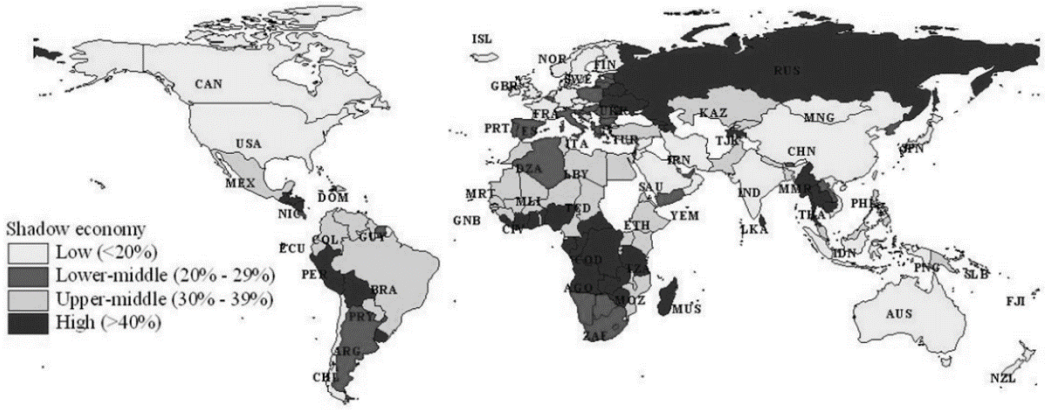
Activities in the informal sector are often legal, except that they are not reported to public authorities for tax, social security, or labour law reasons. Therefore, if someone rents out a room on a sharing economy platform such as Airbnb but does not declare income for tax purposes, then they are operating in the informal sector (Williams and Horodnic 2017). Although Williams and Horodnic (2017) state that sharing is not illegal, according to Guttentag (2015) it is the opposite in terms of legality/illegality. The post states that a large portion of Airbnb rentals are illegal. However, this research confirms the statements of other authors that Airbnb avoids its full tax obligations. Therefore, it is necessary to pay attention to the share of the shadow economy in shared accommodation. Because, for example, the non-payment of local tax to the city will significantly affect the budgets of individual cities, and thus indirectly other residents, in connection with the shadow economy, the number of Airbnb offers in individual countries will also be listed for this reason.

4.1. Shadow economy in selected countries

Alarcón-García, Azorín, and Sánchez (2020) report that the average size of the shadow economies of 158 countries in the period under review (1999-2015) is a very remarkable 31.1% of GDP. In this section, it is necessary to mention that there are several ways how to calculate the shadow economy, it is usually the estimation of shadow economy, as confirm Medina and Schneider (2018). The geographical distribution of the shadow economy also follows a pattern in which there is a certain tendency to cluster countries with similar levels. Countries with high levels of the shadow economy have neighbouring countries with similar levels, and the same applies to countries with medium and low levels. The results suggest that there is a shadow economy interaction between neighbouring countries such that a low/high level of the shadow

economy at home is associated with a low/high level of the shadow economy in the neighbouring country. This research comes with a suggestion for policy makers, who should therefore implement coordinated social awareness measures in transnational policies (e.g., social stigmatisation programmes) because the behaviour of individuals from neighbouring countries affects the behaviour of individuals in the country.

Fig. 2 Shadow economy in the world



Source: Alarcón-García, Azorín, and Sánchez (2020)

Figure 2 shows that the lowest value was recorded in Switzerland (8.764%), while the highest was in Georgia with 63.7% of GDP. The International Monetary Fund (2021) presents an overview of the size of the shadow economy in % of GDP of all countries in the European Union, from 2000 to 2019. Several authors rely on data from the International Monetary Fund for their research, for example Alarcón-García, Azorín, and Sánchez (2020), Hassan and Schneider (2016) or Schneider and Friedrich (2004).

4.1.1. United States of America

According to Goel, Saunoris, and Schneider (2018), there is a significant link between the formal and shadow economy in the US. However, the connection between the formal and shadow economy exists throughout the world. It is impossible to separate these two parts of the economy, so it is not surprising that there is a link between the formal and shadow economies.

Some research into the shadow economy shows that the United States of America has one of the lowest levels of corruption and the shadow economy. This opinion is confirmed by, e.g., Hoinaru, Buda, Borlea, Văidean, and Achim (2020). Table 2 also confirms this opinion.

There is many studies and research in the literature that focus on the determinants of economic growth. However, in the context of the influence of the shadow economy

on economic growth, the amount of literature is limited, especially data related to the shadow economy in the United States. This fact can also be connected to the fact that the United States is the country with the lowest level of shadow economy. There is a large gap in the available literature in this area, and thus there is room for closer investigation, which is also confirmed by the research of Gökçekus and Schneıder (2020) or Goel, Saunoris, and Schneider (2018).

4.1.2. France

Some governments (such as France) and trade unions (such as Germany) have limited the hours people can work in the official economy to reduce unemployment. The intention is to redistribute the limited amount of work more fairly, but the forced reduction of work in the official economy can push people into the shadow economy (Friedrich Schneider with Dominik Enste, 2002).

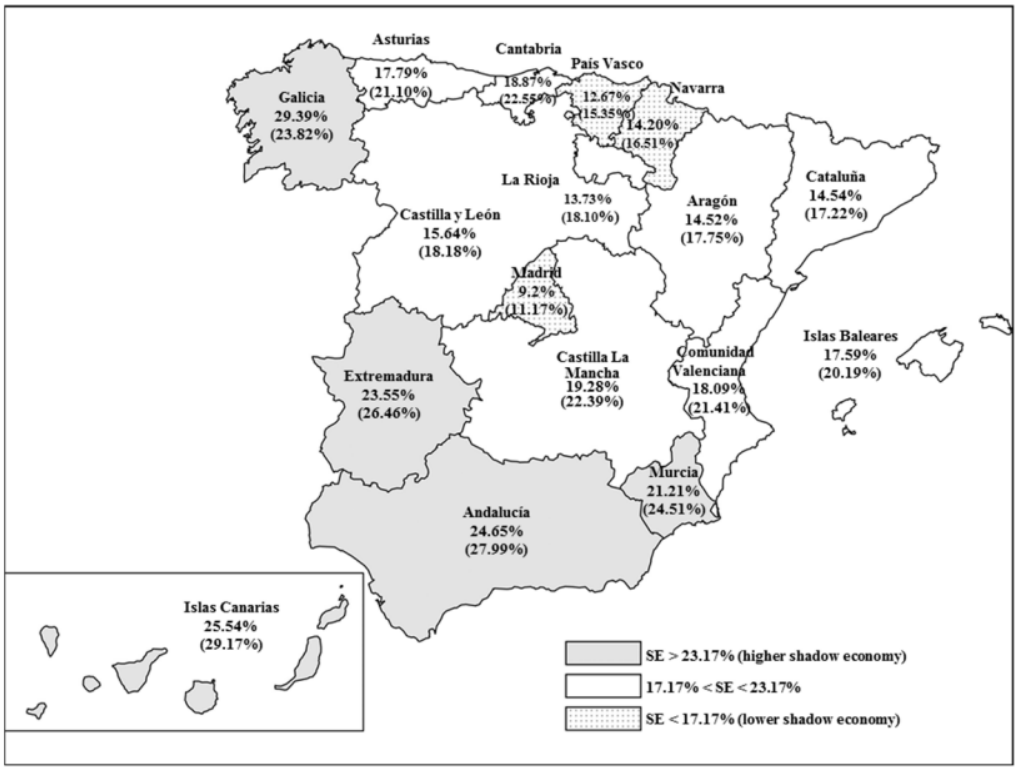
There is a general perception that the main reason people resort to illegal activities is the high rate of income tax. A comparison of the size of the shadow economy in France (as a country with high income tax rates) and in other European countries in different years shows that this belief is not true, and tax reform is not the main cause. In addition to tax rates, another possible reason may be efforts to redesign private and public organisations and attempts at civic education to make society fully aware of the links between taxes and public goods and services. For example, social services in France encourage people to join the formal economy to benefit from these social services in the future. All these efforts are a new governance framework and a change in organisational culture that cannot be done overnight; the change may take years, perhaps decades. These long-term changes in socioeconomic policies are clearly more important and fundamental than tax changes. Tax reform may be necessary, but it will never be sufficient (Tahmasebi, 2016).

4.1.3. Spain

The results of the Rios (2019) analysis indicate the value added tax as one of the main factors driving the shadow economy. For this reason, the author suggests that policymakers aiming to reduce tax evasion should focus on compliance with VAT regulations. Another driver of the shadow economy is the level of education of the population. For this reason, it is imperative to continue investing in public education, as it can have a significant economic return in the future by reducing the size of the shadow economy. Another factor affecting the size of the shadow economy is construction employment, which historically drives the underground economy. The connection with the size of the shadow economy suggests that the labour inspection should focus on the activities of this sector.

A study by González-Fernández, González-Velasco, and Fanjul-Suárez (2020) takes a different view of the shadow economy in Spain. Specifically, it concerns the influence of the shadow economy on innovation. According to the results, innovation would be supported by measures aimed at providing tax benefits for innovative activities and investments, and at the same time, these measures would help to reduce the shadow economy, as taxes are one of the main causes of the formation of the informal sector. At the same time, this study deals with the size of the shadow economy in individual regions of the country; see Figure 3. Figure 3 shows the size of the shadow economy in relation to GDP in Spanish regions. The value in parentheses represents the average value for the shadow economy estimate over time. The average shadow economy in the regions varies between 11.17% and 29.17% and we distinguish three similar ranges related to three groups of regions: regions with a shadow economy higher than 23.17% (regions with a higher shadow economy), regions with a shadow economy between 17.17% and 23.17% (regions with a medium shadow economy) and regions with a shadow economy less than 17.17% (regions with a lower shadow economy).[1]

Fig. 3 Value of the shadow economy in relation to GDP



Source: González-Fernández, González-Velasco, and Fanjul-Suárez (2020)

[1] In the case of the calculation of the size of the shadow economy in the Spanish regions, see Figure 3 (González-Fernández, González-Velasco and Fanjul-Suárez, 2020).

4.1.4. Indonesia

Rothenberg et al. (2016) estimate that more than 93% of firms in Indonesia are in shadow economy. Micro, small, and medium enterprises are the largest contributors to the shadow economy in Indonesia. The research also found that firms operating in the shadow economy in Indonesia tend to pay low wages and have lower productivity than larger firms operating in the formal sector. These companies are limited by the local market and rarely expand their business activities outside of their region. According to the authors of the study, these firms will eventually leave the shadow economy if they gain access to formal financial resources.

The results of Myers (2014) show that Indonesia has the largest proportion of firms operating in the shadow economy (a ratio of more than 130 firms in the shadow economy for every business in the formal sector).

A study by Mopangga, Maski, Multifiah, and Satria (2022) found that in the short term, the shadow economy generates income for shadow tourism and businesses operating in the area. However, in the long term, the shadow economy has a negative impact with respect to the deterioration or complete destruction of the local tourism industry in Indonesia (an example could be unprofessional treatment of the environment, which results in the destruction of surrounding natural attractions and thus the loss of interest of tourists).

4.1.5. Philippines

According to Ofreneo (2014), services in the Philippines are largely in the informal sector. These are mainly sales, unregistered repairs and personal services, domestic work and similar activities, unregistered construction activities, small-scale mining, agricultural work performed by the landless rural poor (those without any land rights), coastal or communal fishing and many other similar activities. Overall, the shadow economy covers a large part of the service sector and agriculture and is also found in industry. The growth of the shadow economy is linked to high unemployment rates in the Philippines. Unfortunately, according to Ofreneo (2014), the country shows no signs of improvement. The growth of informal employment and the high unemployment rates are also reflected in massive and persistent poverty.

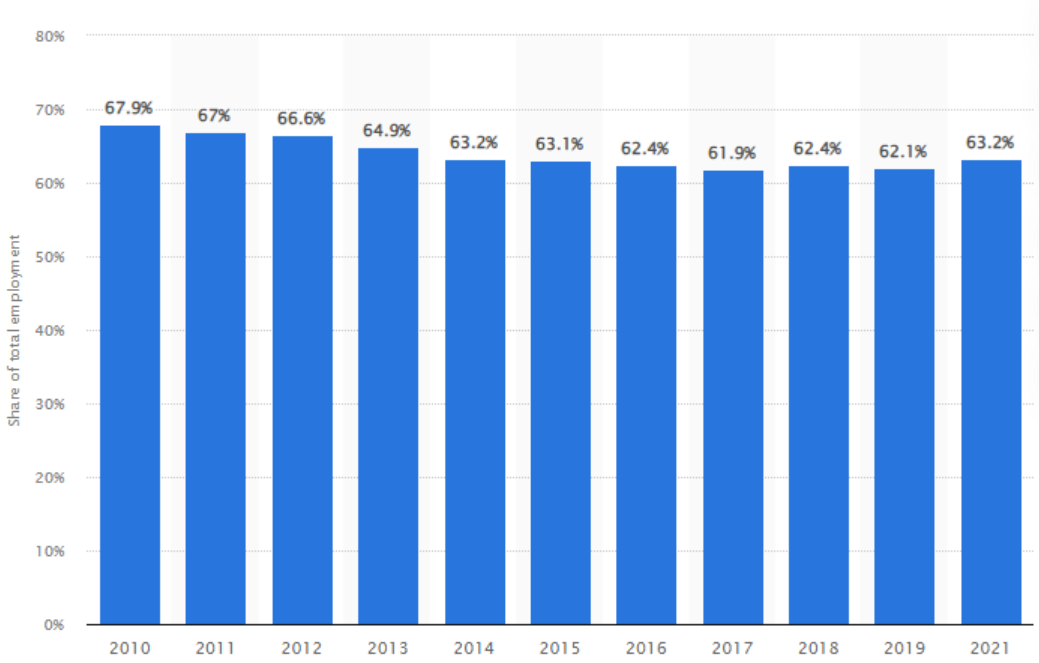
The estimated number of workers in the Philippines in the shadow economy is 15.68 million or roughly 38% of the total working population. Other estimates put the number of Filipino shadow workers at 63%, which represents about a third of the country's economy. Given the different definitions of the shadow economy, it is difficult to accurately quantify the number of people operating in the shadow economy. In the Philippines, this sector can include, for example, mobile vendors and street vendors, small-scale transporters such as tricycle drivers,

temporary construction workers, small-scale miners and quarry workers, unpaid family workers, and those who work from home. This group may also include subsistence farmers and landless farmers, seasonal agricultural workers, artisanal fishermen, guides, or, for example, hairdressers (Castillo, 2022).

4.1.6. Colombia

Estimates by Schneider and Hametner (2014) indicate a large negative impact of the shadow economy on economic growth in Colombia. However, research indicates that this impact is only moderate and shows that there is great potential that cannot be used due to the low productivity of shadow economy activities. This, from the point of view of Schneider and Hametner (2014), may be one of the reasons why Colombia is still classified as a developing country and why its economic level is still relatively low compared to Western industrialised countries. According to data from the OECD (2022), in Colombia, a large part of the population works in the shadow economy and thus loses social protection and pension rights. Despite the great economic growth and government efforts of the country, the level of the shadow economy in Colombia is high. More than 60% of total employment falls into the informal sector, which is also confirmed by Statista's analysis (2023). Figure 4 shows the development of employment in the informal sector. The share of employment in the shadow economy is slightly decreasing. Figure 4 was created based on the research results of Statis (2023). The data are based on employment in the shadow economy and include all persons who were employed in at least one enterprise included in the shadow economy during the survey period, regardless of their job title and regardless of whether it was their main or secondary job. The year 2020 is not included, from the author's point of view it is the consequences of the covid crisis, when the data was either not collected or was misleading, which confirms Schneider (2022). Alvarez and Pizzinelli (2021), on the other hand, dealt with the covid crisis in Colombia and came up with interesting results. The pandemic has disrupted up to a quarter of employment in Colombia, according to research. Women, young people, and people with lower education were most affected by the crisis, with the biggest losses in employment and income due to their occurrence in sectors with great sensitivity to the introduced lockdowns and due to their greater occurrence in the informal sector. For the workers, the pandemic had a double effect. Workers in the informal sector faced job loss or reduced working hours during the pandemic crisis. On the other hand, the shadow economy helped start the formal economy.

Fig. 4 Employment in the shadow economy compared to total employment in Colombia from 2010 to 2021



Source: statista (2023)

Colombia is aware of the potential of the shadow economy and, therefore, is implementing programmes that aim to integrate the shadow economy into the official economy. This is also confirmed by the OECD (2022). According to the OECD (2022), addressing informality requires new multidimensional strategies. One of the solutions may be to support the development of the social and solidarity economy (abbreviation SSE). The SSE represents approximately 4% of Colombia's GDP. This strategy aims to use the full potential of the social and solidarity economy to address informality and its impacts and to provide solutions to support the transition to formal work in many economic sectors.

4.1.7. Czech Republic

The size of the shadow economy has been examined using several different methodologies. Macroeconomic data is commonly used for these purposes to examine, for example, the relationship between the money supply and GDP. This approach was extended by Orviská, Čaplánová, Medved, and Hudson (2006) using cross-sectional survey data based on individual responses to estimate the relative size of household income in the shadow economy as a share of declared income. This research produced several results. The analysis shows that the relative figures for the Czech Republic are 21.8%. The analysis assumes that law-abiding citizens are less likely to engage in the shadow economy. There are various policies that try to deal with the

shadow economy. The increased frequency of tax audits and higher fines are two obvious measures that would be justified in many, perhaps most, countries. Another is to target audits on a likely participant in the shadow economy. One obvious example would be to target rogue citizens, i.e., those found to have broken the law in some other context. Disclosure of the identity of those found to have participated in the shadow economy can be an effective strategy to add social sanctions to legal ones. Finally, publicity campaigns aimed at raising awareness of the damage done to the country by the shadow economy can also be effective in increasing social dissent.

Another conclusion on how to deal with this phenomenon is provided by Rais, Klička and Rod (2015), namely that to reduce the size of the shadow economy, it is necessary to focus mainly on its causes, not on the consequences. The results of the study by Nchor and Konderl (2016) show that the shadow economy of the Czech Republic was on average about 20.9% at the end of 2013 and the country loses an average tax revenue of about 7.2% of GDP annually. From this research, the share of the shadow economy and its calculation can vary. There are many different calculations.

4.2. Size of the Shadow Economy in Individual Countries

The size of the shadow economy is very difficult to determine. There are many options for calculations, however, none of them allows an exact calculation, because the activities included in the shadow economy are difficult to identify, they are hidden. Table 2 shows the size of the shadow economy in selected countries in 2022.

Several insights emerge from the above secondary analysis:

- the shadow economy encourages the implementation of illegal, economically black activities,
- There is a lack in the available literature in this area,
- It is very difficult to estimate the level of shadow economy (and there are many different calculations),
- In the short term, in the tourism area, the shadow economy generates income for shadow tourism and businesses operating in the area,
- In the long term, in the tourism area, the shadow economy has a negative impact with respect to the deterioration or complete destruction of the local tourism industry (an example could be unprofessional treatment of the environment, which results in

the destruction of surrounding natural attractions and thus the loss of interest of tourists).

- There are several methods to reduce the shadow economy, such as:
  - innovation could help to reduce the shadow economy,
  - tax reform may be necessary, but it will never be sufficient,
  - policymakers aiming to reduce tax evasion should focus on compliance with VAT regulations,
  - increasing the frequency of tax audits and higher fines,
  - social services could encourage people to join the formal economy to benefit from these social services in the future.

For reducing shadow economy in sharing economy, the tax reform and bigger control by the state institution would be suitable.

- there are factors driving the shadow economy, for example:
  - tax avoidance (e.g., value added tax, local tax)
  - level of education of the population
  - insufficient regulation or
  - heavy regulation.

Table 2 Size of the shadow economy in 2022 (in % of GDP)

	USA	**France**	**Spain**	**Indonesia**	**Philippines**	**Columbia**	**Czech Republic**
Size of shadow economy	7,3	13,1	21,3	22,7	34,1	33,3	14,5

Source: World Economics (2023)

4.3. Number of Airbnb providers/offers per country

Following on from the above, an overview of Airbnb offers will be presented in each capital city of the selected countries, that is, Washington, DC, Madrid, Paris, Jakarta, Manila, Bogota, and Prague. Due to the large volume of data on the Airbnb platform (there are more than 1000 results when searching for a specific capital city) and due to the scope of the work, it is not possible to analyse this volume of data. Therefore, the data will be obtained from a platform dealing with the number of Airbnb around the world, namely airdna.co (statistics are not provided only for Airbnb, but also for the Vrbo platform, for this reason it is necessary to

recalculate the listed numbers of accommodation facilities) according to the percentage share of Airbnb on the given number.

Airbnb divides its offers into three types of rentals:

1. the entire property (regardless of whether it is a house, an apartment, etc.),
2. private rooms (in a shared apartment) a
3. shared rooms (in a shared flat, like a classic hostel where all spaces are shared).

Table 3 shows the total number of accommodations offered and the share of individual types of accommodation in each capital city of the countries surveyed. The statistics are not only given for Airbnb, but also for the Vrbo platform, for this reason it is necessary to recalculate the listed numbers of accommodation facilities. The number of Airbnb is determined based on offers that have been booked at least once or have been available for at least one day in the last month (i.e., as of 1/15/2023).

Table 3 Number of Airbnb in individual capital cities according to Airdna

Capital City	Number of Airbnb according to Airdna	Entire property	Private rooms	Shared rooms
Washington, DC	3425	2614	777	34
Madrid	12890	9008	3720	162
Paris	22777	19704	2957	116
Jakarta	5625	4271	1283	71
Manila	21956	16947	4361	648
Bogota	13276	8036	5053	187
Prague	6109	4914	1143	52

Source: own processing according to Airdna (2023)

Table 4 records Airbnb indicators in each capital city of the countries surveyed. In this case, it was not possible to exclude the Vrbo platform, the share of accommodation through the Vrbo platform varies between 2-7% (Washington - 7%, Madrid - 3%, Paris - 4%, Jakarta - 1%, Manila - 2%, Bogota - 2%, Prague - 2%). In the case of the Income indicator, this is the median monthly income (nightly rate + cleaning fee) generated over the last 12 months (i.e., from January 2022

to January 2023). Indicator Average size of the rental indicates the average size of all rented spaces through Airbnb platform in each selected capital city. The average number of guest indicator indicates the average number of visitors of all rented spaces through Airbnb in individual capital cities. The Largest share of overnight stays indicator shows the share of overnight stays in individual capital cities via the Airbnb platform.

Table 4 Airbnb indicators in individual capital cities according to Airdna

Capital City	Incomes	Average size (number of rooms)	Average number of guests	Largest share of overnight stays
Washington, DC.	2845$	1,7	4,5	30+ nights (35%) 1 night (24%)
Madrid	2203$	1,5	4,1	1 night (38%) 2 nights (23%)
Paris	2569$	1,3	3,5	1 night (24%) 2 nights (24%)
Jakarta	267$	1,6	3,5	1 night (46%) 2 nights (21%)
Manila	295$	1,0	3,6	1 night (55%) 2 nights (17%)
Bogota	371$	1,5	3,5	1 night (43%) 30+ nights (26%)
Prague	1675$	1,4	4,3	1 night (41%) 2 nights (38%)

Source: own processing according to Airdna (2023)

6. Results

The presented section provides information and research results. Here are the results of the correlation analysis as well as the results of the analysis of the Airbnb platform in the regional cities of the Czech Republic.

The table 5 shows the results of the Pearson correlation analysis and own calculation, including the sample for calculation.

Table 5 The Pearson correlation coefficient

Country	Size of Shadow economy in 2022 (in % of GDP)	Reported incomes of Airbnb	$x_i\, y_i$
USA	7,3	2845	20768,5
France	13,1	2569	33653,9
Spain	21,3	2203	46923,9
Indonesia	22,7	267	6060,9
Philippines	34,1	295	10059,5
Columbia	33,3	371	12354,3
Czech Republic	13,48	1675	22579
RESULTS	average = 20,9	average = 1460,7	sum = **154108,5**
$n\bar{x}\bar{y}$	7 * 20,9 * 1460,7 = 213702,5		
Standard deviation $s_x s_x$	**10,15**	**1133,78**	

Source: own processing according to Airdna (2023) and World Economics (2023)

$$r = \frac{\sum_{i=1}^{n} x_i y_i - n\bar{x}\bar{y}}{(n-1)s_x s_y} = \frac{154108{,}5 \; - 213702{,}5}{(7-1) * 10{,}15 \; * 1133{,}78} = \frac{-59594}{69048{,}73} = -0{,}9 \quad (1)$$

Table 6 shows the Airbnb revenues and the size of shadow economy in the world (in the total) from two different type of calculation methods.

Table 6 Airbnb Revenue and size of shadow economy in the world

	Airbnb Revenue (billion US $)	World data bank - shadow economy	
		DGE_p Method	**MIMIC Method**
2015	0,92	29,1	32,5
2016	1,65	28,9	32,4
2017	2,56	28,7	32,1
2018	3,65	26,8	31,9

Source: own processing according to macrotrends (2023) and World data bank (2021).

Airbnb's revenue represents the total revenue from the activity of providing accommodation in the sharing economy. We can see that Airbnb revenue increased significantly from 2015 to 2018, increased by almost three billion in three years. DGE_p and MIMIC method represent an estimate of the share of the shadow economy in individual years. We can see decrease of shadow economy from 2015 to 2018. In case of DGE_p method, there is decrease from 2015 to 2018 about 2,3 of the average value of the level of the shadow economy in 157 countries. In case of MIMIC method, there is decrease from 2015 to 2018 about 0,6 of the average value of the level of the shadow economy in 159 countries. Table 7 shows the results of correlation analysis of size of shadow economy and Airbnb revenue. The result of calculation shows strong correlation between Airbnb revenues and level of shadow economy.

Table 7 Correlation of size of shadow economy and Airbnb revenue

	Correlation with Airbnb revenue
DGE_p Method	-0,9
MIMIC Method	-0,99

Source: own processing

Based on the international experience presented, the research of Airbnb in the Czech Republic was carried out. The analysis criteria were the regional capitals to assess the entire country. Table 8 and 9 represents the capacity of accommodation in regional capitals of the Czech Republic in summer 2023.It also shows the share of total accommodation capacity based on own calculations. From these tables we can see there is big difference between number of accommodations according to the Airbnb platform and number of accommodations according to the official city borders. For example, in České Budějovice, after entering the city in the search, 236 accommodations were shown, however, there are only 41 accommodation facilities in the administrative border of the České Budějovice. For this reason, the data of accommodation facilities based on the administrative boundaries of the regional cities were used in the calculation. These data seem more suitable.

Table 8 Capacity of accommodation in Czech regional capitals in summer 2023

	Praha	**České Budějovice**	**Liberec**	**Plzeň**	**Ústí nad Labem**	**Jihlava**
Number of accommodations according to the Airbnb platform	more than 1000	236	218	49	194	35
Number of accommodations according to the official city borders	more than 1000	41	45	44	15	10
Average price for two persons for one night	5515	3400	2135	2518	2098	7442
Capacity of accommodation facilities (the number of beds) Airbnb	more than 1000	82	90	88	30	20
Capacity of accommodation facilities (the number of beds), in total	93535	3470	4241	5499	1692	1510
Airbnb's share of total accommodation capacity	X	2,36	2,12	1,60	1,77	1,32

Source: own according to data from Airbnb and ČSÚ (2023)

Table 9 Capacity of accommodation in Czech regional capitals in summer 2023

	Pardubice	**Olomouc**	**Zlín**	**Ostrava**	**Karlovy Vary**	**Hradec Králové**	**Brno**
Number of accommodations according to the Airbnb platform	47	76	66	214	239	47	285
Number of accommodations according to the official city borders	19	55	14	92	140	8	270
Average price for two persons for one night	2626	1974	8577	2534	3743	2216	3144
Capacity of accommodation facilities (the number of beds) Airbnb	38	110	28	184	280	16	540
Capacity of accommodation facilities (the number of beds), in total	1670	3513	2438	6060	12471	2687	12770
Airbnb's share of total accommodation capacity	2,28	3,13	1,15	3,04	2,25	0,60	4,23

Source: own according to data from Airbnb and ČSÚ (2023)

7. Discussion

This part contains the discussion of the results and own option expression of the presented results.

7.1.Number of Airbnb providers/offers in the regional cities of the Czech Republic

The partial aim of this paper is to analyse situation of the sharing economy in the Czech Republic. For this purpose, the analysis of Airbnb platform in all regional cities of the Czech Republic was made. Data collection on the Airbnb platform took place on May 15, 2023. In this analysis, accommodation capacity data on the Airbnb platform for the summer of 2023 was used. The analysis of the capacity of double accommodation in individual regional cities of the Czech Republic took place. The goal of this research was to detect the potential that can be projected into the real occupation of the city. It is necessary to point out that data in online accommodation platform is not accurate in displaying accommodation in individual destinations. For example, in České Budějovice, after entering the city in the search, 236 accommodations were shown, however, there are only 41 accommodation facilities in the administrative border of the České Budějovice. For this reason, the data of accommodation

facilities based on the administrative boundaries of the regional cities were used in the calculation. These data seem more suitable. The total number of beds in individual regional cities was obtained from the Czech Statistical Office, the most recent data are from 2021 (ČSÚ, 2023). The total share of beds on the Airbnb platform is from 0,6 to 4,23 % of the total capacity in the regional cities of the Czech Republic (see table 5 and 6). From the result, the hypothesis two cannot be confirmed, because the share of Airbnb in total accommodation capacity is between 0,6 - 4,23% of total accommodation capacity in the regional cities in the Czech Republic.

7.2.Analysis the situation of payment of local tax in the Czech Republic

The tax and local tax avoidance in sharing accommodation through Airbnb platform is problematic issue. The local tax avoidance negatively influences the local budgets. However, city authorities in the Czech Republic do not pay much attention to the problem. In the Czech Republic, there is a lack of clear legal definition of the collection of local tax. As confirmed by the results of a questionnaire survey, which focuses on the municipal authorities of all regional cities in the Czech Republic, non-payment of local tax is a very pressing economic problem. One of the questions of the questionnaire survey was aimed at evaluating the problem (1 least, 5 most) of non-payment of local tax to the city budget. The average value of all answers is 4.1 points. This means that the authorities perceive non-payment of local tax as a significant problem. However, to the question of whether there is communication between the city and the providers, 10 out of 13 city authorities answered that there is no communication. The majority (specifically 8 city authorities) do not even consider the concept of developing cooperation between the city and Airbnb providers. It follows from this that it is necessary to focus attention on the collection of local tax to limit the shadow economy in accommodation via the Airbnb platform in the Czech Republic.

7.3. Correlation coefficient

Based on the calculations, there is a negative correlation between the shadow and the sharing economy. The Pearson correlation coefficient was used for the calculation. There was found to be a negative correlation between the reported income from the Airbnb provision (data from the Airdna survey) and the size of the shadow economy in % of GDP in 2022. However, the gap of this research is the impossibility of including all the countries examined in the calculation, due to the lack of surveys of the size of the shadow economy in Indonesia, Colombia, and the Philippines from recent years. It would also be advisable to use data from several countries for better results. I see the possibility of further research in this direction. In

table 7 we see the individual data and partial calculation which are used in equation (1). In equation (1), we see the result of the Pearson coefficient, i.e., a negative correlation of -0.6, it is a moderately strong negative correlation. For verification were used other methods for calculation of correlation. Data for correlation are the Airbnb revenues and the size of shadow economy in the world (in the total) from two different type of calculation methods (DGE_p Method and MIMIC Method), see Table 8. The negative correlation can be explained by the fact that the higher the income, the lower the share of the shadow economy.

After creating Table 8, the data were imported into PSPP software, where the data were normalized. To verify the relevance of the data, it was checked whether the data were within the limits of Kurtosis and Skewnes. Then a correlation analysis was performed, see Table 9. A negative correlation was measured for both methods of measuring the size of the shadow economy (-0.9 according to DGE_p and 0.99 according to MIMIC). Results shows a strong negative correlation. This again implies a negative correlation between Airbnb revenue and the size of the shadow economy. The negative correlation can be explained by the fact that the higher the income, the lower the share of the shadow economy.

According to the results, the hypothesis one can be consider confirmed. There is strong negative correlation between sharing and shadow economy.

8. Conclusions

The mail goal was to find out if the sharing and shadow economy are related and how these two phenomena influence each other. Activities in the shadow economy are mostly legal, except that they are not reported to public authorities for tax, social security, or labour law reasons. If someone rents out a room on a sharing economy platform such as Airbnb, but does not declare income for tax purposes, then they are operating in the informal sector (Williams and Horodnic, 2017). Although Williams and Horodnic (2017) state that sharing is not illegal, according to Guttentag (2015) it is the opposite in terms of legality/illegality. The post states that a large portion of Airbnb rentals are illegal. However, this research confirms the statements of other authors that Airbnb avoids its full tax obligations. As already outlined, the sharing economy presents an opportunity to maximise your frozen assets. However, it must be noted that in the case of incorrect legal anchoring and the impossibility of effectively enforcing the defined rules, there is room for the development of the shadow economy. There are often no clearly defined rules for the further development of the sharing economy, and it is not entirely clear where the sharing economy ends, and the shadow economy begins. It is therefore clear that the two topics are closely related and that it is necessary to focus on them in the future as well. Unclear or poorly defined sharing rules create fertile ground for the shadow economy. On the contrary, even very strict regulation can mean the transfer of shared services to the zone of the shadow economy.

As already outlined, the sharing economy presents an opportunity to maximise your frozen assets. However, it should be noted that, in the case of incorrect legal anchoring and the impossibility of effectively enforcing the defined rules, there is room for the development of the shadow economy. There are often no clearly defined rules for the further development of the sharing economy, and it is not entirely clear where the sharing economy ends, and the shadow economy begins. It is therefore clear that the two topics are closely related and that it is necessary to focus on them in the future as well. Unclear or poorly defined sharing rules create fertile ground for the shadow economy. On the contrary, even very strict regulation can mean the transfer of shared services to the zone of the shadow economy.

Also, the results of presented article show there is a connection between sharing and shadow economy. For correlation the shadow and sharing economy the Person correlation coefficient was used. There was found to be a negative correlation between the reported income from the Airbnb provision and the size of the shadow economy in % of GDP in 2022. For verification, other data were used for correlation. The global revenue of Airbnb from 2015 to 2018 and the

average world size of the shadow economy were used. Two methods, to establish the size of shadow economy, were used, i.e., the DGE_p method and the MIMIC method. Average values of the size of the shadow economy in 157 (in the case of the DGE_p method) and 159 (in the case of the MIMIC method) countries of the world were used for the analysis. Data were imported into PSPP software, where the data were normalized. To verify the relevance of the data, it was checked whether the data were within the limits of Kurtosis and Skewnes. Then a correlation analysis was performed, see Table 9. A negative correlation was measured for both methods of measuring the size of the shadow economy (-0.9 according to DGE_p and 0.99 according to MIMIC). Results shows strong negative correlation. The negative correlation can be explained by the fact that the higher the income, the lower the share of the shadow economy. In equation (1), we see the first result of the Pearson coefficient, i.e., a negative correlation of -0.9. Results shows a strong negative correlation in both calculations.

Based on the calculations, there is a negative correlation between the shadow and the sharing economy. The Pearson correlation coefficient was used for the calculation. There was found to be a negative correlation between the reported income from the Airbnb provision and the size of the shadow economy in % of GDP in 2022. In sample 1, we see the result of the Pearson coefficient, i.e., a negative correlation of -0.9. Results shows a strong negative correlation. According to the results, the hypothesis one can be consider confirmed. There is strong negative correlation between sharing and shadow economy.

The issue of determining the size of the shadow economy is also seen in the fact of a lack of information. There is therefore a gap in the available research/data and there is much room for further investigation. There is also the gap of research exploring the impact of the sharing and shadow economy.

There is many studies and research in the literature that focus on the determinants of economic growth. However, in the context of the influence of the shadow economy on economic growth, the amount of literature is limited, especially data related to the shadow economy in the United States. This fact can also be related to the fact that the US is the country with the lowest level of sharing economy. There is a large gap in the available literature in this area, and thus there is room for closer investigation, which is also confirmed by the research of Gökçekus and Schneıder (2020) or Goel, Saunoris, and Schneider (2018).

The partial aim of the article was to summarise the current state of knowledge in the sharing economy services in relation with shadow economy. During the writing of the overview

study, it was found that many professional studies and other publications deal with the mentioned topic. The overview study focused on defining the sharing and shadow economy.

One part of overview study was focused on specification of the sharing economy. The sharing economy is a modern socioeconomic system based on the sharing of human and natural resources. It is necessary to note the confusing designation with the abbreviation SE, which can mean both the shadow and the sharing economy, so it is necessary to keep this fact in mind.

The definition of natural phenomenon of shadow economy is very difficult. According to Schneider and Buehn (2018), the shadow economy includes all market-based legal production of goods and services that are deliberately hidden from public authorities for several reasons. One of the broadest definitions of the shadow economy includes „*those economic activities and income derived from them that evade government regulation, taxation, or surveillance* ". The next part of the presented work focused on existing research and studies in the given area and on the size of the shadow economy in selected countries. While writing the article, it was found that there are several methods for calculating the size of the shadow economy. Due to the scope, it was not possible to specify this issue in more detail.

From the result, the hypothesis two cannot be confirmed, because the share of Airbnb in total accommodation capacity is between 0,6 - 4,23% of total accommodation capacity in the regional cities in the Czech Republic.

The next partial aim was to analyse situation of the shadow and sharing economy in the area of providing accommodation services through Airbnb to the Czech Republic. One of the questions of the questionnaire survey was aimed at evaluating the problem (1 least, 5 most) of non-payment of local tax to the city budget, which is shadow economy. The average value of all answers is 4.1 points. This means that the authorities perceive non-payment of local tax as a significant problem. However, to the question of whether there is communication between the city and the providers, 10 out of 13 city authorities answered that there is no communication. The majority (specifically 8 city authorities) do not even consider the concept of developing cooperation between the city and Airbnb providers. It follows from this that it is necessary to focus attention on the collection of local tax to limit the shadow economy in accommodation via the Airbnb platform in the Czech Republic.

The partial aim is to suggest possibilities for further research. The result of the secondary analysis of data related to the shadow economy and the sharing economy is the determination of one research question for the author's dissertation.

One research questions can be expressed from presented survey, i.e., RQ1. Airbnb divides its offers into three types of rentals:

1. the entire property (regardless of whether it is a house, an apartment, etc.),
2. private rooms (in a shared apartment) a
3. shared rooms (in a shared flat, like a classic hostel where all spaces are shared).

Table 3 shows the total number of accommodations offered and the share of individual types of accommodation in each capital city of the countries surveyed. Based on these data, it is appropriate to analyse the Airbnb platform in individual regions of the Czech Republic about the share of individual types of accommodation. Following this, research question No. 3 was constructed.

RQ1: *What type of accommodation on the Airbnb platform prevails in the case of individual regional cities of the Czech Republic (entire property, private room, or shared room)?*

Based on the analysis of the Airbnb platform and Airdna statistics (2023), it was found that hotel rooms also appear on the Airbnb platform. For this reason, the author sees room for further research in hotel rooms on the Airbnb platform (how are these offers classified - whole property, shared apartment, or shared room?). This fact can greatly affect the average prices of individual types of accommodation and others. The issue of hotel rooms in Airbnb is covered by, for example, insideairbnb.com.

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