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DOCTORAL SCHOOL OF MANAGEMENT AND ORGANIZATIONAL SCIENCES

Head of Doctoral School

Prof. FERTŐ IMRE DSc

Doctor of the Hungarian Academy of Sciences

Supervisor

Prof. emeritus KEREKES SÁNDOR DSc

Doctor of the Hungarian Academy of Sciences

Co - Supervisor

Prof. TÓZSA ISTVÁN

SHARING ECONOMY IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT - THE EMPIRICAL EXAMINATION OF THE ACCOMMODATION SHARING

by

GÖRÖG GEORGINA

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Dedicated to my Mum and Dad
for their unconditional love,
endless support and encouragement

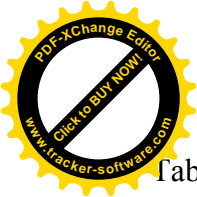


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INTRODUCTION

Considering the global issues, one of our biggest challenges is to find a sustainable, long-term working system which is good for society, the environment and the economy as well. Heinrichs states that “despite the success of some environmental and sustainability initiatives and measures in policy-making, business and society, overall trends follow an unsustainable path” (Heinrichs, 2013. p.228). From this perspective, a positive picture of a fair, trustworthy, low-carbon economy which is more transparent sounds promising, so the sharing economy, also called collaborative economy or access economy or connected consumption; in other words, a more collaborative approach to the exchange of goods and services can be a possible solution.

The main aim of this dissertation is to examine the accommodation sharing, the biggest sharing economy service sector (Vaughan and Hawksworth, 2014), from sustainable development perspective.

At the beginning of my research, I was reluctant to believe that the sharing economy can contribute to sustainable development, because my friends and acquaintances had a good and bad experience with UBER and Airbnb, and I simply assumed these are new and cheaper forms of travelling and short-term accommodation. However, I started to dig into the sharing economy literature and while I was getting more and more familiar with the concept, I recognized that the idea and model of the sharing economy could enhance long-term sustainability. The research area came from my personal experience as well; I like travelling and I had the opportunity to try Airbnb in different cities and I collected various experience with this accommodation sharing platform. For instance, the first case was when I was in Malaga where our rented room was in an apartment where the



owner-family lived, and they shared their home with us. We used the same kitchen and bathroom, they gave us information about sightseeing, restaurants and so on. This experience was really local and quite personal. On the contrary, other case happened in Paphos, where after we confirmed the booking, it turned out that we rented an apartment from a company who builds its business to this new economic system: they have more than 10 flats that they advertise on Airbnb and we did not even meet the company representative (or our host); we could get in the flat with the help of a smart lock. Consequently, *the question came up: where is the personal experience and community building? If more and more entire apartments are used for short-term accommodation purposes, how does it affect local markets and communities?* Considering this question and exploring the accommodation situation in the bigger cities (where the accommodation sale and renting prices getting higher and higher), my main research question is: *does the accommodation sharing in its current form contribute to sustainable development? Does it enhance the fulfilment of sustainable development goals?* If so, that should be welcomed, and promoted; if not how can the current system be changed? I believe that we do have a theoretically good, new economic system that can contribute to the strong sustainability and I find really exciting to examine how it works in practice.



THE GOAL OF THE DISSERTATION. RESEARCH QUESTIONS AND HYPOTHESES

According to several authors, the model which brings economic interests in line with positive environmental and social impacts, the sharing economy has been considered a promising pattern towards more sustainable economy (Cohen and Kietzmann, 2014; Curtis and Lehner, 2019; Heinrichs, 2013). However, other researchers declare that *sharing is not caring*: it is a growing network of unregulated digital marketplaces and it creates unfair competition (Ranchordás, 2015; Martin, 2016, Schor, 2017). My research assumes that ***the concept of the sharing economy supports sustainable development theoretically; however, accommodation sharing is only a new and rebranded form of the old economy.***

In the first part of my examination, I introduce the sharing economy as a new economic system then in the following chapter I analyse the sustainability elements of the collaborative or sharing economy. The next part deals with the housing market in Europe and the accommodation sharing along with its real and potential consequences on the long-term accommodation renting market.

Several studies examine the sharing economy from users' perspective (eg. Havas, 2014; Nielsen, 2014, Hamari et al., 2015) but I find interesting to study this from the supply side as well. Therefore, in my empirical research, I focus on Airbnb, the biggest accommodation sharing platform, and I investigate the characteristics of Airbnb accommodations in 45 European cities.

Initially, Airbnb was used by hosts offering cheap bed and breakfast in their permanent homes for travellers for a short period of time (The Economist, 2013a). Local communities can benefit from this idea or business model of



such **non-professional**, peer-to-peer service by earning income from their unused space also supporting local small businesses (Gyódy, 2019). Furthermore, using Airbnb can contribute to decreasing the feeling of loneliness in case of people who live alone by enabling them to be hosts in this new business and accommodate guests in their houses. However; this trend has changed, and an only small part of Airbnb listings can be categorized as *traditional* sharing economy services and bigger share of listings represent **professional and commercial** offers on the platform (Gyódy, 2019) with its all negative consequences. Various negative outcomes can be identified: accommodation sharing will be attractive among property investors for the purpose of providing business-to-consumer services. Consequently, it can enhance the gentrification of popular tourist areas (Gutiérrez et al., 2017). If hosts prefer the short-term rentals over long-term rentals, the supply of available accommodations is reduced which can contribute to the higher rental prices and it could potentially affect the domestic rental market and the quality life of residents as well.

My research concentrates on the relevant and selected Sustainable Development Goals (SDGs). In this context, the relevant refers to SDG's that Airbnb has a direct effect on via local communities, such as Reducing Inequality or Sustainable Cities and Communities or Decent Work and Economic Growth. I do not exclude environmental and social factors of sustainable development; however, in my empirical research the main focus is on economic factors and I examine Airbnb from an economic perspective.



In my dissertation I would like to answer the following research questions:

- **How does the new economic system shake up the traditional markets? What is its novelty and disruptive effect?**
- **Does accommodation sharing contribute to the fulfilment of the relevant Sustainable Development Goals?**
 - **Are there regional differences between the poorer and richer regions in Europe on the Airbnb market?**
 - **Which factors do influence the number of listings on Airbnb?** How does the change in GDP or change in unemployment rate influence the number of available listings? Do changes in hotel room supply influence Airbnb supply?
 - **Does the housing situation** (such as tenure status: owning or renting a property and average size of dwelling) **have an effect on Airbnb market?** Who do rent out their apartments: the owners or the tenants? Is the bigger the dwelling the higher chance to rent it out?
- **How can we describe the accommodation sharing in its current operation: sustainable lifestyle or new form of the neoliberal economy?**

At the beginning of my research I formulated the hypotheses that I would like to test during my examination:

- **We can identify regional differences on Airbnb market in Europe.** I assume that GDP is negatively associated with Airbnb supply and GDP and income are negatively correlated with the share of multi-listing hosts (I measure the share of professional hosts with the number of multi-listing hosts). Also, I expect that



belonging to Eurozone affects significantly the number of booked Airbnb accommodations, the number of multi-listing hosts and the Airbnb supply.

- **Changes in economic and market conditions have a strong impact on Airbnb penetration.** I assume that there is a strong correlation between the income of households and unemployment rate and Airbnb supply: income is negatively, and unemployment is positively associated with the number of available accommodations on Airbnb. Furthermore, I assume that short-term accommodation market regulation strongly affects the Airbnb supply.
- **The effect of increasing tourism is more significant in case of available Airbnb entire home supply than private room supply.** All Airbnb accommodation types (entire home, private room, shared room) significantly correlate with the number of hotel rooms and the strongest correlation can be observed between entire homes and the number of hotel rooms. The number of hotel rooms is positively associated with available Airbnb supply.
- **The housing situation (such as tenure status: owning or renting a property and average size of dwelling) significantly affects Airbnb market.** I assume that there is a correlation between the average dwelling size and the number of available short-term accommodations: the higher the dwelling size is the stronger correlation with Airbnb supply. If the host has a bigger house or apartment there is a higher chance it is rented out via Airbnb. Also, I expect that the ownership structure correlates the Airbnb supply: changes in the ownership structure cause change in the Airbnb supply.



1. THE SHARING ECONOMY: THE NEW ECONOMIC SYSTEM

1.1. From sharing to the sharing economy: the emergence of the new economy

According to a comprehensive description, sharing economy, also called collaborative economy or access economy or connected consumption, is an expression for the emerging type of business models, platforms and exchanges (Allen and Berg, 2014) where people share their intangible assets and underutilized tangible assets for money or for free with the help of the Internet (Cohen and Munoz, 2016). Looking at its popularity nowadays, sharing economy looks like a brand-new economy; however, **the concept of “sharing” is not new. The practice of sharing has a long-time history**; If we search for the meaning and origin of the word, according to the Oxford Dictionary ‘share’ can be a noun and a verb too. Share as a noun means “a part or portion of a larger amount which is divided among a number of people or to which a number of people contribute”. Share as a verb refers to “have a portion of (something) with another or others”. The verb dates from the late 16th century and origins from the old English word ‘scearu – division, part into which something may be divided’ of German origin; related to Dutch word ‘schare’ (Oxford Dictionary, 2018). People shared their goods with their family members, friends, neighbours or trusted social contacts since they started to live in communities (Belk 2014b; Schor 2014). Not only in prehistoric times but also in the late history there is evidence of sharing which proves that this is not a brand-new concept. For instance, in Germany in the late 19th century, in search of work and better living conditions people moved from the countryside to the cities. The local people and city administrations helped



them with open spaces and land where they could grow their own food. This was the early sign of community gardens (Abele, M. et al. 2015). Another example is when in the middle of the 20th century the US government encouraged ride sharing to conserve resources. In 1948, car sharing was launched in Zurich and it was very popular especially in the 1980s and was operated mainly by small community-based non-profit organisations (Shaheen et al., 1999). Together, these cases outline that during our history, people have shared, borrowed, lent, leased, rented, swapped and donated goods, services and time (Piscicelli, 2016). In agreement with this, Belk (2014a) says that the practice of sharing is as old as humankind, however, the collaborative consumption and sharing economy was born thanks to the Internet. To summarize, sharing has always been part of the cooperation; also, it could bring people together and inspire social cohesion in neighbourhoods (Agyeman & McLaren, 2015). Although Schor (2014) agrees with these statements, she adds that there is something new about the sharing economy, which is so-called “**stranger sharing**”, she explains that this factor is why sharing economy is being considered a novelty.

Generally speaking about the new market, **eBay** is the first online marketplace, that can be considered as a **sharing economy predecessor** (Sundararajan, 2016), where people can buy and swap goods. It was launched in 1995. eBay enhances the circulation of goods in the market and people get it and change it with the help of the internet (eBay, 2017). At that time eBay was a totally brand-new form of marketplace.

In early 2000, Internet became more popular and due to the accelerated technology, businesses started to link the online and offline world resulting that the sharing economy is one of these initiatives (Botsman and Rogers, 2010). In their seminal book ‘*What’s Mine Is Yours: How Collaborative*



Consumption is Changing the Way We Live introduce the new type of marketplace, the concept of shared social and economic activity as well as the meaning of the collaborative consumption. They demonstrate that people 'make the things they owned available to others' (Stokes et al., 2014:30).

Our society is built on the hyper-consumption, we have a lot of goods in our homes that we do not use every day; moreover, we have products that have been used only once. In her TED presentation, Botsman (2010) asks the audience: how many of you have a power drill, own a power drill? The power drill is a typical case of the possible product sharing because it is being used around 12 to 13 minutes in its entire lifetime and our need is the hole, not the drill. During their research, they examined several businesses and identified the different categories of the collaborative consumption businesses, the main drivers as well as the key principles which are essential to making the sharing economy or collaborative consumption work (Botsman and Rogers, 2010).

In 2010, Lisa Gansky also published a book about the sharing economy. She calls this phenomenon 'mesh' and 'mesh economy'. She explains that there is a fundamental shift in our relationship with stuff, with the things in our lives (Gansky, 2010a) and says that definition of 'the mesh' is like the sharing economy. Likewise, to Botsman and Rogers (2010), she identified the characteristics of mesh businesses: they have physical goods that can be shared, they use the internet and mobile technology to execute the business as well as they rely on word-of-mouth and social networks (Gansky, 2010a). Above all, she stresses the new value creation by sharing using information technology (Gansky, 2010b).



Sundararajan (2016) joins this discussion and he highlights the **innovative business model aspects** of the sharing economy, namely how the underutilised products and resources can create economic value.

Rifkin argues that “sharing economy is the third industrial revolution” (Rifkin, 2011:1) and he states that the desire to “access” from “own” keeps growing in case of most of the services (Rifkin, 2011). Sundararajan and Rifkin, both are taking the sharing economy into consideration from the current capitalism point of view. They predict different scenarios, while Rifkin argues that the capitalism will be destroyed by the sharing economy (Rifkin, 2014), Sundararajan (2016) refers to a new form of capitalism which is crowd-based capitalism where a new type of regulations, jobs and social fabric will be born.

Codagnone and Martens (2016) approach this new market from various perspectives and they identify three main basic areas in connection with the sharing economy: (1) *sociological approach*; it focuses on the changing role of individuals, the more conscious and responsible consumer behaviour and the growing altruistic mentality. (2) *Economics approach*; in this meaning, the sharing economy has a positive effect on innovation and stimulates the competition. (3) *Management theories*: it refers to the emergence of new business models and a new type of entrepreneurship; it is a service provider approach that may enhance the reformation of the traditional industries (Codagnone and Martens 2016; cited by Jancsik et al. 2018).

In the business world, the whole sharing economy concept became well-known between 2011 and 2012 with the success stories of Airbnb and UBER (Martin, 2016). Since then, all relevant business journal published articles about the new concept; in 2011, when the idea first became widely recognized, TIME Magazine announced that the sharing economy is one of



the “Ten Ideas That Will Change the World” (Time.com, 2011). Later, in the same journal the leading article was about collaborative consumption (Time.com, 2015). In 2013, Economist published a full volume about this topic (The Economist, 2013a,b) that was followed by Forbes (2013) magazine as well.

In the same time, the conversation on the sharing economy was lagging behind in terms of public discourse and practice in the academic world (Heinrichs, 2013:229). Since then several publications and research papers have been published about the sharing economy: there are lots of articles about its *business opportunity*, (e.g. Daunorienė et al. 2015; Habibi et al. 2016; Wallenstein & Shelat, 2017) its *impact on tourism industry* (e.g. Zervas et al. 2017; Fang et al. 2016), its relationship with *trust and reputation* (e.g. Koopman et al. 2015; Ert et al 2016; Hawlitschek et. al 2016; Möhlmann, 2016), its *regulatory issues* (e.g. Cannon et al. 2014; Koopman et al. 2015; Malhotra and Van Alstyne, 2014; Sundararajan, 2016; Ranchordás, 2015), the *motivation factors for participation* (e.g. Kim et al. 2015; Hamari et al. 2015; Möhlmann, 2015), its *impact on employment* (e.g. Sundararajan, 2016; Bouncken & Reuschl, 2018); as well as its *impact on discrimination* (e.g. Edelman et al. 2017; Cheng and Foley, 2018).

1.2. The sharing economy as a new business model

Nowadays, it is being said that developed countries have a **service economy** (Nádasy-Kerekes-Luda, 2010.). The service economy defined as if more than half of the total workforce is employed by the service sector (Mont, 2002.). In highly industrialized countries roughly 70% of the workers are employed by this service sector: telecommunication,



transportation, information technology, financial services and so on. This new and modern economic form enhances innovation, improved design and quality contributing towards sustainable consumption. The service economy, in other words, functional economy, refers to the phenomenon when ***the customer buys the service provided by the product instead of the product itself*** because he requires mobility, not the vehicle or clean clothes, not the washing machine (Nádasy-Kerekes-Luda, 2010.) Stahel (1988) proposed the concept of the service society as a tool of achieving sustainable development. He advised distinguishing the industrial economy and service-oriented economy. With the functional economy, it became clear that it is not necessary to cling on to the current unsustainable level of mass production, we need to develop a new model which is based on less consumption and the reusing of product. Consequently, the human need is not to own goods, our need is services provided by these products, so we are moving from the stock economy towards the flow economy (Nádasy-Kerekes-Luda, 2010.). Over the past years, several business models were born which support this view (Tukker, 2015) and the message is similar; modern economies need business models which helps society and they do not need to own products because they have a need for the services (Cohen and Kietzmann, 2014).

Over the last decade, internet-based companies have created a new and innovative business model (Chesbrough, 2010). Osterwalder and Pigneur (2010) define a business model as something that “describes the rationale of how an organisation creates, delivers, and captures value” (Osterwalder and Pigneur, 2010, p 14). Based on this statement, the business model is a business strategy translated into a framework to create economic value. This is a strategic management tool, which is widely used to analyse the strategic positioning of a company (Osterwalder, 2004). Sommer (2012, p.



4) defines that a business model can be defined as “a blueprint of the value proposition offered to the customer, the way the business creates and delivers that value and extracts profits from it”. Planing (2018) argues that the two main types of business model orientation are product or service-oriented business model. He adds that another main difference between business models is the business model for business-to-consumer markets or for business-to-business markets. Additionally, business models can be differentiated based on their income models; revenue can be generated by selling, lending or licensing the product or service (Planing, 2018).

Sustainable business models create value in the way which is good our society, environment and economy. In his article, Zilahy (2016) introduces different business models with their potential benefits to the environment and society as well. These groups were originally identified by SustainAblity, an advisory company and they are classified into five groups:

1. Business models with potentially positive impact on the environment
2. Business models aiming at social innovation
3. Base of the pyramid business models
4. Innovative financing models
5. Business models with diverse impacts on sustainability (Zilahy, 2016:70).

In a broader sense, Bocken et al. (2014) identified the sustainable business model archetypes. These models have three main groups: technological, social and archaeological. Within these classes are the archetypes which are: Maximise material and energy efficiency; Create value from ‘waste’; Substitute with renewables and natural processes; Deliver functionality rather than ownership; Adopt a stewardship role; Encourage sufficiency; Re-purpose the business for society/environment; and Develop scale-up



solutions (Fig 1). Figure 1 shows that more sustainable business model archetypes contain various elements of the sharing economy.

In their paper, Kocsis and Harangozó (2018) analyse the main alternatives of traditional economic growth from the sustainable future point of view. They identified the ‘negative growth’ or ‘degrowth’, ‘zero growth’ and ‘positive growth’ as possible ways to overcome the sustainability crisis and draw up options and actions how these could be reached. In case of ‘degrowth’ they introduce the sharing economy as a profit-taking alternative for firms because companies can generate revenue without producing new product or consume more energy.

Over the last years, several business models were born which are innovative and promising from the long-term sustainability point of view; however, most of them could not reach the critical mass. More and more organizations should recognize the importance of sustainable development and change their operation or at least implement sustainable commitments.

Groupings	Technological			Social			Organisational	
	Archetypes							
Examples	Maximise material and energy efficiency	Create value from waste	Substitute with renewables and natural processes	Deliver functionality rather than ownership	Adopt a stewardship role	Encourage sufficiency	Repurpose for society/ environment	Develop scale up solutions
	Low carbon manufacturing/ solutions	Circular economy, closed loop	Move from non-renewable to renewable energy sources	Product-oriented PSS - maintenance, extended warrantee	Biodiversity protection	Consumer Education (models); communication and awareness	Not for profit	Collaborative approaches (sourcing, production, lobbying)
	Lean manufacturing	Cradle-2-Cradle	Solar and wind-power based energy innovations	Use oriented PSS- Rental, lease, shared	Consumer care - promote consumer health and well-being	Demand management (including cap & trade)	Hybrid businesses, Social enterprise (for profit)	Incubators and Entrepreneur support models
	Additive manufacturing	Industrial symbiosis	Zero emissions initiative	Result-oriented PSS- Pay per use	Ethical trade (fair trade)	Slow fashion	Alternative ownership: cooperative, mutual, (farmers) collectives	Licensing, Franchising
	De-materialisation (of products/ packaging)	Reuse, recycle, re-manufacture	Blue Economy	Private Finance Initiative (PFI)	Choice editing by retailers	Product longevity	Social and biodiversity regeneration initiatives ('net positive')	Open innovation (platforms)
	Increased functionality (to reduce total number of products required)	Take back management	Biomimicry	Design, Build, Finance, Operate (DBFO)	Radical transparency about environmental/ societal impacts	Premium branding/ limited availability	Crowd sourcing/ funding	"Patient / slow capital" collaborations
		Use excess capacity	The Natural Step	Chemical Management Services (CMS)	Resource stewardship	Frugal business	Base of pyramid solutions	
		Sharing assets (shared ownership and collaborative consumption)	Slow manufacturing			Responsible product distribution/ promotion	Localisation	
		Extended producer responsibility	Green chemistry			Home based, flexible working		

Figure 1 The sustainable business model archetypes (Source: Bocken et al. 2014: 48)

Looking at the operating model of some well-known sharing economy companies, UBER has no car but it is the world's largest taxi company. Airbnb has no real estate but it is the largest accommodation provider. Netflix, the largest movie house, has no cinemas and the large phone companies have no telecommunication infrastructure (Fruman, 2016). Sharing economy companies represent something new which is totally different from the 'classic economy'. The sharing economy concept is described as an economic model based on "sharing underutilized assets, skills, things, financial or non-financial benefits" (Botsman, 2013 p 6, Lessig, 2008). If we examine the ***operation of the sharing economy business***, it can be realized that the basic model in the sharing economy is slightly dissimilar to the traditional business model. The Sharing Economy business models are usually platform-based where supply and demand can meet (Demary, 2015). One huge advantage of the sharing economy business is the fact of low barrier to entry, namely the platform companies without any assets or strong financial background can easily be established and the services for users can be reached quickly and cheaper way. To run a successful business, platform owners don't have to have or produce goods and services, they must provide the connection and communication between supply and demand.

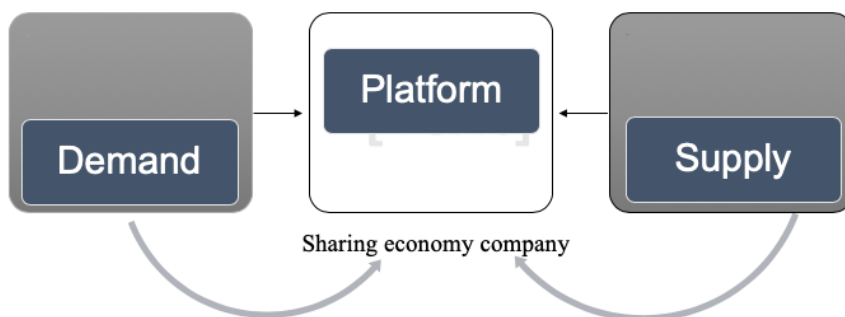


Figure 2 Structure of a peer-to-peer model (Source: Demary, 2015)

Looking at the sharing economy companies, the platform can be accessed globally, the service can be reached locally: for example, in case of peer-to-peer car sharing (eg. UBER), shared travel service can be found worldwide (platform) but drivers (supply) provide service for passengers (demand) locally. Consequently, the peer-to-peer local supply and demand can meet with help of global platform (Fig 2). The platform provider matches local demand and supply in various markets, so the scale of the operation is huge (Demary, 2015).

This new model exists within a triangle of actors: a platform provider, a peer service provider and a customer/seeker (Benoit et al., 2017) as shown in Fig 3.

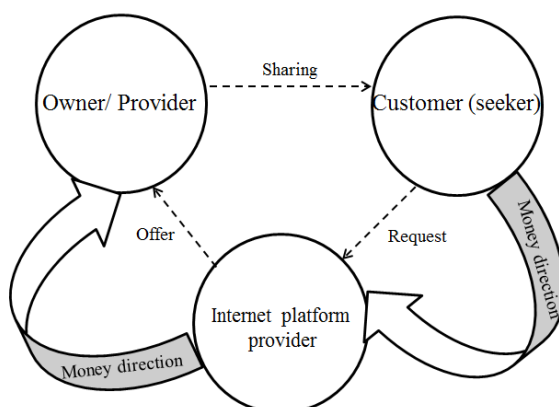


Figure 3 Sharing economy model triangle (Source: own elaboration based on Benoit et al., 2017; Grybaitė and Stankevičienė, 2016)

Considering its operation as Fig 4 shows, the buyers can be sellers and reverse as well, so the role of the customer can change. (Not only sellers, but also buyers can sell their products/services on the online marketplace and sellers also can be buyers.)

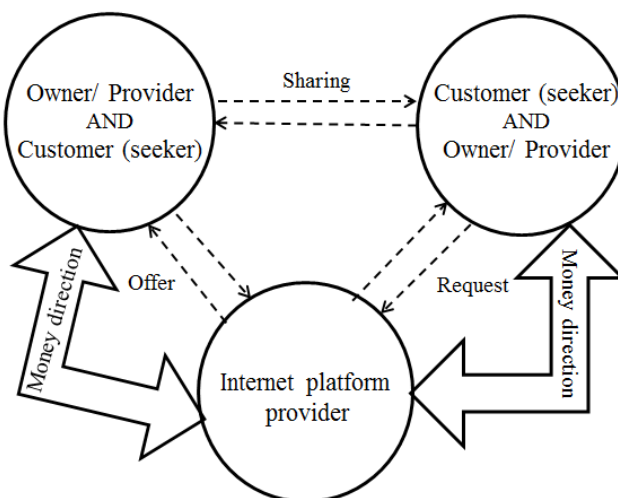


Figure 4 Expanded Sharing economy model triangle (own elaboration)

In case of the base type, a company (internet platform provider) creates peer-to-peer platforms connecting providers and users (customers/seekers) for the exchange, purchase or renting of goods and services (Rauch and Schleicher, 2015). With the help of online platforms, customers can reach the sellers directly without any intermediaries. In this type, the platform provider is an independent, third-party actor.

In order to create and deliver value, a company might need to collaborate with other participants in the industry or society (Osterwalder, 2004; Sommer, 2012.). A corporation needs to decide whether resources should be produced internally or by an external party. This relationship is often described as transaction cost theory (Henten and Windekilde, 2016). The theory indicates that partnerships with participants outside the company will result in an increased focus on the company's core competencies (Williamson, 1979). Considering the difference between the operation of



the traditional business and the sharing economy, the lower transaction cost is one of the biggest advantages of the sharing economy companies.

1.3. The sharing economy as disruptive innovation

According to Richardson (2015) the sharing economy is able to change and disrupt the ‘business-as-usual’. Although, several authors declare that the sharing economy is disruptive innovation because it has shaken up the markets and could transform market economies (Demary, 2015; Guttentag, 2013; Martin, 2016.; Dudley et al., 2017), others say that sharing economy in most cases is not disruptive innovation (Bailey, 2017; Roy, 2018).

Generally speaking, in recent years innovation itself became a buzzword due to the fact that we tend to use it for many different things regardless of its real meaning. Australian Government says that “*Innovation generally refers to changing processes or creating more effective processes, products and ideas...innovation can mean changing your business model and adapting to changes in your environment to deliver better products or services*” (2017). Schumpeter (1934) categorizes five types of innovation: new products, new methods of production, new sources of supply, exploitation of new markets, and new ways to organize business (cited by Fagerberg et al., 2006)

In terms of sharing economy as disruptive innovation, it is essential to highlight the two main innovation groups created by Clayton Christensen (2013): sustaining and disruptive (Fig 5).

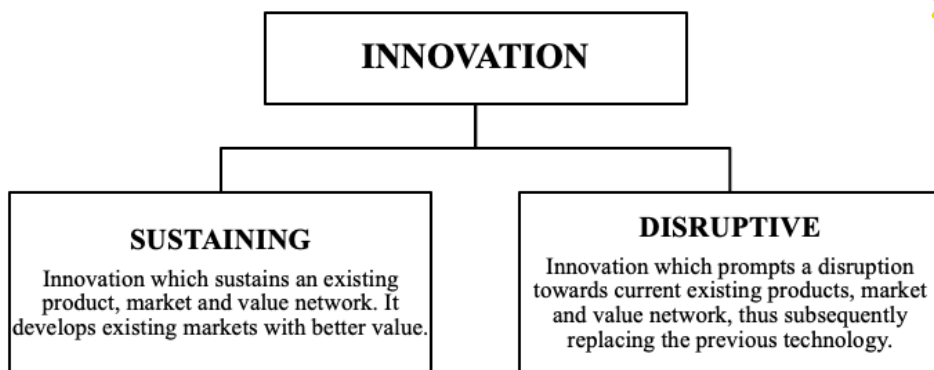


Figure 5 Two types of innovation (Source: based on Christensen cited by Rahman et al. 2017)

Sustaining innovation refers to the innovation which improves existing products. It does not create new markets, but develops existing ones with better value, enhancing firms to compete against each other's sustaining developments (Campbellsville University, 2017) Sustaining innovation focuses on high-end and demanding customers with better performance.

Disruptive innovation defines "a process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves up the market, eventually displacing the established competitors (Christensen, 2015)". This concept was introduced in Harvard Business Review in 1995 and it has proved to be a powerful way of thinking about innovation-driven growth. Disruptive innovation describes a process when a smaller firm ('entrant' or David) with fewer resources is able to overcome the big multinational companies ('incumbents' or Goliaths). In practice the Goliath is focusing on improving its products and services for its more demanding customer segment and they ignore the needs of smaller groups. The 'David's' disruptive technology targets the smaller unnoticed groups (low-end market) and by delivering more suitable functionality (often at a lower price) strengthens its position. Firstly, incumbents think



that entrants are not dangerous and they do not deal with them; therefore, they can target incumbents' main segments too while weakening big companies' position. Eventually, the disruption has occurred when mainstream customer groups start using the entrants' products or services (Christensen et. al. 2015; Shekar, 2016).

There are several good examples for disruptive innovation, such as online media storages (iTunes), film streaming portal (Netflix) and smartphones (Rahman et al. 2017). These innovations have replaced its predecessor and those lost their influences irreversibly.

Pisano (2015) examines the implications of new innovations and how companies must adapt their business strategies properly. According to the author, a disruptive innovation does not only require a new business model, it also challenges the business models of other companies as they started to realize the socio-economic and environmental consequence of their operation.

In terms of sharing economy, it is interesting to questions whether the **sharing economy companies belong to the disruptive innovation group or they are part of the sustaining innovation?** Can we say that small companies with astounding ideas based on the concept of sharing can shake up the incumbent's position?

Satopaa and Mehrotra (2018) distinguish two general categories of innovation: product and process innovation. Product innovation refers to a new, better product which is visible to the customers (eg. Tesla, new iPhone etc.). Process innovation is typically an internal operational innovation which is not visible. The authors say that **sharing economy is a type of process innovation and it is disrupting the business models of traditional industries**. They state that the two most well-known sharing economy company, Airbnb and UBER, both have transformed the business



models of taxi companies and hotels by leveraging existing under-utilised assets, instead of using own cars or rooms (Satopaa and Mehrotra, 2018).

In his article Guttentag (2013) examines Airbnb's potential to disrupt the traditional accommodation sector. He declares that Airbnb appeared in a niche market (basic principle for being a disruptor), it is operating in parallel with traditional accommodation sector, however, he states that its size will never reach the traditional sector's size, therefore, Airbnb will not jeopardize the whole hotel industry. Also, he mentions that Airbnb is appealing for leisure travellers and the other big consumer group, business travellers chose hotels instead of Airbnb accommodations. Nevertheless, he adds that Airbnb should not be overlooked because of its size, as its footprint is already significant. Later, in his other article, he states that the success of Airbnb is partly coming from its constant innovations that helps to provide better service. He says for instance the "Superhost" status which operates such a security mechanism, also some innovations which have been implemented due to convincing the business traveller group as well. However, based on his findings, Airbnb is not truly a disruptive innovation from budget hotels' point of view because Airbnb users think that it is a *superior product* and it is rather a *disruptive threat than a disruptor* (Guttentag, 2017)

Christensen (2015) examined the concept in case of UBER, the world's largest ridesharing service. The research question was that Uber is clearly transforming the taxi business in the US, but is it disrupting the taxi business? His answer is that based on the concept criteria **UBER is not a disruptive innovation** because a disruptive innovation starts from one of those two areas: disruptive innovations emerge in low-end or create a completely new-market but Uber is a different thing, it did not originate in either one. He states that UBER is rather sustaining innovation than



disruptive one and it provides a better taxi service for lower price (Christensen, 2015). However, interestingly, later he said that **he got wrong** and **UBER is a disruptive innovation**. He explains that it is true that UBER entered into the no low end market but it has competitive or even higher prices than taxi companies. Taxi firms are not able to answer for this challenge, because they have fix price and costs as well as they are really asset intensive industry. They have to operate 24/7 so that they will be profitable. On the contrary, UBER has no car, it has a different business model that taxi companies can't adopt. Additionally, he adds that UBER has a business model which is unattractive for its competitors so a less attractive business model can also be disruptive innovation (Adams, 2016). In their paper Laurell and Sandström (2016) state that the sharing economy may be disruptive both institutionally and technologically as well. Overall, there are arguments why sharing economy is disruptive innovation and why it is not. Based on the theories and findings, we can state for sure that this new model has shaken up the traditional models and disrupted the normal operation.

1.4. The sharing economy as the new trust system: the reborn of trust and the role of the online review system

Online marketplaces are one of the biggest success stories of the Internet. These are growing and blooming and also providing new work opportunities. However, not only in the traditional, but also in the **e-business** every transaction requires some level of trust between the participants. This is usually provided by the law or other tools (Tadelis, 2017), but in case of online marketplaces, the buyer and seller do not know



each other; even they do not necessarily meet during the transactions. Consequently, trust has a new significance among users. Generally speaking, trust has enormous literature; because not only in our private life but also in business, all successful relationships are based on trust. The importance of trust in market transactions is well-known, and as Arrow (1972) noted that every commercial transaction contains an element of trust.

Fukuyama defines trust as *“the expectation that arises within a community of regular, honest, and cooperative behaviour, based on commonly shared norms, on the other members of the community”* (Fukuyama 1996:26). Analysing its meaning, it has three main elements: first, trust is associated with regular behaviour that creates stability in social relations. Second, the regular behaviour is honest and cooperative. If someone cheated his friend or fellow, their relationship would end with distrust. Thirdly, cooperative and honest behaviour is effective with the help of shared values and norms. From theoretical perspective, we can distinguish individual trust, organisational trust and national trust (Piricz, 2015) According to Mansur there are so called ‘trust component’. These include communication, satisfaction, cooperation, commitment, asset specificity, shared values, social bonding, long-term orientation, relationship continuity, relationship performance, loyalty, salesperson’s expertise, salesperson’s likeability, reputation, and length of relationship (Mansur, 2013). Repeated interactions and transactions promote the stability of trust among people which is difficult to achieve and keep, especially in our distrusted world. Edelman trust barometer (2017) clearly shows that trust in crisis (Fig 6)

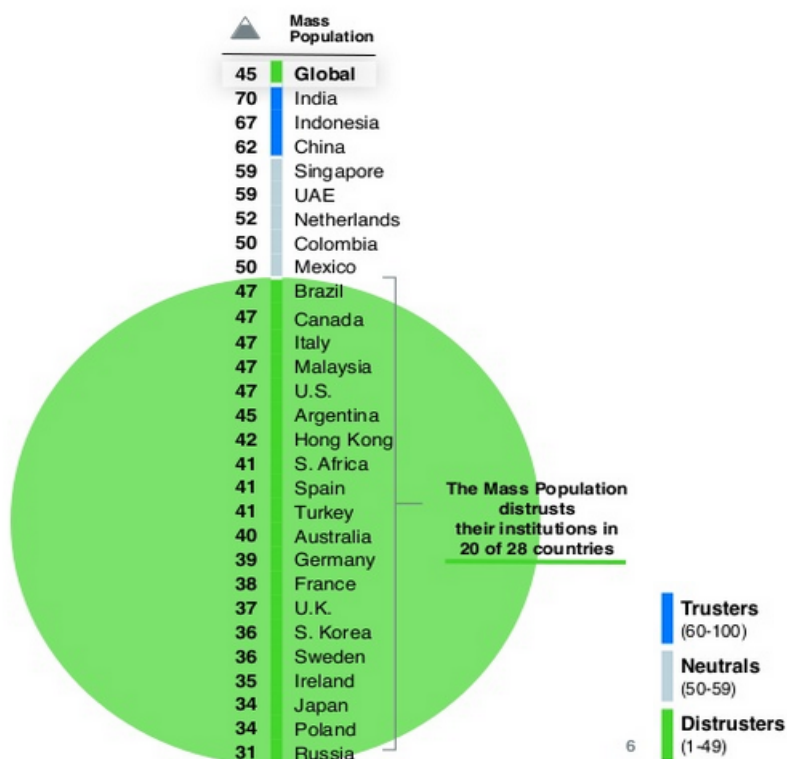


Figure 6 2/3 of the respondent countries are distruster (Source: Edelman Trust Barometer, 2017)

Many theorists and practitioners identified that trust is a key component in business relationship management (Bagdoniene and Zilione, 2009; Brashear et al., 2003). If the customer trusts in sellers, he purchases from the salesperson or company again so he can contribute to the revenue repeatedly. In business research, trust is often considered one of the key factors influencing business relationship quality or relationship performance. However, it is a vulnerable element; it can change easily depending on the experience and outcomes of the actions and interactions (Huang and Wilkinson, 2013).

Several researchers from different disciplines argue that **trust is essential in the peer to peer transactions** as well (Hawlitschek et al. 2016;



Koopman et al. 2015; Ert et al. 2016). On the sharing economy marketplaces there are three different trust triggers: “trust towards peer, platform, and product (3P)” (Hawlitschek et al. 2016, p.26; Teubner et al. 2016), thus, it is an interesting question that people trust the feedback and reputation system, or the company or the market.

Other users’ feedbacks and ratings are important driver of online consumer purchase intentions (Ikkala & Lampinen, 2014). Therefore, it is stated that trust in these peers to peer marketplaces is more critical, because “peers often (...) need to manage the risk involved with the interactions (transactions) without any presence of trusted third parties or trust authorities” (Xiong& Liu 2002:1). This complexity is different from the classic, offline market; subsequently, the trust component is more relevant in the sharing economy.

Botsman (2012) in her TED Talk states that “**the currency of the new economy is trust**” (Botsman, 2012, TED talk). She argues that without trust, collaboration would not be possible, and sharing economy would fail (Botsman, 2012). Botsman and Rogers (2010) in their book they identify the key principles which are essential to making the sharing economy or collaborative consumption work. These principles are *idling capacity*, *critical mass*, *belief in the commons* and *trust between strangers* essential. *Idling capacity* is the “unused potential of tangible and intangible assets (i.e. physical products, time, skills, space, commodities) when they are not in use” (Piscicelli, 2016:25). *Critical mass* is the sufficient number of people who are willing to try the new things and use them regularly. Reaching enough consumers who are satisfied by the convenience and choice available to them is essential to make this system works (Botsman and Rogers, 2010). *Belief in the commons* refers to the set of shared values such as ‘collaboration’ or ‘empowerment’ enabling the overall social value



is being spread. The collaborative consumption requires that participants *trust each other* and trust the platform operator. For this reason, the service providers created **the online reputation system** which enhances the executed online transactions by building a virtual trust system (Botsman and Rogers, 2010). Botsman (2012) argues that Airbnb is using the power of technology to build trust which is social glue between strangers. Although, comparing to the offline businesses, the communication is easier and the transaction cost is cheaper in case of the online marketplaces, the main success factor is the online trust system; namely, the online reputation and feedback system. Finley (2013) states that two factors are different from the offline marketplace: the **impersonal nature of this environment and the higher information asymmetry** in transacting online. Bae and Koo (2017) also highlight that buyers and sellers have asymmetric information about quality and value of product and service. Participants have risks in terms of trust and credibility; thus, one of the most serious risk factors is the *lemon problem* (Bae and Koo 2017).

Overcoming this issue and encourage people to participate in the online shopping, eBay was the first company who has introduced the online feedback and reputation system, where buyers and sellers can evaluate each other. The basic idea behind this concept is that today's activity will lead to future consequences that can influence the future business of seller. Specifically, the importance of online feedback system is to provide future buyers with a window into the seller's past behaviour who have not previously met with help of previous buyers' experience in anonymous marketplaces (Tadelis, 2017). It has become the industry standard and has been developed further by the sharing economy companies. Today, this is one of the key success factors of all sharing economy platforms. Luca (2011) states that the user-generated online reviews have huge credibility



in case of customers and this is an essential part of the decision-making process. With the help of this system, the stranger sharing is less risky (Tadelis 2017).

In practice, there are two big different online feedback methods; one – sided and two –sided review systems. Table 1 introduces some well-known online companies' reputation systems.

Company name	One – sided/ Two- sided
eBay	One – sided Buyer has 60 days to leave a positive, negative, or neutral feedback score for the seller. Sellers are limited to leave positive feedback or no feedback.
Taobao	One – sided If a seller leaves positive feedback for a buyer but the buyer leaves no feedback then the platform's algorithm automatically records positive feedback for the seller
Amazon	One – sided Sellers leave no feedback at all
Airbnb	Two –sided Owners and renters leave feedback that is then aggregated and publicly observed by future marketplace participants
Uber	Two –sided Riders leave feedback, which is not public, drivers can see a rider's feedback for previous rides before accepting a ride request, but riders see the driver's feedback after the ride is confirmed.

Table 1 Types of review system in different online marketplaces (Source: own elaboration based on Tadelis, 2017)



According to Jøsang et al. (2007) this reputation system incentivizes to the good behaviour, which has a positive effect on overall market quality. Botsman (2012) thinks that reputation is the measurement of how much a community trusts you; she states that reputation is a currency that will become more powerful than our credit history in the 21st century (Botsman, 2012). Furthermore, she claims that as collaborative consumption is growing, online reputation is becoming more important (Botsman, 2010). However, a study by Zervas et al. (2015) reports that almost 95% of Airbnb rooms, houses, apartments have an average user-generated rating of either 4.5 or 5 stars (the maximum); practically none have less than a 3.5-star rating, so high ratings might indicate a norm so it does not have additional meaning (De Langhe et al., 2015). Low ratings can refer to a weak performance by hosts and it might require special attention by guests, namely they have to be careful and check other information as well (text, pictures, response rate by host etc), however, a high rating itself does not mean anything. It can be an average accommodation but it can be super high-quality apartment too. From this perspective it is essential to know more about the online review system and to understand the participants so that a better system would be enhanced.

At the beginning, the ratings ('stars') gave a direction to the potential buyers (renters) however there are several researches (Cabral and Hortacsu, 2010; Nosko and Tadelis, 2015) proving that this form is not enough anymore. People make their decisions more sophisticated ways knowing not only ratings but also other characteristics of the online marketplace.

In the same vein, Bae and Koo (2018) found that potential guests who are searching accommodations on Airbnb analyse more components during their searching process. People check the ratings but they are only interested in this if they are low. It means that rating valence (high, low)



does not have a direct impact on decisions; it has an anchoring role in the adjustment of consumers guiding people in selecting a signal to use. They read the written reviews by other guests but they do not deal with the positive content except if it is positive in an exceptional way (the host provides some extra gifts or services to the guests). Based on their cognitive style there are two types of people: visualizers who prefer pictures and readers who prefers the text. Authors found that when people cannot decide due to several unknown factors, do not prefer decision heuristics that fit their cognitive style, they prefer the opposite; for instance, visualizers prefer text (Bae and Koo, 2018). This result also demonstrates that the decision-making process is not based on the rating system only; people take many more factors into the account which influence their final decision.

Theoretically, the system works well; however, participants do not trust the user-generated ratings exclusively (Bae, Koo, 2018). Empirical findings also prove that reputation measures not reflect fully to the performance (Cabral & Hortacsu, 2010; Dellarocas & Wood, 2008; Fradkin et al., 2015). In addition, buyers and sellers tend to give higher ratings because other people look the ratings they gave and if they see low ratings it could mean that previous buyers have been difficult to please (Bae, Koo, 2018) which can be a drawback during their next transactions.

This view is supported by Bolton et al. (2013), Nosko and Tadelis, 2015), Horton & Golden (2015) who published that giving negative feedback is costlier than giving positive feedback due to the possible revenge in the future.



To imagine a possible consequence of the online reputation system, Netflix premiered the third series of Black Mirror¹ on 21 October 2016. The title of the first episode is Nosedive and this introduces a world where people can rate each other from 1 to 5 for every interaction they have which can influence their socio-economic status. If they are likeable, they can get higher ratings and higher score means better jobs, credit position and attractive opportunities. On the contrary, lower score means worse opportunities, waiting list etc. In the story the main character endures bad luck: she received negative starts and she is eventually jailed. After its release, this episode received many positive and negative reviews; many critics mentioned the similarity between this system and the Chinese so called ‘Social Credit System²’.

¹ Black Mirror: This sci-fi anthology series explores a twisted, high-tech near-future where humanity's greatest innovations and darkest instincts collide
<https://www.netflix.com/hu/title/70264888>

² ‘Social Credit System’ was introduced on June 14, 2014. This is a national reputation system where data is collected from people’s social media, voting records, financial information, online purchasing, credit history, tax payments, legal matters, etc. was gathered into their social credit score (SCS)
https://en.wikipedia.org/wiki/Social_Credit_System



1.5. Core categories: Redistributing markets, product-service systems (PSS) and collaborative lifestyle

According to Botsman and Rogers (2010) we can distinguish three basic collaborative consumption activity groups which are Redistributing Markets, Product Service Systems and Collaborative Lifestyle which represent different aspects and operation model of the sharing economy.

a) Redistributing Markets

Redistribute used items from the person or place where there is no need for it to another person or place where there is a need for it (e.g. exchange markets and second-hand products). This type contributes to the fifth 'R': *reduce, reuse, recycle, repair and redistribute*, because this activity extends the life cycle of a product, thus, reduce the waste (European Environment Agency, 2017). These products can be free (Freecycle); others are exchanged (thredUP) or sold (eBay). eBay is one of the best example to introduce the operation of redistributing market. eBay is the world's largest online marketplace with more than 167 million active users in the world (as of Q4 2011) (statista.com, 2017). In September 1995, the founder, Pierre Omidyar wrote a code on his personal computer and launched AuctionWeb (later eBay), a site "dedicated to bringing together buyers and sellers in an honest and open marketplace" (eBay. com, 2017). The foundation of the eBay model is an online peer-to-peer trading community on the Internet, using the World Wide Web, which has traditionally taken place through such forms as garage sales, auctions, flea markets. Sellers offer their new or second-hand products or services to the buyers. The items are arranged by topics, where each type of auction has



its own category. The customers have two options for shopping: fix price shopping or bid shopping. After the transaction has been completed, both the sellers and buyers can evaluate each other with the help of a rating and comment system. This system can ensure the trust and the transparency during the business process. eBay's marketing and customer acquisition costs are lower than most sites because of the power of word-of-mouth. eBay allows also companies to offer their goods via the eBay platform. In this business model, the user can be the seller and the buyer as well (eBay.com, 2017; Bjornsson, 2001; Dubosson-Torbay et al. 2004; Amitt and Zott, 2012).

b) Collaborative Lifestyles

In this category people share and exchange less-tangible assets such as time, space, skills, and money. This includes workspaces (CitizenSpace), parking space (JustPark), loans between individuals (Lending Club) and home renting (Airbnb and Couchsurfing) or Skillshare or TaskRabbit (WEF YGL, 2013).

I use Airbnb as an example to introduce the Collaborative Lifestyle. Airbnb.com was founded in 2008 and is a popular online marketplace for short-term accommodation rentals. The booking services are available in 190 countries with more than 2 million listings worldwide. Approximately 60 million guests have used the service in 34 000 cities (Airbnb, 2017). The company offers a new model of bed and breakfast built on the collaborative consumption model (Guttentag, 2013). In other words, Airbnb is a peer-to-peer accommodation renting platform catering to hosts and travellers. Hosts can use this webpage (or application) to offer their underused space



(entire flat, room etc.) and rent it out to others. Airbnb as a company is a third party between hosts and travellers, and charges fees to both parties.

Travellers use the site to book and stay at another person's flat. According to Trimble (2014) the increased social connections and the opportunity for people to leverage their ownership to help themselves and others also enhancing the operation of the local economies (locally owned businesses are more frequently recommended by local hosts) are the most important social benefits for using Airbnb during a holiday or business trip.

Looking at Airbnb's environmental footprint, Airbnb produced a study about its environmental impact which declares that Airbnb properties consume less energy than hotels per guest night. For instance, Airbnb properties had lower greenhouse gas emissions compared to hotels per guest night by 89% or used less water by 48% (Airbnb, 2017).

c) Product Service Systems (PSS)

The Product Service System refers to the system when the ownership is less important than the benefit of the product. Users who pay for services offered by Product-Service-System companies are allowed to use the product for a short period without owning it (e.g. car/bike sharing - Zipcar, UBER, Snapgoods, RelayRides, City CarShare). Product Service Systems have been around for years, good examples are libraries or laundrettes.

Product-Service-System have different categories, Tukker (Fig 7) introduces eight types, divided into three groups: product-oriented, use-oriented, and result-oriented (Tukker, 2004).

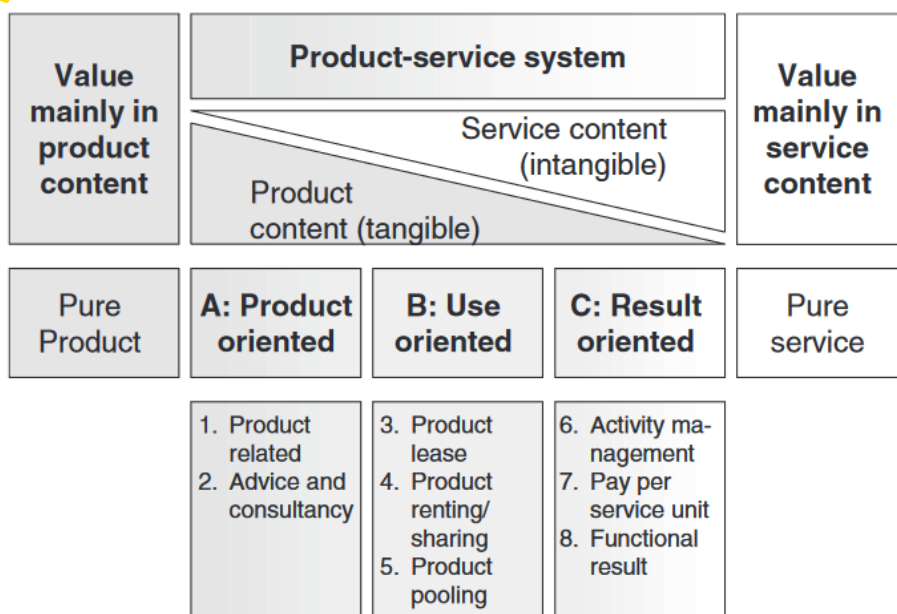


Figure 7 Types of product-service system (Source: Tukker, 2004: 248)

The first category is the *product-oriented services*. In case of this type the business model is based on the sales of the product with some services added to it. The second group is the *use-oriented services* where product ownership is retained by the provider however it is available in various formats and can be shared by many of users. Finally, the *result-oriented services* represent the category where the product is not important, just the service only, so products are replaced by services (Tukker, 2004).

I use UBER as an example to introduce the Product Service Systems. It was established in 2009 and nowadays it is the world’s largest ridesharing service, operating in more than 500 cities around the globe and with over 400 million monthly active riders worldwide (Solomon, 2015). Described by its founders as a platform where “people can push a button on their phones and they get a ride” (uber.com, 2017), Uber is a Smartphone based application that connects drivers offering rides to passengers looking to use



their services. Passengers pay mileage-based fees via credit card for their rides, with Uber taking an agreed percentage of the fares, giving the rest to the drivers (Rogers, 2015). If we consider the environmental impact of this company, it could be argued that the significant growth of the business, and subsequently higher greenhouse gas emissions show that it does not contribute to our environment protection. However, if we take the operation of taxi cars into consideration, shared ride services (UBER, Blabla car, OSZKÁR in Hungary) have less negative impact on our environment than single taxi cabs who carry one customer only in most of the time or often remain on the road even without passenger. UBER has initiated several projects aimed at helping to protect our environment such as carpooling and sharing one Uber ride between multiple different users. The goal of these initiatives is to reduce of vehicles on the road and therefore reduce harmful emissions (Miller, 2015; uber.com; 2017).

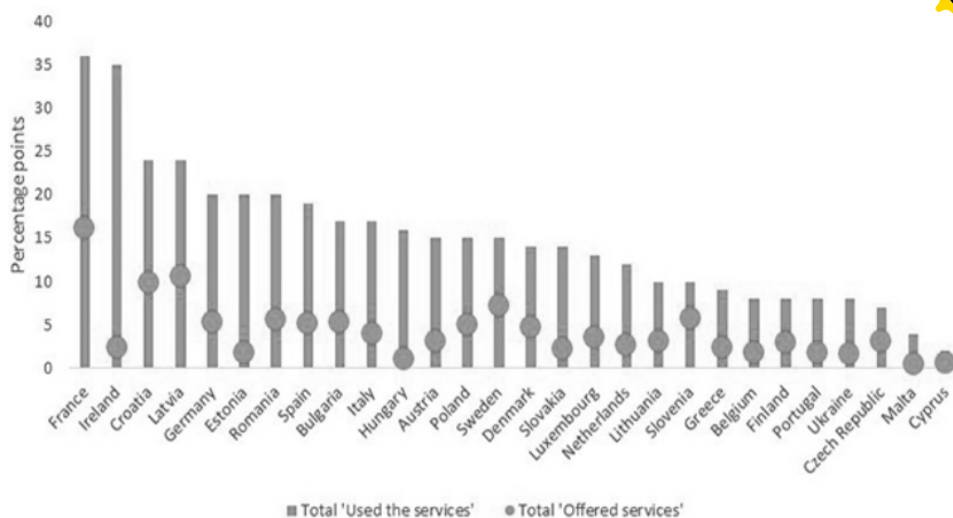


2. SUSTAINABILITY ELEMENTS OF THE SHARING ECONOMY

2.1. The sharing economy from users and legal perspective: the main reasons of its popularity and arguments against it

The sharing economy is a fast-growing sector which is disrupting mainstream industries (Cohen and Munoz, 2016): since it has begun to become more popular, **consumption patterns have been changed** and reached the traditional industries such as tourism, hospitality, transportation, education, job market and so on (Botsman and Rogers 2010). *From customer's perspective*, there are several different reasons **why people participate** in the sharing economy or collaborative consumption. These motives can be divided into economic, environmental and social factors (Piscicelli, 2016). The motivation can be different among the individuals and companies.

Based on the Pew Research Center survey's result it was published that 72% of Americans are involved in sharing economy activities (Smith, 2016). Later, in his blog post Winkler (2017) wrote that in France and in Ireland roughly 1 in 3 people have used sharing economy platform or at least 1 in 10 have tried it in Central and Northern Europe (Fig 8)



*Figure 8 Share of Europeans who use Sharing Economy platforms
(Source: Winkler, 2017)*

In this chart it can be seen that the users not only use sharing economy platforms, they also propose services while earning extra money. Eg. more than 15% in France, 10% in Latvia or half of the users in Sweden have offered their services via sharing economy platforms; they were UBER drivers or rented out room of his or her house or found project job on peer-to-peer freelancing platforms (Winkler, 2017).

One of the first global surveys about the sharing economy has been carried out by Nielsen in 2014. The ‘Nielsen Global Survey of Share Communities’ polled over 30,000 Internet users in 60 countries to estimate the willingness to participate in sharing communities. More than two-thirds of respondents (68%) tend to share or rent their personal assets **for financial benefit** (Nielsen, 2014). Similarly, Havas Worldwide surveyed 10574 people, aged 16 and older from 29 countries. Based on their results, the most appealing aspects of the sharing economy are: saving money (32%), feeling active and useful (13%), reducing consumption/carbon footprint (13%),



Contributing to the broader movement by staying away from hyper-consumption (10%), supporting individuals and/or small/independent companies (9%), having an interesting experience/doing something most people have not tried (8%), and get to know new people (6%) (Havas, 2014. Cited by Piscicelli, 2016)

In 2015, ING the Dutch multinational banking and financial services corporation reported that 5% of consumers in the Netherlands and in Europe broadly have already tried peer-to-peer sharing (ING, 2013). 14 829 people answered for their questionnaire from Europe, Australia and America. They said that cars are the most frequent shared item, but number of shared holiday accommodation is also increasing considerably. The survey shows that the participants are well-educated under the age of 35. The main motivation for participation is saving money (55%) but the view that it is good for the environment is also important factor across in all countries. Among the three negative statements 'I don't like other people using my property', 'I'm worried about insurance' and 'I don't trust the quality of shared items', the first has the highest share as an unfavourable factor for not using it (ING, 2015).

Hamari et al (2015) in their study identified four motivational dimensions why people participate in collaborative consumption (CC): (a) enjoyment, (b) sustainability, (c) economic benefits, and (d) reputation. They stated that participation in collaborative consumption is generally expected to be highly ecologically sustainable (Hamari et al., 2015:5), therefore, they assumed that the perceived sustainability positively influences attitudes towards CC, as well as perceived sustainability of CC positively influences behavioural intentions to the participation. The results show that perceived sustainability substantially predicted attitude to collaborative consumption; however, it did not have a direct association with behavioural intentions.



Also, the perceived sustainability has a small total effect through attitude to behavioural intention (Hamari et al, 2015, p.8.)

The strongest determinant is the enjoyment and they found that some people might take part simply because it is fun and good way to get to know other people in the community. Important result that **theoretically the sustainability is important factor towards participation; however, economic benefits are stronger motivator for the implemented participation** (Hamari et al, 2015:10).

The most recent study carried out by NatCen (Rahim et al., 2017), a research centre in the UK, has been published about **the characteristics of the sharing economy in Great Britain**. They found that 11% of the working age population (5.3 million individuals) participate in the sharing economy as providers. The supporters are mainly young and living in urban areas, 73% earning a gross personal annual income of less than £40,000. The **primary driver** why people participate in this market is the **opportunity to earn money** as well as **flexibility to work**. Further motivations are achieving future goals, enjoyment of the activities and the reputation and benefits of different platforms. In the United Kingdom, the estimated total gross income generated by sharing economy is £8 billion per year. The mean of this annual individual income is approximately £1,700. The total income earned by each provider was most frequently less than £250 (45%). Renting out space and performing short term jobs were the activities that generated the highest income (over £11,000) from sharing economy activity. Most participants (77%) reported that not this business it is their main business and 54% of respondents think that sharing economy activity as just a way of making some extra money, rather than as a formal employment status (Rahim et al, 2017:3). It can be concluded that most



people participate in the new market because they can get high profit with low investment i.e. they gain extra money by renting out their private assets.

On the other hand, recognizing the importance and power of the sharing economy, some people might take advantage of it and mislead the customer sharing false information about the system. In the first part of this dissertation I introduced the **trust** related advantage of the sharing economy, however this factor is the biggest **drawbacks** as well: given it is about sharing, the accountability, security and responsibility are areas which are challenged by everyone's attention. Campbell Mithun cooperating with Carbon View Research Institute (2012) identified that the **trust related concern** is the primary barrier to participating in sharing economy (60% of respondents agree with this). They found that 30% of respondents fear that their goods will be broken or stolen, 23% have a basic mistrust of strangers, and 14% concern about their privacy concerns (Davis, 2016). Piscicelli (2016) agrees with this result, in her dissertation she identified three main categories why people are reluctant to participate in the sharing economy: the first factor is the **trust related risk** (safety and privacy), second is the **quality of the goods or services**, also the reliability of the providers (they are usually non-professional or without quality assurance). Third category is when people do not recognize the value and benefit of the new collaborative models or they do not want to learn to use the new platforms (Piscicelli, 2016).

According to Santana and Parigi (2015) risk awareness is an important factor for participating and being engaged in the sharing economy. They state that risk taking demonstrates a key component that influences and limits the increase of the sharing economy. In their findings, there is

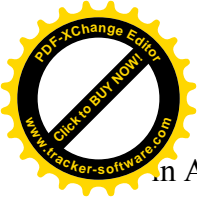


correlation between the risk taker personality and the level of engagement, they found that the frequency of usage and satisfaction diminish risk aversion and positive experiences relate to less risk aversion. Finley (2013) identified the following areas as **risk regarding sharing economy** (specifically relating to the usage of Airbnb):

- Lack of site-wide standards of hospitality: concerns about cleanliness and noise levels or people who are not trained in hospitality management or hosting people and the guest has to deal with it (as an additional element of circumstances) or the main Airbnb risks is “not knowing what to expect”
- The chance that the listing (photos, descriptions, and locations) might not be accurately represented
- Concerns about personal safety

During her examination, she found that the outstanding components during the accommodation selection process are reputation, listing photos, host profile photos, and social graph integration (Finley, 2013.). Likewise, Ert et al. (2016) in their empirical research on Airbnb found that hosts who have a clearer photo, and are evaluated more attractive by the guests, get better ratings and can charge more for their rental; “the more trustworthy the host is perceived to be from her photo, the higher the price of the listing and the probability of its being chosen” (Ert et al. 2016 p. 8). It means that with the selection of a good photo, host can influence the guests’ decision and manipulate the process. This seems to be reduced to one simple idea: we might be simply relying on the pretence of trust, on a perception of trustworthiness (Murillo et al. 2017).

Focusing on the accommodation provider’s perspective, Mittendorf (2016) in his research found that the branding is a key factor, thus the familiarity with Airbnb.com has a significant power on trust. It means that people trust



in Airbnb, so they trust in the accommodation provider (Mittendorf, 2016). Consequently, if someone's risk taking attitude is higher, he or she is engaged in the sharing economy more likely than others who are less risk taker. The respondents confirmed that trust in general is an important element of the attendance, furthermore if a brand (eg. Airbnb) has a good reputation, people trust better in the service providers.

Examining the sharing economy from legal perspective, the European Commission warned Airbnb that their terms and conditions are not complying with EU consumer rules: in terms of pricing, Airbnb used to add extra hidden costs (service and cleaning fees) to the renting fee. Also, EU asked the company to make clear that we can rent the flat/room from a private individual or professional. Numerous other points were not clear in their Term and Conditions, for instance it was not clear that guests had the right to take legal actions against host in case of personal harm or other damages (BBC.com, 2018.). Airbnb has updated this document and it will automatically come into effect for all existing users as of 27 March 2019. One of the really important and remarkable elements is connecting with security: **according to Airbnb's new Terms and Conditions users choose this service voluntarily and at their sole risk:** *"You agree that some Experiences, Events, other Host Services, or the Group Payment Service may carry inherent risk, and by participating in such services, you choose to assume those risks voluntarily. For example, some Host Services may carry risk of illness, bodily injury, disability, or death, and you freely and wilfully assume those risks by choosing to participate in those Host Services. You assume full responsibility for the choices you make before, during and after your participation in a Host Service or the Group Payment Service."* (Airbnb Terms of Service, 2019.)



Botsman and Rogers (2010) states that the sharing economy should be convenient, trust-based and more cost-effective than private ownership. They believe that the improvement of peer-review system and self-regulation tools help overcome the trust related concerns.

Overall, there are some improvement areas in the sharing economy, however, in a better regulated environment people might trust better in this new economy because it has new opportunities: this can be a new chance toward a fairer society; cleaner environment and contribute to the better community life.

At the beginning of the popularity of collaborative consumption most of the literature and news dealt with the positive consequences of the sharing economy and this new business model. However, later we heard some deterrent examples as well, why we do not use these new services³. These organisations did not have clear legal, regulatory systems, including policy challenges around its taxation, insurance, types of legal forms and so on (Stoke et al., 2014). Zilahy (2016) agrees with this and adds "while providing various benefits to its users – and probably to society as a whole – the sharing economy poses important questions for established businesses trying to avoid disruption, new entrants who wish to lure away clients and policy makers who try to regulate and manage the market." (Zilahy, 2016:68.)

Platforms have been criticized for their tax system which did not exist, also the erosion of workers' rights (eg. lack of health insurance, the question of job security) (Schor, 2014; Bardhi and Eckhardt, 2012).

³ Some examples: Sexual harassment and the sharing economy: the dark side of working for strangers (<https://www.theguardian.com/business/2017/aug/23/sexual-harassment-sharing-economy-uber-doordash-airbnb-twitter>) or Uncensored Airbnb Stories & Reasons not to use Airbnb (<https://www.airbnbhell.com/>)



The growing popularity of ride sharing services such as UBER has led to several taxi driver protests. This happened in Hungary and Barcelona as well: in Budapest, on 18th January 2016 angry taxi drivers were protesting UBER and blocked Deák tér, one of the busiest areas of the city. They aim was to “stop Uber application” (Tkatchenko, 2017).

They movement was successful: in Hungary UBER ceased its operation in July 2016 after the government passed legislation blocking the app. Furthermore, answering to protest movement by local taxi drivers, Barcelona also banned UBER and Cabify as of January 2019 (The Guardian, 2019). This economy creates unregulated marketplaces and its current operation contributes to the grey economy which is also risky from consumers point of view.

According to IDDRI, a French think tank organization, so that the sharing economy can be sustainable, governments and public authorities need to work out an economy and regulatory framework which support the operation of this new model. They highlight the importance of eco-design, recycling and efficient public transport to promote the value of the sharing economy. They classified four action areas to enhance the sharing economy:

- To develop an action plan regarding the regulations to benefit the new model
- To subsidize innovative projects
- To make the sharing economy visible via communication campaigns and labelling.
- Also, to encourage public authorities to promote and implement best practices. (Demailly & Novel, 2014)

Although UBER has been banned in several cities, there are growing number of countries and cities who have already worked out sharing



economy regulations: for example, Vienna whose aims to enhance the economic benefits of the sharing economy companies, alignment with the protection of workers' and users' rights, fair competition or fair taxation (StadtWien, 2015). In Amsterdam (the 'sharing city' - iamsterdam.com, 2019) the entire homes could be rented out for 60 nights per calendar year, and private rooms, shared rooms are not affected by this regulation. However, from 2019 onwards, the number of bookable days will be reduced for 30 days so that the city protects itself from overtourism. Furthermore, hosts need to register their property at the city council (iamsterdam, 2019). Likewise, to protect Berliners, the local municipality announced that the hosts have to have a permit (they need to pay for it) to rent out their entire main or second home for a short time period (airbnbcityzen, 2018). Consequently, if the regulators, local governments develop sustainable law system and regulations, the sharing economy system would be able to work well.



2.2. Potential outcomes: a pathway to sustainability or a new form of neoliberalism? (Chris J. Martin, 2016)

Examining the sharing economy in the context of sustainable development, its required to introduce Chris J. Martin's (2016) comprehensive research about the potential outcomes of the sharing economy. He states that this new phenomenon is understood contradictory ways: some researchers say that this is the potential pathway to sustainability, while others declare that this is a new form of neoliberalism. The common vision about the sharing economy is that it is a niche of innovation, on the other hand, it makes the established socio-technical and economic structures decentralised and disrupted (Martin, 2016). He applied the sustainability transitions methodology (Markard et al., 2012) where scientist examine how framings⁴ and narratives are employed to shape and innovate the incumbent⁵ sociological and technological systems. Snow et al. (1988) identified three types of core framings which are *diagnostic*, *prognostic* and *motivation* and these categories are used by Martin (2016) too: diagnostic framings identify the issue and its causes, prognostic framings recommend solution to the problem and motivational framings encourage actors and public to execute these actions.

Martin (2016) classified tourism, mobility, employment, waste and production-consumption as regimes or existing structures that are being transformed by the sharing economy: the niche can be conceptualised as accommodation sharing platforms; car and ride sharing platforms; peer-to-

⁴ '*Framing*' or *framing theory* is a theoretical approach and it refers to the process where people work out specific and different conceptualisation of a problem by applying various information how people understand situations and activities (Snow et al., 1988)

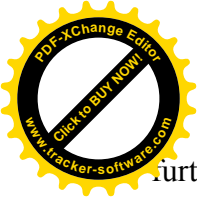
⁵ *Incumbent actors* mean the established and mainstream industries and systems.



peer employment markets; and, peer-to-peer platforms for sharing and circulating resources. In several cases the incumbents and ‘disruptors’ can contribute to the emergence of alternative business models like in case of car and ride sharing platforms or accommodation sharing platforms.

Martin (2016) identified six possible outcomes: the sharing economy can be framed as (these framings can be found in the Annexes):

- (1) an ***economic opportunity***; this refers to the potential to create new forms of jobs and create new commercial opportunities with the help of ICT. Individuals can work as micro entrepreneurs – for example in case of Airbnb where hosts have new form of work (motivational framing)
- (2) a ***more sustainable form of consumption***; this means that the consumption patterns in their current status are unsustainable (diagnostic framing) and a new, less-resource based consumption is more promising (Prognostic framing).
- (3) a ***pathway to a decentralised, equitable and sustainable economy***; climate change and growing inequality are the consequences of the current capitalist economies (diagnostic framing) and the promise of the sharing economy is a decentralised, community-based, fairer economy (prognostic framing)
- (4) ***creating unregulated marketplaces***; regardless of all positive characteristics, the sharing economy enhance the black and grey economy because it has lack of regulations, the workers are not protected and it is promoting tax avoidance (diagnostic framing).
- (5) ***reinforcing the neoliberal paradigm***; this result refers to the fact that those can share only who has assets already that they can share which contributes to the inequality. Also, the less environmental pollution is a positive consequence but it is not an aim in the sharing economy,



furthermore, due to the rebound effect it can be more harmful to our environment (diagnostic and prognostic framing)

(6) an *incoherent field of innovation*: this finding means the confusion around the sharing economy: it creates mixed impact and cause confusion (diagnostic framing).

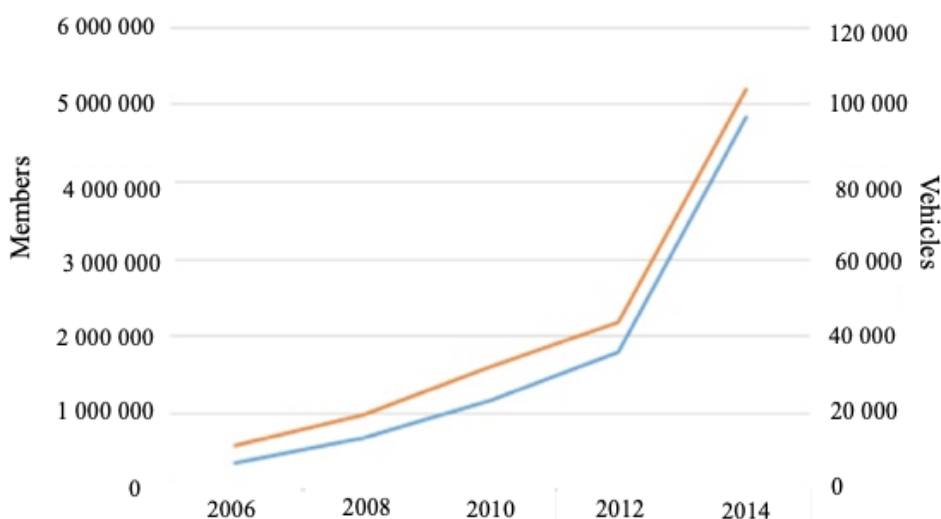
The next question, what is the future development of the sharing economy? Martin (2016) states that if the sharing economy keeps moving on the same trajectory as it is now, **it will not disrupt the current practices and established structures**, they can operate parallel with each other but the radical change will not happen.

Therefore, I think, it is essential to examine my research questions, because based on the literature, the sharing economy can contribute to the sustainable development, however, on the other hand, it can move to other direction easily and fitting and conforming to the well stabled old regimes.

2.3. The environmental, social and economic impacts of the sharing economy

Considering the sharing economy's economic impact, Schor and Fitzmaurice (2015) argued that this new phenomenon is currently the most popular form in the service industry; it has had rapid growth and according to the forecasts this will experience extreme development over the next decade. PwC published a study in 2014, in which they state the total turnover from sharing-economy services will increase from 15 billion to 335 billion US dollars between 2015 and 2025 and it will provide 1/3 of the whole turnover of the industry. Also, in 2015 among the five key sharing sectors (P2P accommodation; P2P transportation; on-demand household services; on-demand professional services; collaborative

finance), €28.1 billion was generated in transaction value (PwC, 2015). UBER and Airbnb tripled their value during three years which represents the quick spread of the sharing economy services. In terms of the market size, the P2P Accommodation services had the biggest contribution to the value of transactions and among the five key sectors the P2P transportation platforms reached the highest revenue in 2015 (Vaughan and Hawksworth, 2014). In the case of carsharing, not only the number of users but also the number of vehicles increased fivefold during 8 years worldwide (Fig 9). This trend is really similar in case of Airbnb listings as well: there were 3000 listings in 2010 and this number gained 2 300 000 in 2016 (Fig 10).



*Figure 9 Growing number of members and vehicles in case car sharing
(Source: Shaheen, 2015.)*

Looking at a country level example, Barbezieux and Herody (2016) predicted that the sharing economy activities generate 13,000 permanent jobs, involve approximately 15,000 firms (including self-employed people)

and produce \$2.5 billion in France. This would come to nearly 0.1 % of French GDP generated by 0.5 percent of French companies for 0.05 percent of French total employment (Petropoulos, 2017.)

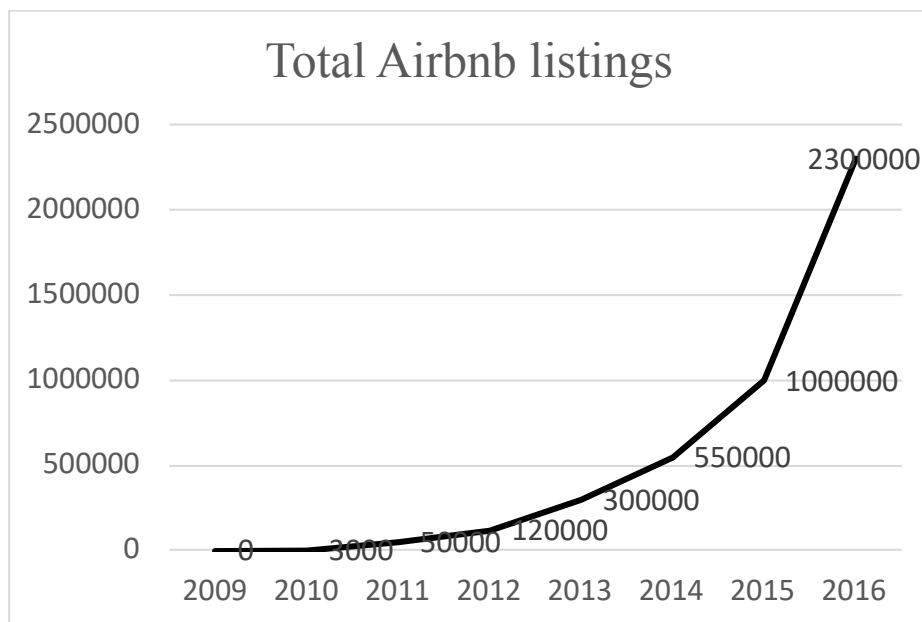


Figure 10 Growing number of listings on Airbnb (Source: Airbnb.com)

The numbers above demonstrate the rapid and unstoppable growth of the sharing economy. Recognising its fast development, not only the number of entrepreneurs within this business model is growing but also several “classic” companies invest into firms whose models are based on the sharing concept (DeBord, 2016). From economic angle, the main sectors which are mostly affected by this new economy are the mobility industry; the retail and consumer goods; tourism, hotel industry; entertainment, multimedia and telecommunication; financial sector; energy sector and human resources (PwC, 2015).

In terms of product efficiency, it is being said that “Unused value = wasted value” (cleverism.com, 2015). For instance if a car is being used only one



out of five days, this means that the 80% value is wasted because it is not being used up to its maximum potential (cleverism.com, 2015). In their book Botsman and Rogers (2010) argue that collaborative consumption **reduces the environmental impact**, results in an efficient utilization of physical assets and facilitates new social contacts. They explain that it has several environmental advantages, such as less new product purchases, reduced waste, less energy usage, encouraged development of better products, also to maximise the product lifecycle, and more conscious usage of goods (Botsman and Rogers 2010). It can also enhance the circular economy (Sposato et al. 2017).

This new model can generate relationships and social connectivity as well as enhance the operations of the local businesses. The ‘neighbourhoodship’ and ‘neighbourly values’ also a strong sense of community becomes important again (Botsman, 2013). Looking at the potential of spare capacity in products, skills and spaces with the help of technology, it may generate financial business opportunities and benefits. It can help save money, space and time (Botsman and Rogers, 2010).

In his article Heinrichs (2013) also argues that the sharing economy is claimed to have positive environmental and social effects (Heinrichs, 2013:229). Others say that it has the potential to change global and local economies toward sustainability (Cohen and Kietzmann, 2014; Daunorienė et al. 2015). The collaboration can create innovation, jobs and community (Krueger, 2012); the sharing could bring people together and stimulate social cohesion in neighbourhoods (Agyeman & McLaren, 2015). Strengthening this aspect, Slee (2014) defines the sustainability focus of the sharing economy as follows, “There’s a definite green slant to the movement, too: ideas of ‘sharing rather than owning’ make appeals to sustainability (...): property and consumption do not make us happy, and



we should put aside the pursuit of possessions in favour of connections and experiences. All of which leads us to ideas of community: the shared economy invokes images of neighbourhoods, villages, and ‘human-scale’ interactions” (Slee, 2014).

Demaill and Novel (2014) identify the *key requirements for the environmental sustainability of sharing models*, which are the quality of the shared goods, the optimization of the product transportation and the consumption modes they are associated with. In their report they analyse the environmental potential of the sharing economy and they agree with Heinrich that it can contribute towards sustainable development. In their study Leismann et al. (2013) also strengthen the resource-saving potentials of this economy.

Table 2 provides a summary about the benefits of the sharing economy based on the three sustainable development connotations:

ECONOMIC BENEFITS	ENVIRONMENTAL BENEFITS	SOCIAL BENEFITS
<ul style="list-style-type: none"> • Raising productivity • Catalysing individual innovation and entrepreneurship • Cost savings • Creating innovation, jobs 	<ul style="list-style-type: none"> • Resource efficiency • Potential energy savings • Reducing the environmental impact - less new product purchase, reduced waste, less energy usage • Encouraged development of better products • Maximising the product usage, more conscious usage of goods 	<ul style="list-style-type: none"> • Make meaningful connections • Re-emergence of community • Social inclusion • Different consumer mind-set creation • Generate relationships and social connectivity • Enhance the operation of the local businesses • ‘Neighbourhoodship’ ‘Neighbourly values’

Table 2 Benefits of the sharing economy (Own elaboration based on Grybaitė and Stankeviciene, 2016)

The **relationship between the sharing economy and sustainable development is becoming more popular**, during the last 1-2 years many prominent journals (eg. Journal of Cleaner Production; Resources, Conservation and Recycling; Sustainability; Management Decision) announced special issues about the relationship between these two outstanding topics.

Several authors (eg. Cohen and Munoz, 2016; Kaushal, 2018) approach the topic of sustainable development and sharing economy from the **consumption model perspective**, ie. they prove that the sharing economy has the potential to change the traditional “product ownership over access” towards more *sustainable consumption model*: I agree with Piscicelli (2016) that collaborative consumption can create a different consumer mind-set that prefers access over ownership and alters the relationship between people and physical products (Botsman and Rogers, 2010).



Curtis and Lehner (2019) state that there is a huge semantic confusion about the term of “sustainable development” in the academic literature and it complicates the realization of its sustainability potential in case of sharing economy too. They conducted a database search and with the help of qualitative content analysis they recommend ***sharing economy definition for sustainability***.

They propose an interpretation consisting of relevant semantic properties such as ICT-mediated, non-pecuniary motivation for ownership, temporary access, rivalrous and tangible goods that helps to examine the sharing economy from sustainability angle.

In their paper Geissinger et al. (2019) examine ***the sustainability connotation in the sharing economy platforms***. Their research questions are that how can the sustainability connotation of the sharing economy be understood based on the platforms' communication and what differences and similarities are there among different platforms and among different sectors of the economy? They examined social media posts (4829) and platforms (121) with the help of Notified (data analytics tool which tracks user-generated contents) and qualitative content analysis.

They found that mainly fashion, on-demand services and logistics are the sectors where sustainable development connotations (mainly environmental concerns) are being mentioned, also they found that sustainability-oriented platforms are still emerging in the sharing economy. Ciulli and Kolk (2019) in their empirical research examine the ***‘incumbent’ companies and how they enter and adjust to the sharing economy*** with the help of different types of business models and by exploring the implications for social, environmental and economic sustainability. They conducted an ‘exploratory empirical analysis and collected 106 cases of



in-cumbents engaging in the sharing economy and introduce 12 types of business model innovation for the sharing economy.

Other researchers, however, highlight the *negative side of the sharing economy* (Cohen and Kietzmann, 2014; Schor, 2014). Frenken and Schor (2017) in their significant *theory-based paper* assess *critically* the sharing economy platforms in terms of the economic, social and environmental impacts. They note the twofold economic impact of this new model: on one hand the growing consumer welfare and on the other hand the increasing economic inequality driven by provider-side dynamics. They are sceptical about the sharing economy's environmental impacts, because there are no clear numbers which prove the less demand for new goods or shrinking emissions. With regards to the social impact, they are not sure that people will participate in the sharing economy due to its positive social impact (they rather prefer its economic advantage). They conclude that it is difficult to measure the impact of the sharing economy until platforms do not provide data publicly available.

One of the biggest controversial consequence of this phenomenon is the 'rebound effect'⁶; which refers to that cheaper and community-based consumption is positive from economic and social point of views, however, due to the possibility for higher consumption, it can be negative from an environmental perspective (Zilahy, 2016)

Schor (2014) highlights its overrated environmental gains and the erosion of workers' rights. She argues the unfair competition between platforms and regular companies and remarks the tendency towards monopoly (Schor 2014). Also, some of the primary criticism of the sharing economy are

⁶ **Rebound effect** "an increase in consumption which may occur as an unintended side-effect of the introduction of policy, market and/or technology interventions aimed at environmental efficiency improvements" (Maxwell et al., 2011: 28)



aimed at the activities which are mostly driven by economic self-interest rather than any genuine ideological reasons (Cohen and Kietzmann, 2014; Bardhi and Eckhardt, 2012; Schor, 2014). Taking its all positive characteristics into account, considering the lack of its legal regulation, consumer protection, the avoidance of tax payments, the missing quality assurance and working conditions (Malhotra and Van Alstyne, 2014; PwC, 2015) prove that this is a disputed concept.

Piscicelli (2016) says that although the sharing economy has potential for change in our cultural, economic, political and consumption era, we know little about its real effect on these systems. I agree with her statement; therefore, I selected and examine the accommodation sharing from supply side in my research.

2.4. Sustainable Development in practice? The sharing economy and the Sustainable Development Goals

As it is well-known, the main connotations of sustainable development are the environmental, social and economic sustainability. To turn the theory into practice, in 2015 the United Nations Member States specified and announced 17 Sustainable Development Goals (SDGs) “*for peace and prosperity for people and the planet, now and into the future*”. The main purpose of these SDG’s is to determine targets to the theory of sustainable development.

The Sustainable Development Goals are:

Goal 1: **No Poverty**: End poverty in all its forms everywhere

Goal 2: **Zero Hunger**: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture



Goal 3: ***Good Health and Well-being***: Ensure healthy lives and promote well-being for all at all ages

Goal 4: ***Quality Education***: Ensure inclusive and equitable quality education and promote life-long learning opportunities for all

Goal 5: ***Gender Equality***: Achieve gender equality and empower all women and girls

Goal 6: ***Clean Water and Sanitation***: Ensure availability and sustainable management of water and sanitation for all

Goal 7: ***Affordable and Clean Energy***: Ensure access to affordable, reliable, sustainable, and modern energy for all

Goal 8: ***Decent Work and Economic Growth***: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Goal 9: ***Industry, Innovation, and Infrastructure***: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Goal 10: ***Reducing Inequality***: Reduce inequality within and among countries

Goal 11: ***Sustainable Cities and Communities***: Make cities and human settlements inclusive, safe, resilient and sustainable

Goal 12: ***Responsible Consumption and Production***: Ensure sustainable consumption and production patterns

Goal 13: ***Climate Action***: Take urgent action to combat climate change and its impacts

Goal 14: ***Life Below Water***: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Goal 15: ***Life On Land***: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat



desertification, and halt and reverse land degradation and halt biodiversity loss

Goal 16: ***Peace, Justice, and Strong Institutions***: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Goal 17: ***Partnerships for the Goals***: Strengthen the means of implementation and revitalize the global partnership for sustainable development

Mi and Coffman (2019) state that the sharing economy has the potential to enhance the necessary shift from our current consumption behaviour towards a sustainable model and support the Sustainable Development Goals (SDGs), however better operational models needed from the governments. In his speech, Rosellini (2017) support this idea and demonstrates how the sharing economy can promote the SDG's: he explains that the growing popularity of "green" forms of transportation enhance the sustainable urban development and decarbonisation also the sustainable consumption patterns. With regard to its social benefits, he analyses that it can strength the social ties, contribute to the mitigation of famine, good health and well-being by improving the social conditions. Furthermore, he argues that in terms of its economic aspect, the sharing economy has the ability to stimulate the economic growth: in GDP and in employment as well by providing flexible work opportunities and decrease poverty.

In my view the definition of sustainable development by Bruntland Committee is too vague and it does not contain either action plan or steps towards the long-term sustainability. These SDGs are well-defined goals



which are very welcomed; however, these are mainly world level challenges and goals, but we must find the local level aims as well and set action plans accordingly. Therefore, in my dissertation I chose a practical approach, the examination of the accommodation sharing and its impact on local communities by studying it from supply side mainly with the help of economic factors. My goal is to investigate whether it contributes to the relevant SDG's in practice or not. Based on my research questions and hypotheses, these relevant and selected goals are Decent Work and Economic Growth (Goal 8), Reducing Inequality (Goal 10), Sustainable Cities and Communities (Goal 11) and Responsible Consumption and Production (Goal 12).



3. THE ACCOMMODATION SHARING AND ITS IMPACT ON PROPERTY MARKET AND HOTEL INDUSTRY

3.1. The expansion of the short-term accommodation rentals: its benefits and drawbacks

Since 2008, when Airbnb has been established, the short-term accommodation rental has gained huge publicity. News about its positive side and concerns about its potential negative effects on tourism industry and housing market made Airbnb and other short-term accommodation rental businesses well-known.

Palgan et al. (2017) in their article they state that although, Airbnb, Couchsurfing and Home Exchange are all accommodation sharing platforms; their operation and features are different. Home Exchange is based on reciprocity of apartment sharing, Couchsurfing offers free accommodations for travellers, and Airbnb is a rental platform: offers bed (and breakfast) for rental fee. Therefore, they distinguish *free, reciprocal and rental P2P accommodation sharing organisations*. In their study they examined *whether environmental, social and economic aspects of the sharing economy are being framed* the same way in case of the three different types of accommodation sharing platforms. Their results show that the generalisation of sustainability framings regarding the accommodation sharing can be misleading; in case of **for-profit accommodation sharing** owners/platform operators prioritise the economic aspect, but they tend to emphasize its environmental and social advantage. On the contrary, **non-profit platforms** prefer these benefits against economic gain (Palgan et al. 2017). They define the **accommodation sharing** as a “peer-to-peer, ICT-enabled, short-term



renting, swapping, borrowing or lending of existing privately-owned idling lodging facilities” (Palgan et al. 2017:71).

Short term accommodation sharing in general means the rental of a home or a room in a home for less than 31 consecutive days. The European Commission distinguishes the **peer-to-peer and professional service providers** in legal perspective (European Commission, 2016). They use the threshold of number of days per year a host can rent out a home, eg. if it's more than 120 days, this host is a professional host. Also, the **second home listings or multi-listings (especially entire homes)** are considered not peer-to-peer, rather professional services (Gyódi, 2019).

Nickerson and Fitzgerald (2018) in their research state that these short-term rentals were part of the sharing economy phenomenon formerly; however, it has changed and **nowadays it operates commercially** and running like a hotel and increase the long-term rental prices (used by residents not tourists) and housing prices too. In their paper they explain that the short-term accommodation rentals are profitable because of high demand (mainly from tourists) for a low price and beneficial investment opportunity. Tourists like this type of accommodation due to its lower rental prices, the opportunity to have local experience and get to know local people, and the ‘home-feeling’ for lower price. It enables tourists to ‘live like locals’ (Segú, 2018). Additionally, they can try extreme accommodation types, for instance they can sleep in a castle, yurt, or in a tree house. In terms of its business opportunity, it provides financial benefit for hosts or home owners, therefore, lots of people see the short-term accommodation sharing as an investment. Nickerson and Fitzgerald (2018) in their research found that in Whitefish and Gardiner (US) the main driver for the real estate



Investment is the rapid growth of the short-term rentals. According to their collection, the main reasons are why it is fruitful business:

- Income from the short-term rentals are sometimes higher than from long-term rental
- They can pay mortgage from this extra income
- In case of second or additional homes, owners would like to cover the costs of this second home from the extra revenue
- The short-term market is increasing and it is easy to find an online platform to advertise his property/ extra room
- Owners also can spend their holiday in their vacation home (Nickerson and Fitzgerald, 2018)

They result confirmed that **real estate firms push up the prices in case of attractive investment opportunities** that has negative effect of first home buyers. Additionally, landlords tend to rent their property to short-term rentals rather than long-term rentals and it is tightening the market which also cause higher rental rate and housing prices. However, they add that **not only the short-term accommodation rentals caused higher prices** in Montana, there are other factors as well; but Airbnb and short-term rentals have undeniable effect.

Taking into consideration their results and looking at the real estate market for instance in Budapest, Fig 11 clearly shows that the portion of buying home for investment purposes is increasing year on year and it has the biggest share since 2012.

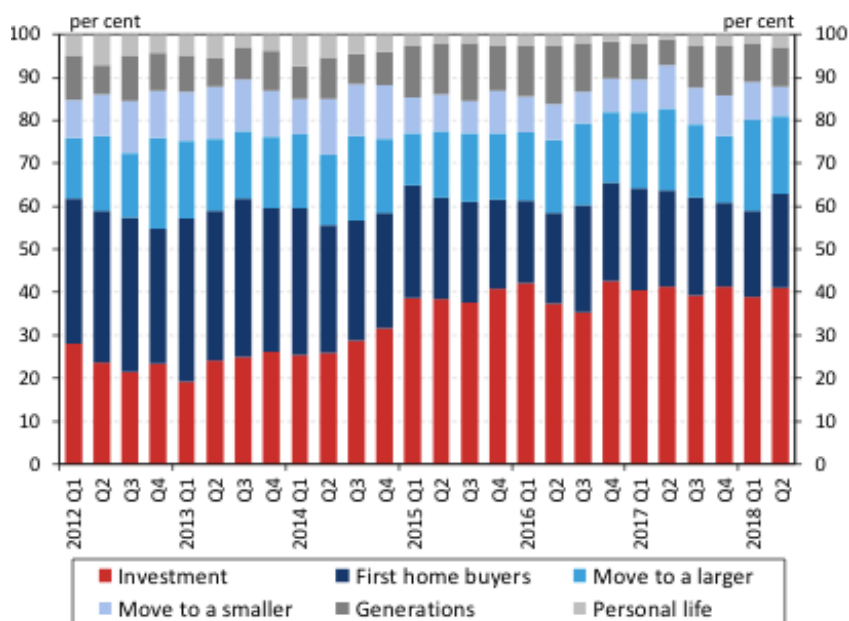


Figure 11 Distribution of home buyers in Budapest by the purpose of home purchase (Source: MNB, 2018)

According to Magyar Nemzeti Bank (Hungarian National Bank) one of the main reasons of the popularity of the investment in the housing market is the **steadily low interest rate** which support this environment. However, the general problem in Hungary as well that it is more and more difficult to enter to the market and buy the first home because the prices are growing faster than the salaries (Átöl et al. 2016)

It can be concluded that **buying a real estate for investment purposes** is considerable consequence of the sharing economy (especially the accommodation sharing). Based on AIRDNA (Airbnb market data collector company) data, The Telegraph published a research about available multi-listing hosts with the number of properties in different cities (Morris, 2017). Fig 12 shows that there are 881 properties which have the same owner in London. The 881 properties meant \$15.6 million in 2016.

They chart shows not only the multi-listing owners but also the revenue that has been generated from short-term accommodation rental. This article and data also confirm the findings by Nickerson and Fitzgerald (2018) that short-term accommodation is a financially beneficial business.

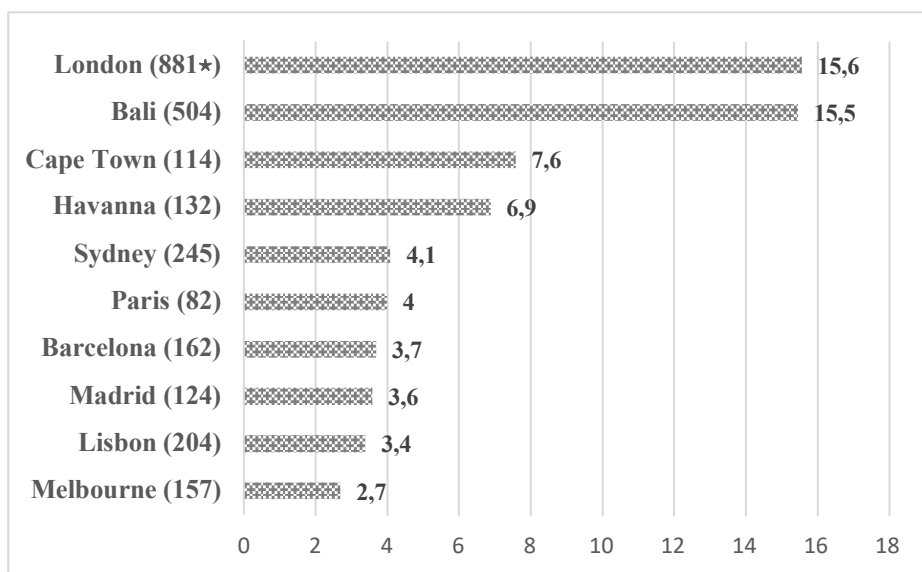


Figure 12 Multi-listing home owners on Airbnb: numbers in brackets mean the number of managed properties; numbers on the right side mean the revenue in \$ million (Source: The Telegraph, AIRDNA)

3.2. The housing market in Europe and Hungary

Good quality housing is a fundamental human right and it is essential part of our well-being. A decent house or flat in safe environment is a basic need and everyone in our world should be provided by this. However, for many households their largest cost in each month is the **housing cost**: pay for mortgage or renting fee. Eurostat defines the so called '**housing cost overburden rate**' which refers to those households which allocate at least 40% of their income to housing cost (Eurostat, 2007). In 2016, this rate was 11.1 % of the population of the European Union (and was much higher

among tenants than owners). There is large difference among member countries: this rate was 3.1% in Cyprus and 1.4% in Malta, however this is at least 15% in Denmark, Germany and 40.5% in Greece (Eurostat, 2018.) Most of European citizens aim is to **have private home**, because it gives increased security feeling and 69.3% of the population in the European Union own their private home (Fig 13). This share is the biggest in Romania (96%), Croatia (90.3%) and in Lithuania (90.1%), however, the lowest in Germany (51.7%) and in Austria (55%) (Eurostat, 2016).

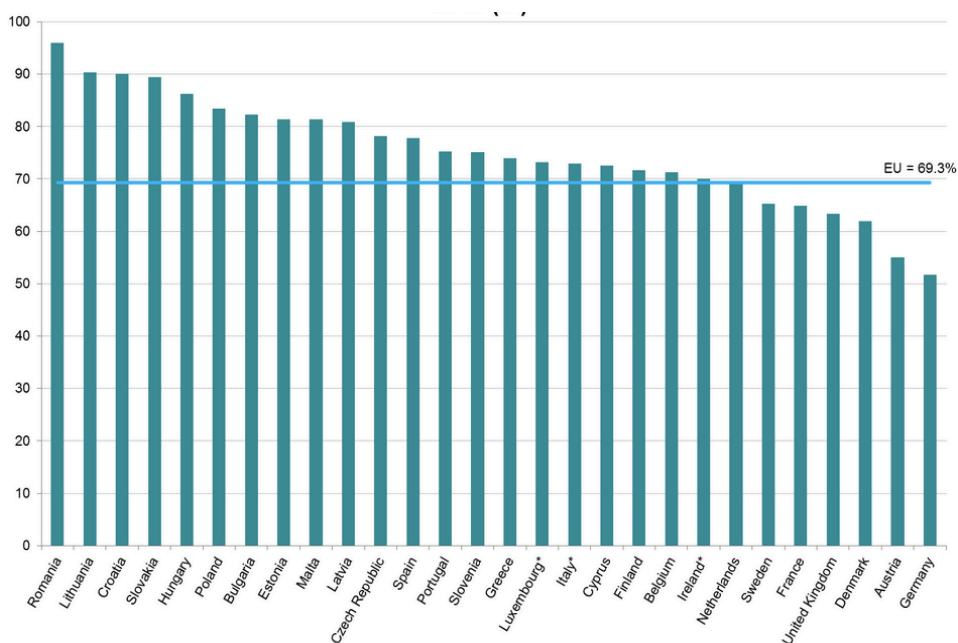


Figure 13 Share of population living in owner-occupied dwellings in the EU member states, 2016 (%) (Source: EUROSTAT)

According to Eurostat, 86% of the population live in their own dwellings in Hungary. The housing rental market is under restructuration here: 15 years ago, people with lower-middle and upper-middle income lived in rented flats, this trend has changed and nowadays low-income class, and high-income class live in rented dwellings (KSH, 2016). The long-term

rental fee and house price is growing and growing and less people can afford to buy their first home and enter to the market (Fig 14)

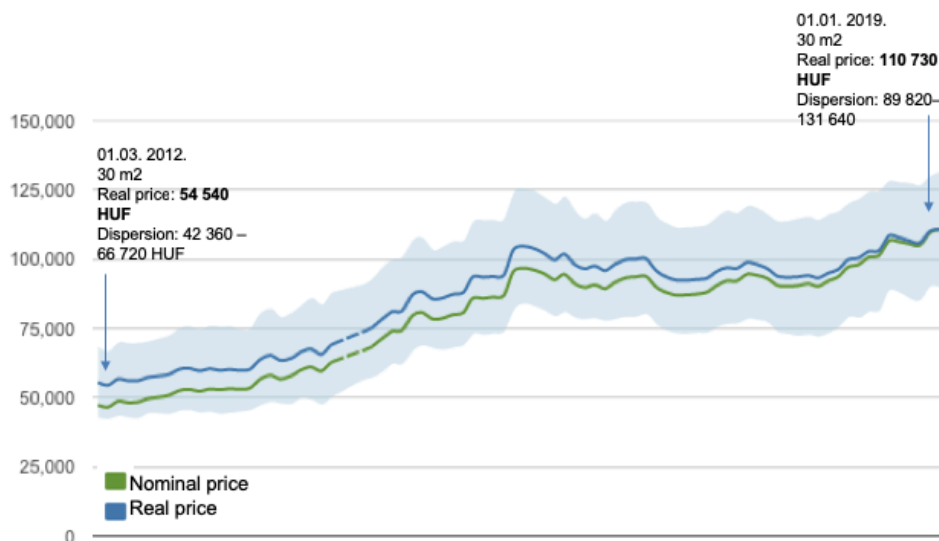


Figure 14 Average monthly rental cost development in case of an average 30 m² apartment in Budapest (in HUF) (Source: ingatlannet.hu)

According to Vértessy (2018) the higher renting and selling prices have various reasons. First, he mentions the phenomenon that the **economic activity** is increasingly **centralizing in big cities** which means more job opportunities and higher salary. Therefore, it is more attractive to young professionals. Other consequence of the economic activity is that many **apartments** are used as **offices**, which also limits the supply on the market. Thirdly, this trend is further enhanced by the **increasing number of foreign students and tourists**, especially in Budapest, who are able to pay higher rents. Furthermore, there are **demographic reasons** for the increase in the number of tenants: the number of single, childless and single-parent families is growing (Vértessy, 2018). Additional factor is that the government is going to be broaden the field of **family housing allowances** in Hungary which also have effect on prices (Licskay, 2018).

Airbnb also must have impact on prices in Budapest: Boros et al. (2018), cited that the number of listed properties has grown 70% in 2015 in Budapest: there were nearly 3800 listed properties and this number has been growing since then: according to the latest available data on AIRDNA, there were 12 606 short-term rents at the end of 2018 (AIRDNA, 2019).

Fig 15 shows that in Budapest the Airbnb accommodations are concentrated in the city centre.

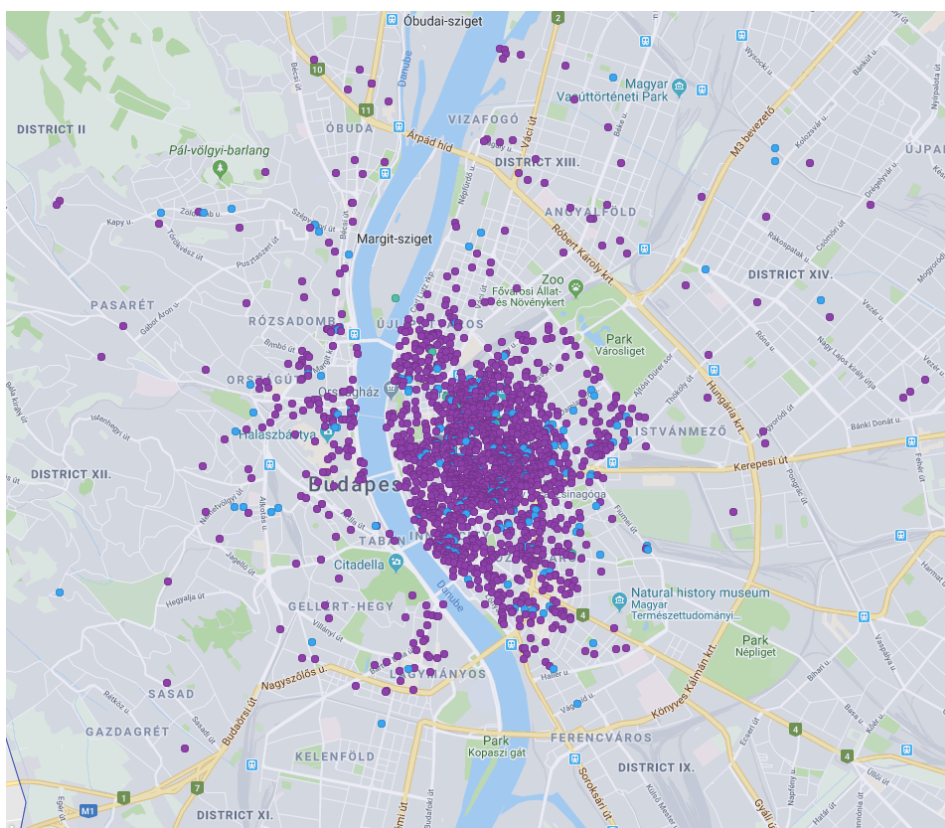


Figure 15 The distribution of Airbnb accommodations in Budapest (purple dots shows the entire homes and blue dots indicates the private rooms) (Source: AirDNA)



3.3. Previous studies about short-term accommodation sharing, its consequences and city-level regulations

Short-term accommodation sharing has impact on property market and hotel industry as well. Hotels consider Airbnb as an unfair competitor, local communities think that it disturbs their everyday life and caused increased rent prices in their neighbourhoods (Segú, 2018).

Silver (2018) in his article states that according to the Residential Landlords Association in the UK, Airbnb listings raised by almost 200% between 2015 and 2017 to more than 210,000 in ten UK cities - which is more than 10 times the number of traditional bed and breakfasts. He adds that this phenomenon causes problems not only in the big cities such as London, Berlin or Barcelona, but also in smaller cities: higher renting prices, issues in local communities, increased housing price.

Segú (2018) examined the impact of Airbnb on housing rents in Barcelona. She found that **1% increase in Airbnb density causes higher renting prices by 4%** compared to renting prices in other neighbourhoods without Airbnb. In the period 2013-2016 the renting prices increased by 28% on average in Barcelona; however, she adds that **not only Airbnb has caused higher renting prices**; liberalisation of the rental market, start of the reconstruction period and the growing trend of housing investment also contributed to the higher prices.

Zervas et al. (2017) analysed **Airbnb** and examines its **impact on the hotel industry** in Texas. They estimated that in Austin (where Airbnb has the highest penetration) Airbnb has impact on the hotel revenue in the range of 8-10%. They assumed that low-priced hotels and hotels without offering services to business travellers are more affected. They result show that additional 10% increase of the size of the Airbnb causes 0.39% decrease in



the hotel revenue. Furthermore, they result shows that **growing Airbnb supply is a sign for increasing accommodation demand**. However, they found that 10% growth in the supply of hotel rooms results in 1.6% decrease in hotel room revenue in Texas. Consequently, **Airbnb has less significant effect on prices than additional hotel rooms**.

Strommen-Bakhtiar and Vinogradov (2019) analyse the effect of Airbnb on the Norwegian hotel industry. They found that hotels where Airbnb has more accommodations have more guests than in other regions where Airbnb is less popular. Their findings did not show correlation between positive Airbnb activity and negative hotel prices. Furthermore, they have a remarkable result, namely Airbnb has “an independent positive effect on the number of rooms and room nights sold” (Strommen-Bakhtiar and Vinogradov, 2019:101)

The extensive growth of Airbnb has its drawbacks and benefits as well. To protect the local residents and enhance the white market, several cities developed tax system to regulate the short- term accommodation rentals. In chapter 2.1. I deal with the sharing economy from legal perspective in general and Table 3 shows a couple examples how cities regulate Airbnb. We can find different solutions in this table. From innovation perspective; however, it is difficult to find the good balance between the regulation and the innovation, because if we over-regulate Airbnb, it can cause *stifling innovation* (Shabrina et al. 2017.)

Cities	Regulations	Details
San Francisco	Residential Unit Conversion Ordinance (Chapter 41.A) regulating the short-term rental of residential units.	Buildings should be owned or rented by permanent residents of San Francisco who reside in the units at least 275 days/year. 90 days rule (not applied for hosted rentals). Register and obtain permit to the Office of Short-Term Rental and pay \$50 fee for two years.
London	Deregulation Act 2015	Act amending the outdated 1973 Greater London Council laws 'requiring Londoners to get planning permission for rentals of fewer than 90 nights, or face a fine of up to £20,000 for each unlawful rental' making it legal to list and rent short term rental properties.
Amsterdam	Amsterdam Short Stay Policy	Rental of non-subsidised housing for periods from seven nights to six months. Owner of property must secure a permit for short stay rentals and pay a fee. Local city districts put a cap of 10% of total private housing on who can be granted a permit to ensure sufficient housing supply for residences.
Berlin	<i>Zweckentfremdungsverbot</i>	New regulation passed in 2014 with a two-year transition period (began on 30 April) banning short-term rentals without explicit permission from the Berlin Senate.
Seoul	Banned	Existing regulation ruled against unregistered home sharing due to tax and health concerns.
New York	Senate Bill S6340A prohibiting advertising the use of dwelling units in a class A multiple dwelling	Rentals that last fewer than 30 days are prohibited if residents are not present.

Table 3 Regulatory responses to Airbnb in various cities (Source: Shabrina et al. 2017: 7-8)



Overall, the assessment of the short-term accommodation sharing is controversial: it has effect on the housing market and hotel industry too. This trend has positive and negative consequences; however, this is not the only factor which causes higher prices on the property market. The size and extend is different and various; but it has an undoubtable impact on our everyday life.



4. EMPIRICAL RESEARCH: THE EXAMINATION OF THE ACCOMMODATION SHARING

The aim of the empirical examination is to investigate the hypotheses underlying the Airbnb's role as a sharing economy platform in contributing to the fulfilment of the relevant Sustainable Development Goals in the selected European cities.

In my dissertation, the empirically and statistically tested hypothesis are in Table 4.

H(1)	We can identify regional differences on Airbnb market in Europe.
<i>Sub-hyp</i>	<p><i>Sub-hypothesis 1a:</i> GDP is negatively associated with Airbnb supply.</p> <p><i>Sub-hypothesis 1b:</i> GDP and income are negatively correlated with the share of multi-listing hosts.</p> <p><i>Sub-hypothesis 1c:</i> Belonging to Eurozone affects significantly the number of booked Airbnb accommodation, the number of multi-listing hosts and the Airbnb supply.</p>
H (2)	Changes in economic and market conditions have a strong impact on Airbnb penetration.
<i>Sub-hyp</i>	<p><i>Sub-hypothesis 2a:</i> There is a strong correlation between income and Airbnb supply. Income is negatively associated with Airbnb supply.</p> <p><i>Sub-hypothesis 2b:</i> There is a significant association between unemployment and Airbnb supply. Unemployment is positively associated with the number of available accommodations on Airbnb.</p> <p><i>Sub-hypothesis 2c:</i> Short-term accommodation market regulation strongly affects the Airbnb supply.</p>
H (3)	The effect of increasing tourism is more significant in case of the available entire home supply than private room supply
<i>Sub-hyp</i>	<p><i>Sub-hypothesis 3a:</i> All accommodation types (entire home, private room, shared room) correlate with the number of hotel rooms and the strongest correlation is between entire homes and the number of hotel rooms.</p> <p><i>Sub-hypothesis 3b:</i> There is a correlation between hotel accommodation supply and Airbnb supply and the growth in hotel rooms supply is positively associated with the growth in Airbnb supply.</p>
H (4)	The housing situation (such as tenure status: owning or renting a property and average size of dwelling) significantly affects the Airbnb market.
<i>Sub-hyp</i>	<p><i>Sub-hypothesis 4a:</i> There is a correlation between the average dwelling size and the Airbnb supply. The higher the dwelling size is the stronger correlation with Airbnb supply. If the host has a bigger house or apartment there is a higher chance it is rented out via Airbnb.</p> <p><i>Sub-hypothesis 4b:</i> The ownership structure correlates the Airbnb supply: changes in the ownership structure cause change in the Airbnb supply.</p>



Table 4 Hypotheses of the dissertation (own elaboration)

After the financial crisis in 2008 people who lost their jobs looked for alternative ways to earn and save money and sharing their idle assets provided a good opportunity for users, service providers and companies for this (Carlton, 2017; The Economist, 2013a). For instance, accommodation sharing via Airbnb was a favourable option because hosts can get extra income with zero or pretty low investment (Airbnb, 2019). Bergh and Funcke (2016) published an empirical analysis which suggests that the sharing economy services via Airbnb and Flipkey are more common in countries that have lower GDP per capita, are economically more open and have many travellers.

My first **hypothesis is that we can identify regional differences in case of the selected European cities on the Airbnb market.** I assume that participation in Airbnb influences richer cities and municipalities with less GDP differently because their motivation is also different.

I find important to examine the impact of belonging to Eurozone to Airbnb market. If hosts and guests are from Eurozone country, meaning that they do not have to exchange money, we can assume they prefer similar cities where the currency is Euro (why it is convenient). My following expectation is that **changes in economic and market conditions strongly influence the Airbnb market:** we can assume that if unemployment rate increase (Choi et al., 2015) or income decrease, the Airbnb supply increase because it can serve as an income supplement. Given that it is still in the grey zone, I also find interesting to study how the regulatory changes influence the Airbnb market.

However, not only economic factors can influence the short-term accommodation sharing: Airbnb can influence the hotel and the real estate



markets and vice-versa (Segú, 2018). There is large number of publications which deal with these areas mainly from the price perspective.

From the beginning of Airbnb's popularity, it is stated and widely examined whether it is a threat for the hotel industry. In my research, I acknowledge that **there is a strong correlation between Airbnb and the hotel market** but I assume that an increase in the number of hotel rooms cause rise in the available entire Airbnb homes. I think that the number of private rooms also grow but if demand for short-term accommodation increase, hosts invest and rent out entire homes rather than private rooms. Consequently, my assumption is that **the effect of increasing tourism** (I measure this by the number of tourists, air transport of passengers and number of hotel rooms) **is more significant in case of available Airbnb entire home supply than private room supply.**

In case of the real estate market, I expect to find **correlation between the average dwelling size and the Airbnb supply** and I assume that the higher the dwelling size is the stronger correlation with Airbnb supply: if host has bigger house or apartment there is a higher chance it is rented out via Airbnb. Likewise, if we take into consideration that Airbnb can help to earn extra money, we can assume that the ownership structure can influence the Airbnb supply. Namely, if the number of long-term home renters is rising, the number of Airbnb supply also increasing. Therefore, my fourth hypothesis is that **the housing situation (such as tenure status: owning or renting a property and average size of dwelling) significantly affects the Airbnb market.**

4.1. Dataset and methodology

To examine the hypotheses and answer my research questions, I gathered data for 45 European cities. First, the European capitals have been selected then I completed the study by adding other well-known tourism destinations (Table 5). These cities are popular “city-sightseeing“ places, namely the primary motivation of tourists and visitors is to spend a couple of days in the city, so generally, these are not traditional coastal or hiking areas.

Amsterdam	Dublin	London	Oslo	Stockholm
Athens	Edinburgh	Luxembourg	Paris	Sofia
Berlin	Florence	Madrid	Porto	Tallinn
Barcelona	Geneva	Malaga	Prague	Vienna
Bratislava	Helsinki	Manchester	Reykjavik	Valletta
Brussels	Istanbul	Milan	Riga	Venice
Bucharest	Kraków	Munich	Rome	Vilnius
Budapest	Lisbon	Nice	Rotterdam	Warsaw
Copenhagen	Ljubljana	Nicosia	Seville	Zagreb

Table 5 List of the examined cities (own elaboration)

In my dissertation, I use publicly and freely available dataset with mainly web-scraped information on Airbnb listings. Furthermore, the selected variables can be found on EUROSTAT, World Bank, AirDna and InsideAirbnb.

Characteristics of the short-term accommodation sharing

As a first step, I collected data regarding Airbnb performance in the selected European cities. I chose Airbnb because it has the biggest market share in case of short-term accommodation sharing. AIRDNA was the data



source I used: this is a data company and it is the world's leading provider of short-term vacation rental analytics and data. They track statistics on daily basis on Airbnb, HomeAway and more other home-sharing platforms. They offer various services such as Market Minder, Investment explorer and Trend reports which are possible to get for one-off and monthly fee and limited number of data is available for free of charge (AIRDNA, 2019). Their data collection method is so called web-scraping. At the beginning of my research I collected all freely available data on AirDNA, that means 15 different attributes (market grade rental demand; average daily rate; occupancy rate; revenue; number of active rentals; rental type; rental size; rental activity: length of booking; supply growth; active hosts; number and % of superhosts; number and % of multi-listing hosts; number and % of single-listing hosts; number and % of accommodation with multi-listings host) for the examined cities. The first stage of data collection was during the period of September- November 2018. Since then AirDNA has changed the city level available data and unfortunately, some of them are not accessible for free of charge.

After the selection process and fine-tuning, I choose the most relevant Airbnb variables which help answer my research questions and reduced the number of factors that I apply in my research⁷.

Table 6 shows the selected Airbnb variables that I use during my analysis.

⁷ For instance, there are several excellent research papers (eg. Gibbs et al. 2017; Lorde et al. 2019; Teubner et al. 2017; Wang and Nicolau, 2017) which analyse the price attributes of the shared accommodations but in this research, I do not deal with this aspect.

Variable	Description	Year	Data source
Nr of Active Rentals/ Rental Growth (number and %)	This number shows the development of the available rentals	2015-2019	AirDNA
Rental Type: Entire Home (number and %) Private Room (number and %) Shared Room (number and %)	Type of accommodation: Entire Home Private room Shared room	2018	AirDNA
Multi-listing Hosts (number and %)	Number and % of multi-listing hosts (hosts who has more than one property)	2018	AirDNA
Actual booked accommodations (number)	Number of actual booked accommodation in 2018	2018	AirDNA

Table 6 Characteristics of the short-term accommodation sharing - list of employed variables (own collection)

I would like to examine the Airbnb market from the supply side and I identified four main variables that I test in this study: **Airbnb supply data, the share of multi-listing hosts, number of booked accommodations and rental type (entire home, private room, shared room).**

In the case of **Airbnb supply data, I have data for 4 consecutive years (2015-2018); however, in case of the other three variables, I found available data for one year only (2018).** I asked AIRDNA to send me data for a couple years but unfortunately, I did not get a reply. Thus, I use the database for 2018 which does not give us as meaningful results as time data series but it provides us valuable input and support for my research.



Factors That Influence the Airbnb supply market

In order to identify the factors that affect the number of Airbnb listings, the number of multi-listing hosts, the number of booked accommodations and the number of rental types (entire home, private room, shared room) I selected various variables. Part of the variables is from the previous literature: for instance, *economic variables* (GDP, income, unemployment), *tourism-related* (Air transport of passengers, Nights spent at tourist accommodation establishments), *hotel industry related* (Number of hotel rooms) *social variables and Population*. Part of them is based on my assumptions: social variables (share of single-person household, youth-dependency ratio, old-age-dependency ratio). Furthermore, I tested my research questions with nominal variables as well. I assume that belonging to Eurozone has an effect on Airbnb market, therefore I added Eurozone as a dummy variable to the list (Choi et. al. 2015). Also, I think that Airbnb regulation influences the Airbnb supply, therefore I added it as Yes or No nominal variable (the Airbnb market is regulated or not in the selected city). Table 7 shows the full list of selected variables.

Variable	Years	Data source
GDP (million EUR)	2015-2018	Eurostat
Unemployment rate (%)	2015-2018	Eurostat
Income of households (million EUR)	2015-2018	Eurostat
Air transport of passengers (Foreign travellers) (Thousand passengers)	2015-2018	Eurostat
Population (number)	2015-2018	Eurostat
Average dwelling size	2011	Eurostat, Census
Nights spent at tourist accommodation establishments (number) reference as number of tourists	2015-2018	Eurostat
Number of hotel rooms	2015-2018	Eurostat, Collins International
Housing type: Owner, with and without mortgage or loan (%)	2015-2018	Eurostat
Housing type: tenant (%)	2015-2018	Eurostat
Share of single person household (%)	2018	Eurostat
Youth-dependency Ratio (%)	2018	Eurostat
Old-age-dependency Ratio (%)	2018	Eurostat

Euro zona	Yes/No
Airbnb regulation	Yes/No

Table 7 Selected variables in my research models (own collection)

Methodology

I test the hypotheses with the help of statistical and econometric methods. I apply quantitative methodology which is categorized into two main approaches: experimental and non-experimental (Gall et al., 2007). My research is based on experimental design which has three subcategories: descriptive/observational, causal-comparative/ex post facto and correlational design (Strommen-Bakhtiar and Vinogradov, 2019). In this



research secondary data is being used to examine the Airbnb market in the selected European cities.

At the beginning of the research, I developed different models and tested them: I conducted the examination in two main steps: in the first step I used **correlation analysis** one by one because my aim was to investigate possible relationships among various variables then I used **regression analysis**.

Due to the nature of data, I used correlation tests in case of all main variables and I ran regression analysis in case of selected main variables.

Correlation is a bivariate analysis that examines the existence, directions and strength of a relationship between variables and the possible connections between two or more existing, non-manipulated variables (Rovai et al., 2013: 81). The strength of the relationship is measured by the value of the correlation coefficient (r) which varies between +1 and -1. A value of ± 1 indicates a perfect degree of association between the two variables. As the correlation coefficient value goes towards 0, the relationship between the two variables will be weaker. The direction of the relationship is indicated by the sign of the coefficient; a + sign indicates a positive relationship and a – sign indicates a negative relationship (Rovai et al., 2013). If the coefficient is

0: very weak (0-0,1) 1: weak (0,2-0,3) 2: moderate (0,4-0,6)
3: strong (0,7-0,85) 4: very strong (0,85-1)

After correlation analysis, I applied **multiple regression analysis**. The multiple regression analysis is an extended form of the simple linear regression analysis by describing the relationship between a dependent variable and several independent variables. The regression analysis examines the effect that some independent variables have over one dependent variable and it can be used for predicting and forecasting (Turóczy-Liviu, 2012). I selected **stepwise regression** which is a method of



regressing multiple variables while simultaneously adding or removing those that are not statistically significant. Stepwise regression essentially does multiple regression a number of times, each time removing the most statistically insignificant variable. At the end, we have only those variables that explain the dependent variable the best. It has three main methods: forward (step-up) selection, backward (step-down) selection and stepwise selection (Pasha, 2002). In my research, I chose the ***backward selection method***. In this method we begin with a full model and then, the variables that do not (significantly) predict anything on the dependent measure are removed from the model one by one.

In the second stage of my examination, I estimated and analysed the relationship between the Airbnb supply and selected variables by ***regression analysis on my panel dataset*** (Bakucs -Fertő – Benedek, 2019). Panel data allows the researcher to control variables it cannot be observed or measured like cultural factors or variables that change over time (Torres-Reyna, 2017) and it helps us to get a relatively unbiased estimation. The fundamental advantage of a panel analysis is that it provides the researcher with great flexibility in modelling differences in behaviour across individual observations. “Panel data give more informative data, more variability, less collinearity among the variables, more degree of freedom and more efficiency”. It is also a better estimation method to study the duration of economic status and the “dynamics of change” over time (Baltagi 2001:23). With panel data we can include variables at different levels of analysis, therefore, it is suitable for multilevel or hierarchical modelling (Torres-Reyna, 2017). I am interested in time-related changes in Airbnb penetration, panel data analysis is an excellent tool for this examination.



When we deal with the panel data analysis *fixed-effects* and *random effects* models are the two most commonly used models. Fixed-effects model controls for entity-specific characteristics, thereby allowing it to be correlated with the explanatory variables. Random effects model; however, assumes that the above-mentioned characteristics are random and completely uncorrelated with the independent variables. According to Schurer and Yong (2012), the fixed-effects model is much more frequently used in economics for analysis. Fixed-effects model estimates the effects within the entity and therefore does not suffer from the heterogeneity bias; however, it can only measure the impact of variables which vary over time. Random effects, on the other hand, can include the constant variables, therefore the random effects model without the heterogeneity bias is usually preferable (Bell and Jones, 2015).

The common panel data regression model is

$$Y_{i,t} = \beta_0 + \beta x_{it} + \epsilon_{i,t}$$

For n observations and t time periods: $i = 1, 2, \dots, n$ and $t = 1, 2, \dots, n$.

$Y_{i,t}$ is the dependent variable

β_0 is the intercept

β is the matrix of parameters based on the number of independent variables

x_{it} represents an independent variable

$\epsilon_{i,t}$ is the error term.

The general fixed and random effects models are:

Fixed-effect model: $Y_{i,t} = \beta_{0i} + \beta_i x_{it} + \epsilon_{i,t}$

Where β_{0i} is an unknown intercept for each entity which absorbs time invariant variables and β_i represents coefficients for each of the independent variable.

Random effect model: $Y_{i,t} = \beta_0 + \beta_i x_{it} + U_i + \epsilon_{i,t}$

U_i is very important in the i panel analysis. In fixed-effect model U_i is unobserved but correlated with x_{it} . This fixed-effect model takes U_i to be a group-specific constant term in the regression model. Unlike the random effects model, the U_i is unobserved and can be assumed to be independent of x_{it} . This random effect model specifies that U_i is a group-specific random variable (Choi et al. 2015:5).

To determine the preferable model (fixed-effects or random effects) a Hausman test is often used. In the Hausman test the null hypothesis is that the random effects model is preferred and as a consequence, if we reject the H_0 , the fixed-effect model will be the appropriate model (Table 8). It tests if error term $\epsilon_{i,t}$ is correlated with the independent variables or not (the null hypothesis is they are not) (Torres-Reyna, 2017).

	H0 is true	H1 is true
RE estimator	Consistent Efficient	Inconsistent
FE estimator	Consistent Inefficient	Consistent

Table 8 Hypothesis of the Hausman test (Source: Tarnóczy et al. 2015)

The significance of nominal variables (belonging to Eurozone, Airbnb regulation) is examined by ***nominal by interval relationship***. During this



test one variable is categorical and the other is quantitative. In this case, we measure the association with Eta coefficient. The range of Eta is from 0 to 1, with 0 indicating no association between the row and column variables and values close to 1 indicating a high degree of association. Two eta values are computed: one treats the row variable as the interval variable, and the other treats the column variable as the interval variable. (IBM SPSS Statistics)

All data were analysed using Statistical Package for the Social Sciences 22.0 (SPSS 22.0) and STATA version 15.

4.2. Results (1): Correlation Analysis in case of Airbnb market

At the beginning of my research, I identified four main Airbnb related factors (dependent variables) and I tested them with the help of selected independent variables. With the help of these factors, I would like to examine the Airbnb market and test our hypothesis. The four main variables are

- Number of rental type (entire home, private room, shared room) for 2018
- Number of multi-listing hosts for 2018
- Number of booked accommodations for 2018
- Airbnb supply growth for 4 years (2015-2018)

As it was mentioned earlier, I have data for four years in case of Airbnb supply but I have data only one year in case of the other selected main variables. In the first step, I conducted a correlation analysis with all selected factors.

Correlation examination of the rental type category (entire home, private room, shared room)

In Appendix the figure name of ‘*Share of Airbnb accommodation types*’ shows the share of the entire home/private room and shared rooms. Based on this figure I can state that entire homes represent the biggest share among available accommodation types. It is also confirmed by the descriptive statistics (Table 9). All accommodation type can be managed by non-professional and professional owners as well. For instance, it is really common that hostels and guesthouses rent out their space via Airbnb but several multi-listing hosts advertise their entire homes or separate rooms in their home on this online platform. In his study, Gyódi (2019) examined the Airbnb phenomenon in Paris, Warsaw, Berlin and Barcelona. He found that in cities where more entire homes are advertised on Airbnb, Airbnb has a stronger impact on long-term rental market (Gyódi, 2019) meaning that it can cause apartment shortage and increase the long-term rental fees.

	AVG	SD	MIN	MAX
Rental Type Entire Home (%)	72.86	12.42	45 (Istanbul)	89 (Nice)
Rental Type Private Room (%)	25.77	12.32	10 (Nice)	52 (Istanbul)
Rental Type Shared Room (%)	1.35	0.60	1	3 (Bucharest, Istanbul, Reykjavik)

Table 9 Descriptive statistics of the share of the available accommodation types (data in %) (own collection)

In my sample the biggest share of available entire home is in Nice (89%) and the lowest number is in Istanbul (45%).



I ran the Pearson correlation test for the three different accommodation categories and examined the correlation with the selected variables (Table 10 shows the result of our tests). The tables contain the factors only which correlate with the main variables and exclude the variables which are not correlated. The number of entire homes was strongly positively correlated with income (0.843) and air transport of passengers (0.797), number of tourists (0.798) and the number of hotel rooms (0.846). The number of private rooms was strongly positively correlated with income (0.732), number of hotel rooms (0.799) and it has the strongest correlation with number of tourists (0.853).

Due to the increasing number of tourists and air passengers, I assume that there is a strong correlation between the Airbnb market and hotel market: one of my hypotheses (H3a) is that *all accommodation types (entire home, private room, shared room) correlate with the number of hotel rooms and the strongest correlation is between the entire homes and the number of hotel rooms.*

Based on the results of my correlation analysis, I can conclude that I ***can accept this hypothesis***. The first part is confirmed by data in Table 10: all accommodation types are strongly correlated with the number of hotel rooms. Also, the strongest correlation is observed between the entire homes and number of hotel rooms. If the number of hotel rooms increase, the number of available entire homes also rise and greater extend that the share of private rooms. The difference between entire homes and private rooms are not significant but taking into consideration that the highest share of available accommodations are entire homes and the correlation analysis also confirms the hypothesis it can be concluded that more hotel rooms can cause more available entire apartments (rather that shared or private rooms). To examine this further, regression analysis will be applied.

	Rental Type Entire Home (number) 2018		Rental Type Private Room (number) 2018		Rental Type Shared Room (number) 2018	
	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)
Income of households 2018	0,843	,000	0,732	,000	0,726	,000
Air transport of passengers 2018	0,797	,000	0,646	,000	0,686	,000
Average dwelling size 40 — less than 50 square metres	0,358	,016	0,562	,000	0,652	,000
Average dwelling size 50 — less than 60 square metres	0,422	,004	0,621	,000	0,693	,000
Average dwelling size 60 — less than 80 square metres	0,413	,005	0,628	,000	0,729	,000
Average dwelling size 80 — less than 100 square metres	0,408	,005	0,611	,000	0,704	,000
Average dwelling size 100 — less than 120 square metres	0,435	,003	0,535	,000	0,626	,000
Average dwelling size 120 — less than 150 square metres	0,449	,002	0,437	,003	0,533	,000
Average dwelling size 150 square metres and over	0,39	,008	0,449	,002	0,593	,000
Population 2018	0,445	,002	0,654	,000	0,747	,000
GDP 2018	0,77	,000	0,516	,000	0,622	,000
Nights spent at tourist accommodation establishments 2018	0,798	,000	0,853	,000	0,638	,000
Number of hotel rooms 2018	0,846	,000	0,799	,000	0,703	,000



*Table 10 Pearson correlations - available accommodation types (N=45)
(own elaboration)*

Correlation analysis in case of the share of multi-listing hosts

Other selected research area is the share of multi-listing hosts. Owners with more than one property are more likely commercial hosts than local users (Segú, 2018). In her paper Segú (2018) mentions that in Barcelona 61% of all listings had multi-listings owners, and 38% were owned by single property users in 2015.

Based on my research, I can conclude that this number grew in 2018, because 64% of all available accommodations have multi-listing owners (AirDNA, 2018). Figure 16 shows the share of multi-listing hosts in the examined cities at the end of 2018. It can be seen that in most of the cities are more multi-listing hosts than single owners: this ratio is the biggest in Valletta and Krakow (76%), then Lisbon (72%), Venice (71%), Porto (70%). There are less multi-listing hosts in the Nordic countries: Copenhagen and Stockholm (15%), Oslo (24%).

In case of more than 50% of the examined cities (24 municipality) there are more multi-listing hosts in the accommodation sharing business than single listing hosts. Overall, it is less than 50%; however, if we consider the fact that in most of the cities (17 cities) this ratio is equal or more than 60%, I can conclude that there are more multi-listing hosts than single users and, in several cases, as it was mentioned in the literature review part as well, it is a popular business. Based on this we can say that in several cities the phenomenon of ‘support the locals and rent a flat via Airbnb’ is rather business opportunity: there are more multi-listing hosts in the



accommodation sharing business than single listing hosts, therefore, the advantage of the community building is disappearing.

It would be exciting to examine this phenomenon with the help of chronological data; however, AirDNA does not provide this in its current form for free of charge.

Where the ratio is higher than 60%, we can conclude that there might be monopolisation on the market. Comparing these numbers with the structure of owner-occupied dwellings in Fig 13, there are countries where bigger share of population lives in their own dwellings and higher % of Airbnb accommodations have multi-listing hosts. Good example is Valletta which has lower GDP and 80% of the population (data for Malta) has their own flat or house while 76% of listing properties have multi-listing hosts. Poland is similar: 83.5% of inhabitants have their own dwellings and 76% of Airbnb homes in Kraków have multi-listing owner (Warsaw: 65%). The pattern in Nordic countries is different: almost 70% of people have own houses in Sweden and Denmark (60%) and only 15% of the available listings belong to multi-listing owner. Based on these numbers, we can assume that in countries with higher GDP the accommodation sharing is 'real' so they share their spare rooms and spaces; however, *Airbnb contributes to the opening of the economic scissor in countries with lower GDP, because there is less owner with more properties on the market who can invest in additional properties while others in the bottom of the pyramid cannot enter to the real estate market.*

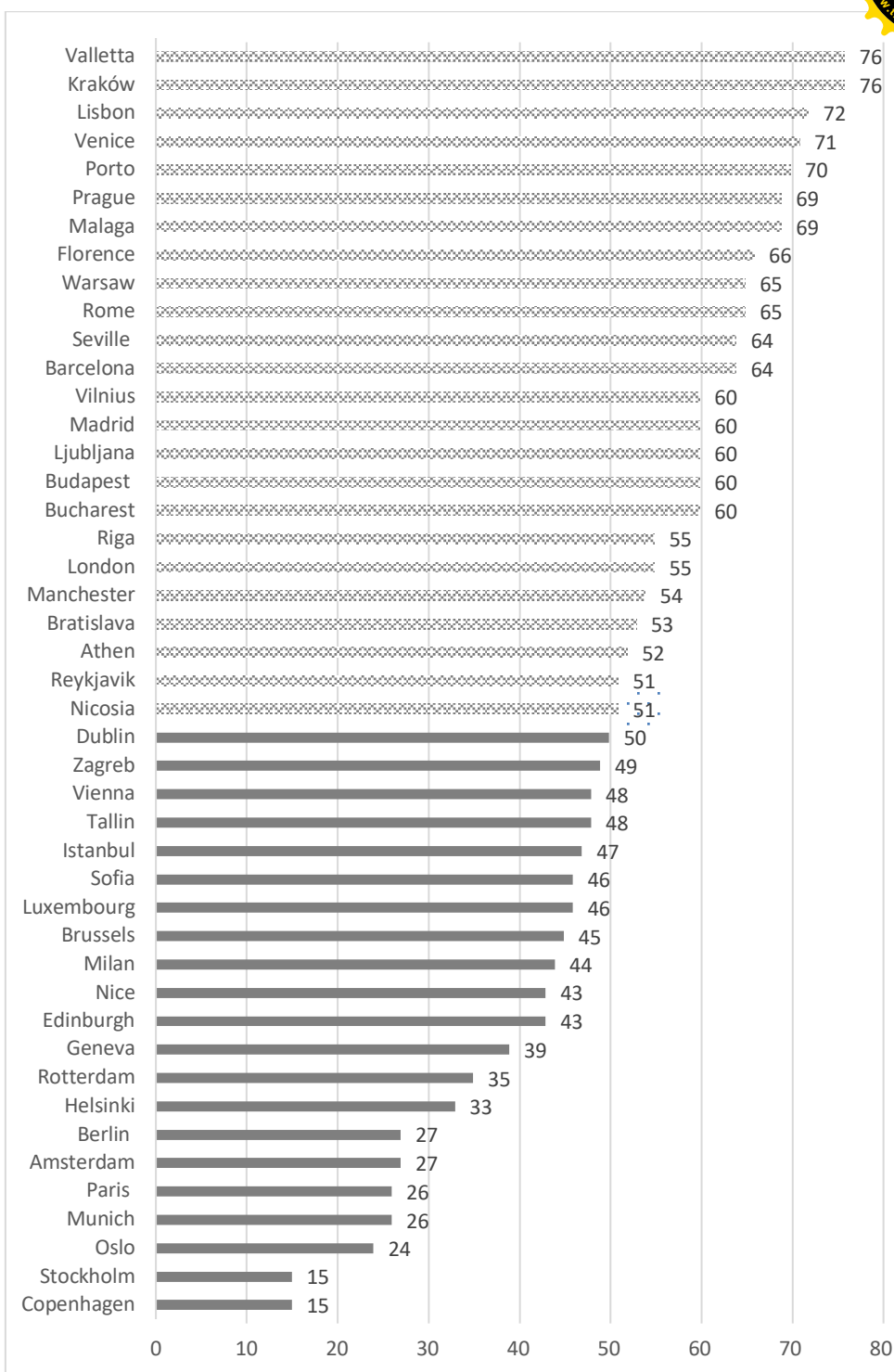


Figure 16 The share of multi-listing hosts (%) (Source: AirDNA, 2018, own elaboration)



I ran the Pearson correlation analysis and test the factors which correlate with the number of multi-listing hosts. (Results can be seen in Table 11) the strongest correlation can be observed in case of the nights spent at tourist accommodation establishments (Pearson coefficient is 0.845) and number of hotel rooms (0.881).

The results are logical and not really surprising: more guests will result more interest from the accommodation sharing' and investors' perspective, given it is a blooming business.

From economic angle, income shows strong positive correlation (0.734) meaning increasing income may result increasing number of multi-listing hosts, however, GDP shows a moderate correlation (0.572). One of my sub-hypotheses is that *GDP is negatively correlated with the number of multi-listing hosts*, meaning increase in GDP causes decrease in the number of multi-listing hosts. In reference to the moderate correlation, we cannot state the strong relationship between these two variables, therefore, this hypothesis is rejected.



	Multi-listing Hosts 2018	
	Pearson Correlation	Sig. (2-tailed)
Income of households 2018	0,734	,000
Air transport of passengers 2018	0,681	,000
Average dwelling size 40 — less than 50 square metres	0,468	,001
Average dwelling size 50 — less than 60 square metres	0,538	,000
Average dwelling size 60 — less than 80 square metres	0,554	,000
Average dwelling size 80 — less than 100 square metres	0,54	,000
Average dwelling size 100 — less than 120 square metres	0,55	,000
Average dwelling size 120 — less than 150 square metres	0,499	,000
Average dwelling size 150 square metres and over	0,494	,001
Population 2018	0,574	,000
GDP 2018	0,572	,000
Nights spent at tourist accommodation establishments 2018	0,845	,000
Number of hotel rooms 2018	0,881	,000

Table 11 Pearson correlations - share of multi-listing hosts (N=45) (own elaboration)



Correlation analysis in case of the number of booked accommodations

Although, I do not have hypothesis regarding the number of actual booked accommodations, I ran a test and examined the factors that have effect on this main variable. The results are similar to the previous examinations, namely there is a strong correlation between the income of households and the number of booked accommodations and GDP, night spend at tourist accommodation establishments and the number of hotel rooms strongly positively correlated with the number of actual booked accommodations.

We can observe that the demand related factors (eg. increasing number of air passengers and tourist) have the most significant effect on the actual bookings and other factors for instance the share of single households does not correlate with the actual bookings.

	Number of booked accommodations in 2018	
	Pearson Correlation	Sig. (2-tailed)
Income of households 2018	0,856	,000
Air transport of passengers 2018	0,796	,000
Average dwelling size 40 — less than 50 square metres	0,419	,004
Average dwelling size 50 — less than 60 square metres	0,479	,001
Average dwelling size 60 — less than 80 square metres	0,465	,001
Average dwelling size 80 — less than 100 square metres	0,452	,002
Average dwelling size 100 — less than 120 square metres	0,45	,002
Average dwelling size 120 — less than 150 square metres	0,447	,002
Average dwelling size 150 square metres and over	0,393	,008
Population 2018	0,497	,001
GDP 2018	0,761	,000
Nights spent at tourist accommodation establishments 2018	0,812	,000
Number of hotel rooms 2018	0,837	,000

Table 12 Pearson correlations - number of booked accommodations (N=45) (own elaboration)

I created an informative graph about the results of the correlation analysis of the factors above (this graph can be found in Appendix under the name of *Results of correlation analysis in case of Airbnb dependent variables*).



Variables such as GDP, income of households, air transport of passengers, number of hotel rooms, population, number of tourists and dwelling size all correlate weaker and stronger level with the selected main variables.

Unemployment rate and social variables such as share of single person households, Youth and Old dependency ratio in the population along with housing ownership (owner or tenant) do not correlate with our main variables, thus, those are not in the graph.

Correlation analysis in case of the Airbnb supply growth

One of my main research questions is which factors influence the number of listings on Airbnb. I collected data for the actual Airbnb supply for four consecutive years: 2015- 2018 and first I ran the correlation test for all years. The results can be found in Appendix.

The factors which correlate with the Airbnb supply are the same as in case of the number of multi-listing host, rental type and actual booked accommodations; however, the housing ownership (owner or tenant) variable also shows correlation with the number of available Airbnb accommodations.

I created a graph about the results of this analysis (this figure can be found in Appendix under the name of *Time series correlations of Airbnb supply*) which presents that the strongest correlation can be observed in case of the income (the coefficient is above 0.8 in case all years), air transport (passengers) (the coefficient is above 0.77 in case all years), number of hotel rooms (above 0.8) and GDP (above 0.7). This ***correlation analysis supports my hypothesis about the existence of the association between Airbnb supply and hotel accommodation supply.***

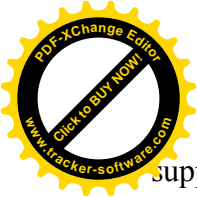


Similarly to my results earlier, higher demand (measured by passengers travel by airplane, number of tourists) results higher Airbnb supply.

Income and GDP both highly and positively correlated with Airbnb supply in case of all selected years. Based on this result ***we cannot accept our hypotheses*** (that *GDP is negatively associated with Airbnb supply* and that *there is strong correlation between income and Airbnb supply. Income is negatively associated with Airbnb supply*) and this result is surprising. Airbnb started to become popular after the financial crisis and mainly in the US people who lost their jobs used UBER and Airbnb to earn extra money. Therefore, I assumed that people who have less money use Airbnb as an income supplement. My expectation was strong but negative correlation, namely if GDP or income decrease, Airbnb supply increase. However, the correlation analysis gives us different outcome. I created a figure which shows the relationship between Airbnb supply and population (it can be found in Appendix). We can see there that rich cities (eg. London, Paris and Rome) have the biggest Airbnb market but there are several municipalities (eg. Lisbon, Venice, Porto, Valetta) which are not “rich” cities traditionally but they have big Airbnb market comparing to the population. With panel data regression ***I examine this further.***

In my analysis no significant correlation was observed between the unemployment rate and the Airbnb supply. Therefore, based on this result, we cannot accept this hypothesis. (***There is a significant association between unemployment and Airbnb supply.***) I investigate this further.

Weak and negative but not negligible correlation can be discovered in case of the dwelling owners which means if the share of dwelling owners (with and without mortgage) decrease (more people become tenant) the Airbnb



supply increase. Its pair variable is the share of tenants where the correlation factors is 0.235- 0.336 which indicates a weak positive correlation with Airbnb supply. My sub-hypothesis is that *the ownership structure correlates the Airbnb supply: changes in the ownership structure cause change in the Airbnb supply. Based on the correlation analysis, I cannot accept* this assumption.

I expected to find *correlation between the average dwelling size and the Airbnb supply* and I assumed that the higher the dwelling size is the stronger correlation with Airbnb supply. If host has bigger house or apartment there is a higher chance it is rented out via Airbnb. The table name of *time series correlations of Airbnb supply* in Appendix shows that the correlation coefficient is between 0.4- 0.5 regardless of the dwelling size meaning that the *dwelling size is not significant factor in case of Airbnb supply*.

In case of this variable I have data for different years, therefore I applied panel data regression analysis.

4.3. Results (2): Examination of Airbnb supply with panel data regression

In order to investigate the impact of the selected variables on the Airbnb supply growth, I estimate the following general panel model:

$$Y_{i,t} = \beta_0 + \beta(Econ_{i,t} + Controls_{i,t} + Tourism_{i,t} + Hotel_{i,t} + Owner_{i,t} + Dwell_{i,t} + Dum_{i,t}) + \epsilon_{i,t}$$



where $Y_{i,t}$ is the Airbnb supply growth, β_{0i} is an unobserved individual fixed-effect, β is the matrix of coefficients, i refers to the individual, and t denotes a time period ranging from 2015 to 2018.

Econ contains GDP and Income at any given year at each region.

Controls are control variables (population, the unemployment rate in each area for each year). The population is used as a proxy for demographic change and unemployment is used as a proxy for economic activity in a region. These two variables are applied separately in the model.

Tourism refers to the variables of air transport of passengers and nights spent at tourist accommodation establishments at any given year at each region. I applied these two variables in the model separately.

Hotel is a number of hotel rooms at any given year in each region.

Owner category represents the dwelling ownership at any given year at each region. In this category one independent variable is the housing type: owner, with mortgage or loan, also we have a variable about the share of tenants (these are used separately).

Dwell meaning the average dwelling size. This is a time fixed variable.

Dum category refers to the dummy variables, namely, belonging to eurozone = 1, and 0 if not. “Rich” and “poor” categories are also tested within this category, rich =1, 0 if not; poor=1, 0 if not.

First, I tested the **multicollinearity** of the chosen variables with a VIF test (variance inflation factor). Table 13 shows the results where we can see that income and GDP are not totally independent, which makes sense interpretation wise, therefore I chose to remove income (it has the highest VIF score) from the model.



. vif

Variable	VIF	1/VIF
Income	29.88	0.033464
GDP	23.29	0.042931
Airtransport	5.78	0.172894
HDI	5.78	0.173046
nightspent~n	4.74	0.211124
Hotelrooms	3.92	0.255317
ownerwi~2015	3.23	0.309253
Population	2.77	0.361331
tenant2015	2.46	0.405922
richarea	2.42	0.412964
Unemployment	1.83	0.545418
Y2015	1.68	0.596394
Y2016	1.58	0.632023
Y2017	1.52	0.659884
eurozone	1.46	0.685512
regulated	1.39	0.720853
Mean VIF	5.86	

Table 13 Testing for Multicollinearity with Variance Inflation Factors (VIF) 1 (own elaboration)

After removing income, I tested it again (Table 14) and we can see that there is no significant multicollinearity among the variables. According to Hair et al. (2015) if VIF values are <10 , there is no multicollinearity and we can use the variables as independent ones.

. vif

Variable	VIF	1/VIF
Airtransport	5.74	0.174276
HDI	5.69	0.175631
GDP	4.86	0.205891
Hotelrooms	3.87	0.258613
ownerwi~2015	3.23	0.309425
Population	2.64	0.378557
nightspent~n	2.54	0.393353
tenant2015	2.45	0.407654
richarea	2.37	0.421152
Unemployment	1.68	0.593662
Y2015	1.66	0.603623
Y2016	1.57	0.637305
Y2017	1.51	0.660294
eurozone	1.46	0.686012
regulated	1.39	0.721585
Mean VIF	2.84	

Table 14 Testing for Multicollinearity with Variance Inflation Factors (VIF) 2 (own elaboration)

I would like to test the following hypotheses with panel data regression:

- There is a significant association between GDP and the Airbnb supply.
- There is a significant association between unemployment and Airbnb supply.
- There is a correlation between hotel accommodation supply and Airbnb supply and the growth in hotel rooms supply is positively associated with the growth in Airbnb supply.
- There is a correlation between the average dwelling size and the Airbnb supply. The higher the dwelling size is the stronger correlation with Airbnb supply. If a host has a bigger house or apartment there is a higher chance it is rented out via Airbnb.



- The ownership structure correlates the Airbnb supply: changes in the ownership structure cause change in the Airbnb supply.

I expect that Econ is negative and significant, it means that the decrease in GDP would cause the Airbnb supply to increase.

In case of the other variables, I assume positive and significant association:

- Unemployment increase, Airbnb supply increase
- Number of hotel rooms increase, Airbnb supply increase
- Dwelling size increase, Airbnb supply increase
- I expect positive and significant association in case of owner with mortgage and tenant as well, meaning that an increase in the ratio of people with mortgage and rise in the number of tenants boost the Airbnb supply

It is evidence, but good test to validate my model is that I predict a positive and significant relationship between the Tourism variables (air transport and the number of tourists) and Airbnb supply.

First, I conducted the Hausman test for the above panel estimation model. The $\text{prob} > \chi^2$ value is 0.0001 (Table 15) and it is not greater than the critical value (0.05). Therefore, I reject the null hypothesis and adopt the fixed-effect model for the empirical analysis.

	Coefficients		(b-B) Difference	sqrt (diag (V_b-V_B)) S.E.
	(b) fixed	(B) random		
Airtransport	.7050677	.2244401	.4806276	.2352219
Hotelrooms	.5029819	.1554285	.3475534	.0626327
Unemployment	-347.0609	-479.6559	132.595	265.8423
Population	.015952	.0002053	.0157467	.0059977
GDP	-.1710043	-.0133171	-.1576872	.0550452
nightspent~n	.0002432	.0002109	.0000324	.0003408
ownerwi~2015	-34.08533	20.97669	-55.06202	321.7179
tenant2015	-178.3079	-35.04205	-143.2658	551.372

```

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

      chi2(5) = (b-B)' [(V_b-V_B)^(-1)] (b-B)
              =          26.14
      Prob>chi2 =          0.0001

```

Table 15 Coefficients of Hausman test (own elaboration)

At the beginning of my research, I suspected that there are certain time fixed-effects which would affect all independent variables similarly. STATA allows us to test for time fixed-effects with the “testparm” command. It is a joint significance test where the null hypothesis is that there is no time fixed-effects that affect independent variables the same way in each year. I ran this test and it failed to reject the null hypothesis, thus I included the time dummy variables for each year in our Fixed-effect regression.

Table 16 shows the results of the panel regression with the fixed-effect model. Due to the nature of fixed-effect model it cannot handle the variables where the change over time is really small or not exist at all, therefore, the model cannot pick and test the *dwelling size* variable (we have data for one year) and the dummy variables (belonging to *eurozone* yes or no), therefore I cannot test these variables with this test.

As I assumed, the relationship is significant with the *air transport of passengers* meaning that 1 more passenger will lead to an increase of 0.54



in Airbnb supply. It is not surprising, because it also proves the growing popularity of tourism and higher demand contributes to the greater supply. The correlation is significant with the ***number of hotel rooms***, so my hypothesis regarding this variable is confirmed, namely, 1 more hotel room will result in an expand of 0.471 Airbnb supply.

The impact of the ***population*** on Airbnb supply is positive and significant. An increase of 1 additional person in population will lead to an increase of 0.013 in Airbnb supply which is again can be explained by the supply-demand equilibrium.

I found negative correlation between ***GDP*** and the Airbnb supply, namely a ***decrease in GDP can cause an increase in Airbnb supply*** (1 decrease in GDP can cause an increase of 0.2 in Airbnb supply market). It is interesting result that in the regression analysis GDP shows negative correlation with Airbnb supply, although it was positively correlated with it when I checked it independently, without any other variables. The different result can be explained by the nature of the two different methodologies. Correlation does not consider time or the other cities or other variables which are controlling; however, panel data regression takes other factors into account. In my case correlation can be positive if population increases or unemployment decreases or air transport increases but if we control for those in that case we get a more precise estimate meaning thus it can be negative in case of Airbnb supply.

Surprisingly, I cannot prove a significant association between the ***unemployment rate*** and the number of available Airbnb accommodation. I did not find relationship when I tested the Pearson correlation between these two variables, therefore I controlled it with other factors as well. However, I cannot find any association between the unemployment rate and the Airbnb supply with this examination either, consequently, I ***reject***



my hypothesis (*there is a significant association between the unemployment and Airbnb supply*). The reason behind this can be that unemployment rate does not really matter in case of short-term accommodation rental market. Furthermore, looking at the nature of the unemployment rate (Table 17 shows the descriptive statistics of our model), the change in unemployment ratio is relatively small, therefore it did not really have impact on the Airbnb supply. The *owner with mortgage* rate and *tenant* rate variables do not show correlation with Airbnb supply either. If we had absolute values about the exact number of unemployed people and precise number how many people have their own dwellings with and without mortgage and how many people rent out apartments or houses with long-term accommodation contracts, the result might have been different. However, unfortunately, at this stage, the available data didn't allow me to measure this.

VARIABLES	Airbnb
Air transport	0.540** (0.233)
Hotel rooms	0.471*** (0.0657)
Unemployment	79.19 (308.0)
Population	0.0135** (0.00547)
GDP	-0.207*** (0.0541)
Nights spent	0.000278 (0.000317)
Owner with mortgage	-31.04 (296.7)
tenant2015	-54.81 (506.4)
Y2015	-3,672*** (1,274)
Y2016	38.66 (1,022)
Y2017	617.8 (765.3)
Y2018 (omitted)	-
Constant	-21,332 (22,390)
Observations	180
Number of id	45
R-squared	0.707

Standard errors in parentheses
 *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 16 Results of panel data regression (own elaboration)

VARIABLES	N	Mean	Std. dev.	Min	Max
Airbnb	180	9,236	12,861	48	85,095
Air transport	180	22,558	21,390	1,404	104,508
Population	180	1676269	2596371	5,876	14970000
GDP	180	117,654	122,105	9,628	729,103
Unemployment	180	8.563	5.848	1.300	31.50
Nights spent	180	14510000	19730000	41198	120100000
Hotel rooms	180	39,228	41,444	15.24	214,214
Owner with mortgage	180	27.77	16.36	0.900	64.70
Tenant	180	26.88	10.88	3.200	58.70
Number of id	45	45	45	45	45

Table 17 Descriptive statistics of panel data regression (own elaboration)

4.4. Results (3): Stepwise regression analysis in case of entire homes and shared rooms

The applied stepwise regression analysis belongs to the Ordinary Least Squares (OLS) linear regression, meaning that its model is the following:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_n x_n + \epsilon \quad \text{for } n \text{ independent variables}$$

In the equation, the betas (β) are the regression coefficients that OLS estimates. ϵ is the error term. β_0 is the intercept and x represents the independent variables. With stepwise regression analysis I examined which



variables have impact on the number of entire homes and private rooms. The dependent variables (Y) are the number of available entire homes and number of available private rooms. The independent variables are the following:

- GDP
- Unemployment rate
- Air transport of passengers
- Population
- Number of tourists
- Number of hotel rooms
- Housing type: Owner, with mortgage or loan
- Housing type: tenant
- Dwelling size: I built three categories based on this: 'small', 'average' and 'big' dwellings. 'Small' dwelling category is less than 50 square meters, 'average' is between 50 and 100 square meters and 'big' category is above 100 square meters.

First, I tested multicollinearity among dependent variables, the results of the VIF tests can be found in the Appendix. Based on its outcome, I excluded the unnecessary variables and ran the stepwise regression with backward selection method for both selected dependent variables.

My third main hypothesis is that *the effect of increasing tourism* (measured by number of tourists, air transport of passengers and number of hotel rooms) *is more significant in case of available Airbnb entire home supply than private room supply*. With Pearson correlation analysis I proved that all accommodation types (entire home, private room, shared room) correlate with the number of hotel rooms and the correlation coefficient was slightly higher in case on entire homes than private rooms. Table 18 shows the results of regression analysis in case of entire homes where we can see that purely tourism related variables explain the number of entire homes (83%) in 2018. This outcome is also strengthened by my

previous result (showed by results of panel data regression) that the number of air transport passengers have the highest impact on Airbnb supply.

Following table (Table 19) shows that number of available private rooms are explained by different variables (mainly control variables and GDP also is considerable). Based on this I accept my *hypothesis* that the effect of increasing tourism is more significant in case of number of available Airbnb entire homes than private rooms.

begin with full model						
p = 0.8686	>= 0.0500	removing Population				
p = 0.5655	>= 0.0500	removing OnwerWithMortgage				
p = 0.4419	>= 0.0500	removing big				
p = 0.4263	>= 0.0500	removing tenant2018				
p = 0.3324	>= 0.0500	removing small				
p = 0.2123	>= 0.0500	removing GDP				
p = 0.0762	>= 0.0500	removing unemploymentrate2018				

Source	SS	df	MS	Number of obs	=	45
Model	3.1466e+09	3	1.0489e+09	F(3, 41)	=	70.46
Residual	610363707	41	14886919.7	Prob > F	=	0.0000
				R-squared	=	0.8375
				Adj R-squared	=	0.8257
Total	3.7570e+09	44	85386046.4	Root MSE	=	3858.4

EntireHome	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Airttransport	.1225795	.038321	3.20	0.003	.0451886	.1999704
NightsSpent	.0001429	.000041	3.48	0.001	.000006	.0002257
HotelRooms	.0823107	.0207268	3.97	0.000	.0404521	.1241694
_cons	-600.3865	863.4503	-0.70	0.491	-2344.16	1143.387

Table 18 Results of Stepwise regression, forward selection: Entire homes (own elaboration)

```
begin with full model
p = 0.7204 >= 0.0500 removing big
p = 0.6765 >= 0.0500 removing tenant2018
p = 0.6659 >= 0.0500 removing Airttransport
p = 0.3720 >= 0.0500 removing small
```

Source	SS	df	MS	Number of obs	=	45
Model	1.4770e+09	6	246164134	F(6, 38)	=	74.48
Residual	125590209	38	3305005.51	Prob > F	=	0.0000
				R-squared	=	0.9216
				Adj R-squared	=	0.9093
Total	1.6026e+09	44	36422159.4	Root MSE	=	1818

PrivateRoom	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
Population	.0007321	.0001248	5.87	0.000	.0004795 .0009848
Unemployment	-185.8399	57.93697	-3.21	0.003	-303.1272 -68.55262
GDP	-.0081177	.0032675	-2.48	0.017	-.0147323 -.001503
NightsSpent	.0001745	.00002	8.74	0.000	.0001341 .0002149
HotelRooms	.0482563	.010657	4.53	0.000	.0266822 .0698303
OnwerWithMortgage	44.7238	17.84843	2.51	0.017	8.591533 80.85606
_cons	-1218.944	745.5227	-1.64	0.110	-2728.176 290.2876

Table 19 Results of Stepwise regression, forward selection: Private rooms
(own elaboration)

4.5. Results (4): Examination of belonging to Eurozone and Airbnb regulation by nominal by interval relationship

One of my hypotheses is that *belonging to Eurozone affects significantly the number of booked Airbnb accommodation, the number of multi-listing hosts and the Airbnb supply*. This relates to my assumption that there are regional differences on Airbnb market. In their paper Choi et. al. (2015) used the exchange rate as a variable but in my study belonging to Eurozone makes more sense because I examine the cities in the European Union. I assume that guests prefer the cities where they do not need to exchange currency or they can invest in euro. For this examination I applied nominal variables and I measured it with nominal by interval relationship.

Table 20 contains the results if this analysis.

Measures of Association		
	Eta	Eta Squared
Supply Growth 2018 * Euro zone	,047	,002
Number of booked accommodations in 2018 * Euro zone	,041	,002
Multi-listing Hosts (host db) 2018 * Euro zone	,031	,001
Rental Type Entire Home (db) 2018 * Euro zone	,020	,000
Rental Type Private Room (db) 2018 * Euro zone	,082	,007
Rental Type Shared Room (db) 2018 * Euro zone	,025	,001

Table 20 Results of nominal by interval relationship in case of Eurozone (own elaboration)

In this test I measure the association with Eta. In Table 20 we can see that Eta is close to 0 in case of all main variables, meaning that Eurozone nominal variable does correlate with none of them and do not have an effect on the examined variables. Consequently, according to this examination, I ***cannot accept*** my hypothesis that ***belonging to Eurozone affects significantly the Airbnb supply***.

Due to the fact that short-term accommodation sharing market and Airbnb is quite new, at this stage I could not apply the time variable (before and after the selected areas joined to Eurozone) and measure it with other method for instance difference-in-difference analysis.

I ran this test for the Regulation nominal variable too. I assume that if the Airbnb market is regulated in the selected cities, it has effect on the supply. Table 21 introduces the results of this test: Eta does not show any correlation between the regulation and the selected variables. Based on this



result, at this point I *reject* the hypothesis that *Airbnb market regulation affects the Airbnb supply* and regulation does not have effect on share-of multi-listing hosts, or the number of available accommodation type. In case of cities where the local governments have already implemented law about short-term accommodation sharing, it would be great to compare the number of available Airbnb homes before and after the year of regulation and it is good starting point for future researches.

Measures of Association		
Regulated	Eta	Eta Squared
Supply Growth 2018 * Regulated	,156	,024
Number of booked accommodations in 2018 * Regulated	,150	,022
Multi-listing Hosts (host db) 2018 * Regulated	,159	,025
Rental Type Entire Home (db) 2018 * Regulated	,141	,020
Rental Type Private Room (db) 2018 * Regulated	,163	,027
Rental Type Shared Room (db) 2018 * Regulated	,117	,014

Table 21 Results of nominal by interval relationship in case of Airbnb regulation (own elaboration)

4.6. Conclusion and discussion

The results of the hypothesis examination can be found in Table 22 below.

Hypothesis (1)	We can identify regional differences on Airbnb market in Europe.	FALSE
<i>Sub-hypotheses</i>	<p><i>Sub-hypothesis 1a:</i> GDP is negatively associated with Airbnb supply.</p> <p><i>Sub-hypothesis 1b:</i> GDP and income are negatively correlated with share of multi-listing hosts.</p> <p><i>Sub-hypothesis 1c:</i> Belonging to Eurozone affects significantly the number of booked Airbnb accommodation, the number of multi-listing hosts and the Airbnb supply.</p>	<p>TRUE</p> <p>FALSE</p> <p>FALSE</p>
Hypothesis (2)	Changes in economic and market conditions have strong impact on Airbnb penetration.	FALSE
<i>Sub-hypotheses</i>	<p><i>Sub-hypothesis 2a:</i> There is strong correlation between income and Airbnb supply. Income is negatively associated with Airbnb supply.</p> <p><i>Sub-hypothesis 2b:</i> There is a significant association between unemployment and Airbnb supply. Unemployment is positively associated with the number of available accommodations on Airbnb.</p> <p><i>Sub-hypothesis 2c:</i> Short-term accommodation market regulation strongly affects the Airbnb supply.</p>	<p>FALSE</p> <p>FALSE</p> <p>FALSE</p>
Hypothesis (3)	The effect of increasing tourism is more significant in case of available entire home supply than private room supply	TRUE
<i>Sub-hypotheses</i>	<p><i>Sub-hypothesis 3a:</i> All accommodation types (entire home, private room, shared room) correlate with the number of hotel rooms and the strongest correlation is between entire homes and the number of hotel rooms.</p> <p><i>Sub-hypothesis 3b:</i> There is a correlation between hotel accommodation supply and Airbnb supply and the growth in hotel rooms supply is positively associated with the growth in Airbnb supply.</p>	<p>TRUE</p> <p>TRUE</p>

Hypothesis (4)	The housing situation (such as tenure status: owning or renting a property and average size of dwelling) significantly affects the Airbnb market.	FALSE
<i>Sub-hypotheses</i>	<i>Sub-hypothesis 4a:</i> There is a correlation between the average dwelling size and the Airbnb supply. The higher the dwelling size is the stronger correlation with Airbnb supply. If host has bigger house or apartment there is a higher chance it is rented out via Airbnb.	<i>FALSE</i>
	<i>Sub-hypothesis 4b:</i> The ownership structure correlates the Airbnb supply: changes in the ownership structure cause change in the Airbnb supply.	<i>FALSE</i>

Table 22 Results of the hypothesis analysis (own elaboration)

Based on the results of my analysis I cannot state that there are regional differences among different cities on Airbnb market in Europe. Although, I have found a minor negative correlation between GDP and the Airbnb supply, namely decrease in GDP can cause increase in Airbnb supply (one decrease in GDP can cause increase of 0.2 in Airbnb supply market), my other two sub-hypotheses need to be rejected. In case of the share of multi-listing hosts, I have assumed that in cities with higher GDP the accommodation sharing is ‘real’ so they share their spare rooms and spaces and in municipalities with less income we have more multi-listings hosts. However, GDP correlated moderately and income shows a strong positive correlation with the share of multi-listing hosts, therefore I have concluded that increasing income may result in growing number of multi-listing hosts, consequently, I cannot accept my hypothesis. My assumption regarding belonging to Eurozone is also rejected because I have not found correlation



between this variable and the Airbnb supply, the number of booked Airbnb accommodation and the number of multi-listing hosts.

The second hypothesis, that changes in economic and market conditions have a strong impact on Airbnb penetration, also needs to be rejected. The income of households highly and positively correlated with Airbnb supply in case of all selected years. Based on this result I cannot accept the hypotheses (although there is a strong correlation between income and Airbnb supply, income not negatively associated with Airbnb supply as I assumed). Furthermore, I cannot prove an association between the unemployment rate and the number of available Airbnb accommodation. Neither the simple correlation analysis nor the panel data regression analysis does show association. The reason behind this can be that the unemployment rate does not really matter in case of Airbnb supply and people (hosts) participation in the short-term accommodation sharing for other purposes. It would be exciting to examine with exact data (not ratio data); however, in case of the examined 45 cities, the actual number was not available. In terms of Airbnb regulation, the selected methodology has not found a connection between the regulation and the number of available accommodations.

My third hypothesis is that the effect of increasing tourism is more significant in case of available entire home supply than private room supply. Looking at the share of short-term accommodation types, much more entire homes are available on Airbnb than private rooms. Originally (and theoretically), the sharing economy is the share of excess capacity. It does not mean that we should buy more products or build more buildings so that they can be rented out on the short-term accommodation market, it means that we should rent out our existing “extra” which is already ours. However, data shows (Fig 12) that investment into apartments is a



flourishing business. There can be a specific reason behind this (for instance interest rate is low and it is not worth to have a savings account and/or this is the best investment option) but this is also a trend. Therefore, I have assumed that the impact of growing tourism is more significant in case of entire homes. First, I examined it with correlation analysis. I found that the selected tourism variables (I measure it by the number of tourists, air transport of passengers and number of hotel rooms) are all correlated with the number of available entire homes and shared rooms as well. In case of the hotel rooms, if its number increases, the Airbnb supply increases and the number of available entire homes also rise and by a greater extent than the share of private rooms. The difference between entire homes and private rooms are not significant but taking into consideration that the highest share of available accommodations are entire homes it can be concluded that more hotel rooms can cause more available entire apartments (in share and number more than shared rooms or private rooms). It was also examined by stepwise regression analysis and in this case the results strengthen my previous results and confirmed my hypothesis, namely increasing tourism is more significant in case of available entire home supply than private room supply.

My last assumption is that the housing situation (such as tenure status: owning or renting a property and average size of dwelling) significantly affects the Airbnb market. My test results show that weak and negative but not negligible correlation can be discovered between the dwelling owners and Airbnb supply which means if the share of dwelling owners (with and without mortgage) decreases (more people become tenant) the Airbnb supply increases. Its pair variable is the share of tenants where the correlation coefficient indicates a weak positive correlation with Airbnb supply, meaning that the share of tenant increases, the Airbnb supply also



increases. Given that these numbers show a very weak correlation, I cannot accept my sub-hypothesis. Additionally, the panel regression does not show any impact on Airbnb supply either. Furthermore, I assumed that the higher the dwelling size is the stronger correlation with Airbnb supply. If a host has a bigger house or apartment there is a higher chance it is rented out via Airbnb. However, during my test, I have not found a connection between the dwelling size and the Airbnb supply. Similarly, to my methodology related assumption at the unemployment rate, I used ratio data (that was available) not exact numbers which may have an influence on the outcome. Also, it can mean that the Airbnb market size depends on other factors.

To summarize the findings, a general consequence is that the demand related factors (such as number of tourists, passengers carried by air transport, number of hotel rooms) and GDP and income showed correlation, but unemployment rate, average dwelling size, ownership structure did not demonstrate relationship with Airbnb supply.

Although other literature has a different outcome, my analysis proves that Airbnb is a blooming business everywhere regardless of the geographical location and economic circumstances. It has an impact on the real estate market that influence the quality of life of local residents. More and more investments go into the short-term accommodation market that has an effect on apartment selling and long-term renting prices, meaning that inhabitants can enter the real estate market much harder. Based on my findings I agree with Mi and Coffman (2019) who said that the sharing economy has the potential to enhance the necessary shift from our current consumption behaviour towards a sustainable model and support the Sustainable Development Goals (SDGs), however additional governmental



support and control would be highly recommended. Although I have not found correlation between Airbnb regulation and Airbnb supply, I assume that law and governance control can enhance a fair and transparent operation, therefore further investigation needed in this area. For instance, price cap in case of long-term accommodation sharing or dwelling selling prices would allow people who have less to purchase an own house or apartment and not only wealthy investors could have the possibility to buy more and more apartments so that it could be rented out via Airbnb. Furthermore, the maximum number of entire homes by the same owner should be regulated as it also contributes to higher renting and selling prices.

The empirical results reported herein should be considered in the light of some limitations. Although the short-term accommodation sharing is not a brand-new phenomenon, the supply related available database is still limited. Except the number of available Airbnb accommodations, in case of the other main variables I have publicly available data for one year only, therefore, I could not examine it in a long-term and drew conclusion that could be generalized. Yet, this research provides us a useful and valuable picture of the situation. The dataset restricted the methodology as well: panel data regression analysis is an excellent tool to measure the time-related differences; however, as it was showed by the Hausman- test I should apply the fixed-effect model where I could not test the variables where nothing has changed. Also, correlation analysis gives us a good starting point but it does not show results where long-term consequences can be drawn. In the next phase of the research, it would also be interesting to study the Airbnb supply side with qualitative examinations such as interviews or focal group.



5. NEW SCIENTIFIC RESULTS

- My examination is a novelty in terms of regional analysis. The study of Airbnb phenomenon in “richer” and “poorer” municipalities is a new area and it includes several future research possibilities. Although based on my results, I cannot accept my hypothesis that there are regional differences, it has confirmed that the trend of thriving Airbnb is the same on city level apart from its economic and social dissimilarities.
- I found that more and more entire homes are available on the Airbnb market, and although Airbnb originally rented out spare rooms, this trend has changed and due to the growing number of tourists and travellers, hosts invest in entire homes, they do not share their existing extra places. From this perspective, it does not contribute to the responsible consumption and production.
- The supply-demand equilibrium can be followed nicely on Airbnb market: more guests will result in more interest from the accommodation sharing and investors’ perspective, resulting in a blooming business.
- I did not find correlation between the dwelling size and Airbnb supply. I assumed that higher the dwelling size is, higher the chance it will be rented out but my analysis showed that the size does not matter.



- I assumed that changes in housing conditions such as in ownership with or without mortgage and changes in the share of tenants with long-term contracts have an effect of Airbnb supply. I expected that more tenants and more owners with loan result higher number of available Airbnb accommodations, however, I did not find correlation and relationship between these factors.
- Airbnb is growing due to the general factors of market growth and social and environmental factors are less important. Increasing number of tourists, the number of hotel rooms and growing number of passengers carried by air transport are the most important determinants behind its expansion. It contributes to economic growth but does not support the locals who are not hosts.



6. SUMMARY

Nowadays, the sharing economy is a popular topic because it offers an alternative and cheaper version of passenger transportation service, second-hand products, short-term accommodation and it shows a new lifestyle which based on its principle, can enhance the sustainable development. Therefore, I find interesting to investigate the sharing economy in practice from sustainable development perspective and I selected its biggest sector, accommodation sharing that I examine in my dissertation.

First, I determined my research questions and hypothesis then I introduced and analysed the theory with the help of relevant literature. As the size of the sharing economy is growing, the power of its economic impact also increasing. We can say that the sharing economy represents a new economic system: not only the basic concept but also all relevant elements, such as new trust system, disruptive innovation, new sustainable business model suggest that this scheme could work well and enhance the sustainable development. My question was that how does it work in practice? Does accommodation sharing in its current form contribute to sustainable development? Does it enhance the fulfilment of sustainable development goals (SDGs)? I assumed that the concept of the sharing economy supports sustainable development theoretically; however, accommodation sharing is only a new and rebranded form of the old economy. During the empirical examination, I collected data for 45 European cities and I analysed them with econometric method. Several studies examined the sharing economy from users' perspective (eg. Havas, 2014; Nielsen, 2014, Hamari et al., 2015) and I found exciting to study this phenomenon from the supply side as well.



I chose the accommodation sharing because short-term accommodation has an impact not only on tourism and hotel industry but also on the real estate market. The most studies deal with the impact on travellers, guests and users in general, therefore, I selected a different area and I investigated the impact on local residents. I highlighted relevant SDGs which are Decent Work and Economic Growth (Goal 8), Reducing Inequality (Goal 10), Sustainable Cities and Communities (Goal 11) and Responsible Consumption and Production (Goal 12) and I analysed them with the help of formulated hypotheses.

My last research question was how can we describe the accommodation sharing in its current operation: sustainable lifestyle or new form of the neoliberal economy? My study has some limitations but based on my results, I did not find that accommodation sharing via Airbnb in its current form would contribute to the fulfilment of the SDGs. As we could see, from a theoretical perspective it would be the ability to enhance sustainable development; however, this will not happen in its current form. This market should be regulated on the local level and not only the Airbnb but also the real estate market.

Although, the sharing economy and accommodation sharing are not new research areas, many interesting patterns found in this study that would require further examination. I believe that the sharing economy could be a way towards long term sustainability; based on the literature it has a potential to it; however, according to my findings, we still have to work on this system and its environment so that it can operate successfully and enhance a better, fairer, trustworthy and more transparent system.



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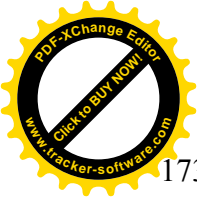
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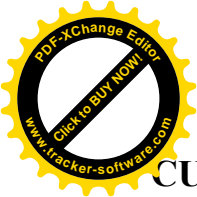


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CURRICULUM VITAE

Georgina Görög was born on 20 March 1989 in Nagyatád. She received her GCSE with excellent grade at Táncsics Mihály Secondary Grammar School (Kaposvár) in 2007. She graduated from University of Szeged and received her First-Class honours with distinction BSc diploma of Agricultural and Rural Development Engineer in 2011. She studied at University of Pécs Faculty of Business and Economics and received her Master's degree of Management and Leadership, graded excellent.

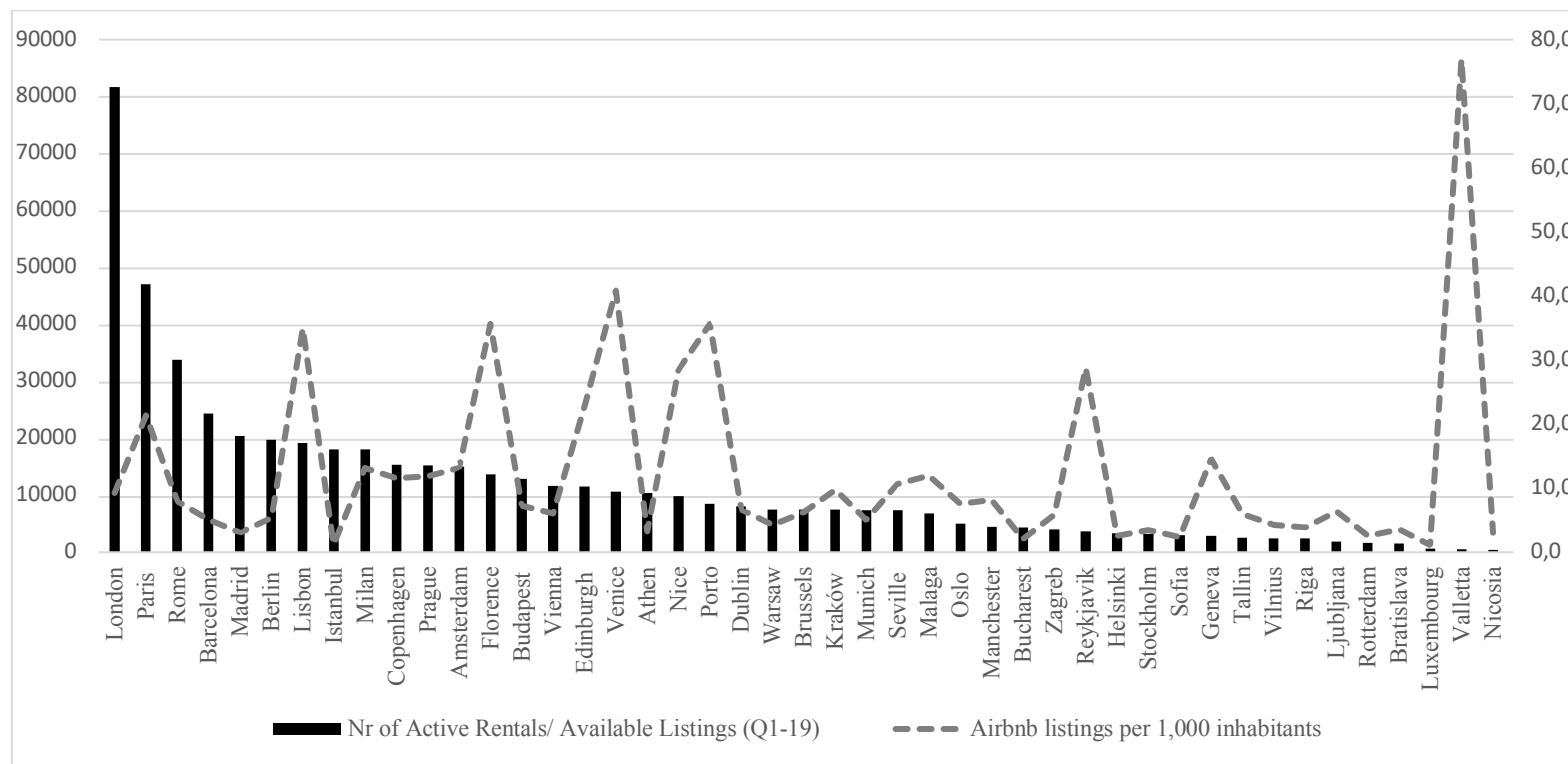
She has been participating in scientific life since the beginning of her university studies: she took part in National Conference of Scientific Students' Associations (OTDK) several times where she won 1st prize; 3rd prize and Special Award. Georgina was awarded the Scholarship of the Republic of Hungary (Köztársasági Ösztöndíj) at University of Szeged and at University of Pécs as well. She started her PhD studies at Budapest University of Technology and Economics then she applied and was admitted to the Doctoral School of Management and Organisational Science of Kaposvár University in 2016. In the academic year of 2018/2019 she won New National Excellence Program Scholarship of the Ministry of Human Capacities of Hungary (Új Nemzeti Kiválóság Program Ösztöndíj). Georgina has language certificates in intermediate level German language and advanced level Business English.



ANNEXES



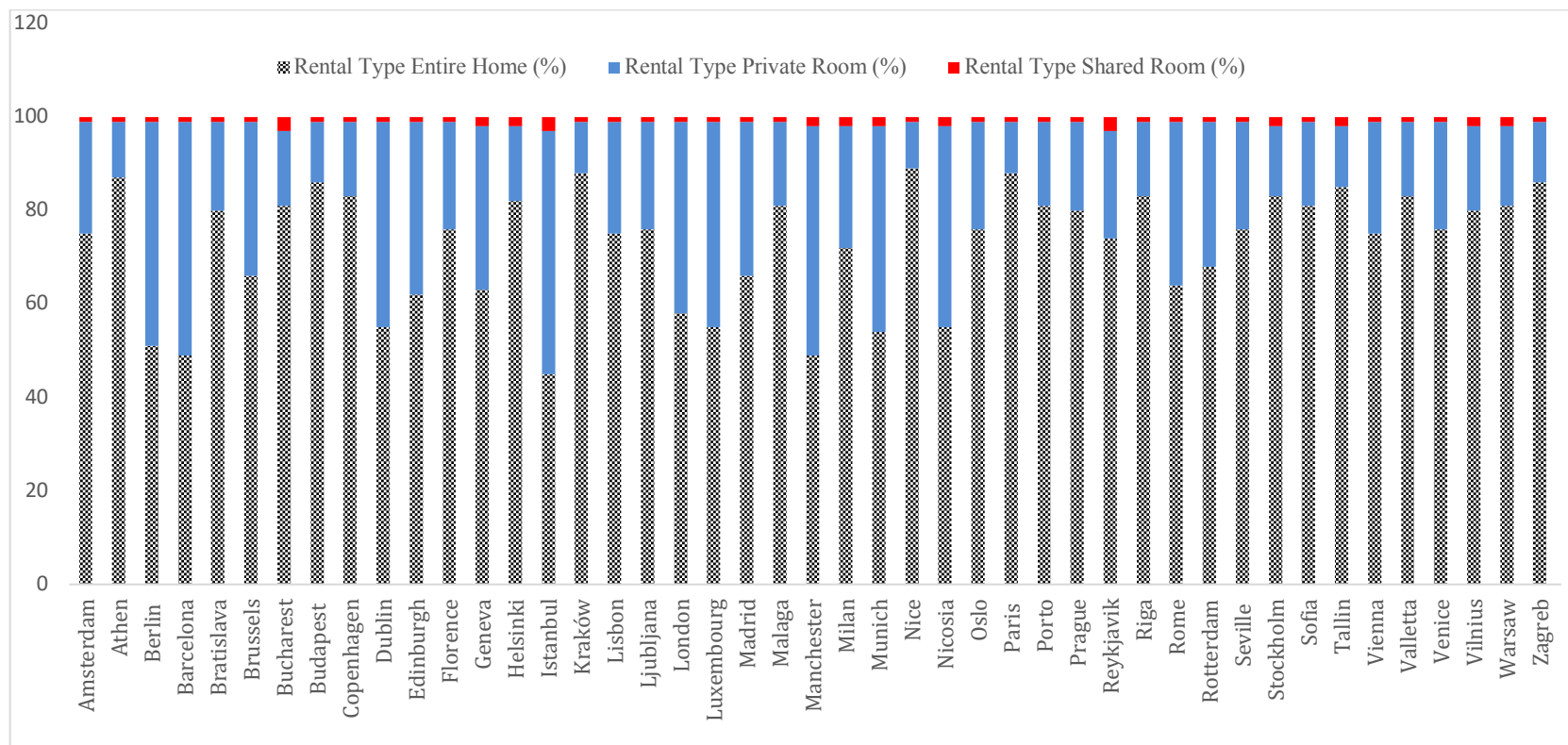
Airbnb listings per 1,000 inhabitants (Source: AirDNA, Eurostat, own elaboration)



Correlation matrix of main variables (Y) (own elaboration)

		Correlations					
		Supply Growth 2018	Number of booked accommodations in 2018	Multi-listing Hosts (number of hosts) 2018	Rental Type Entire Home (db) 2018	Rental Type Private Room (db) 2018	Rental Type Shared Room (db) 2018
Supply Growth 2018	Pearson Correlation	1	,985**	,958**	,972**	,934**	,820**
	Sig. (2-tailed)		,000	,000	,000	,000	,000
Number of booked accommodations in 2018	Pearson Correlation	,985**	1	,906**	,991**	,868**	,806**
	Sig. (2-tailed)	,000		,000	,000	,000	,000
Multi-listing Hosts (host db) 2018	Pearson Correlation	,958**	,906**	1	,898**	,946**	,786**
	Sig. (2-tailed)	,000	,000		,000	,000	,000
Rental Type Entire Home (db) 2018	Pearson Correlation	,972**	,991**	,898**	1	,823**	,767**
	Sig. (2-tailed)	,000	,000	,000		,000	,000
Rental Type Private Room (db) 2018	Pearson Correlation	,934**	,868**	,946**	,823**	1	,804**
	Sig. (2-tailed)	,000	,000	,000	,000		,000
	N	45	45	45	45	45	45
Rental Type Shared Room (db) 2018	Pearson Correlation	,820**	,806**	,786**	,767**	,804**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	
**. Correlation is significant at the 0.01 level (2-tailed).							

Share of Airbnb accommodation types (Source: AIRDNA, own elaboration)







Correlations in case of Airbnb supply 2015-2018 (N=45) (own elaboration)

	Supply Growth 2015		Supply Growth 2016		Supply Growth 2017		Supply Growth 2018	
	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)
Income of households	0,819	,000	0,852	,000	0,849	,000	0,836	,000
Air transport of passengers	0,852	,000	0,859	,000	0,809	,000	0,771	,000
Average dwelling size 50 — less than 60 square metres	0,434	,003	0,499	,000	0,506	,000	0,526	,000
Average dwelling size 60 — less than 80 square metres	0,441	,002	0,495	,001	0,503	,000	0,524	,000
Average dwelling size 80 — less than 100 square metres	0,421	,004	0,487	,001	0,489	,001	0,513	,000
Average dwelling size 100 — less than 120 square metres	0,504	,000	0,507	,000	0,493	,001	0,498	,001
Average dwelling size 120 — less than 150 square metres	0,520	,000	0,502	,000	0,478	,001	0,466	,001
Average dwelling size 150 square metres and over	0,425	,004	0,436	,003	0,430	,003	0,435	,003
Population	0,435	,003	0,516	,000	0,529	,000	0,554	,000
GDP	0,848	,000	0,820	,000	0,761	,000	0,701	,000

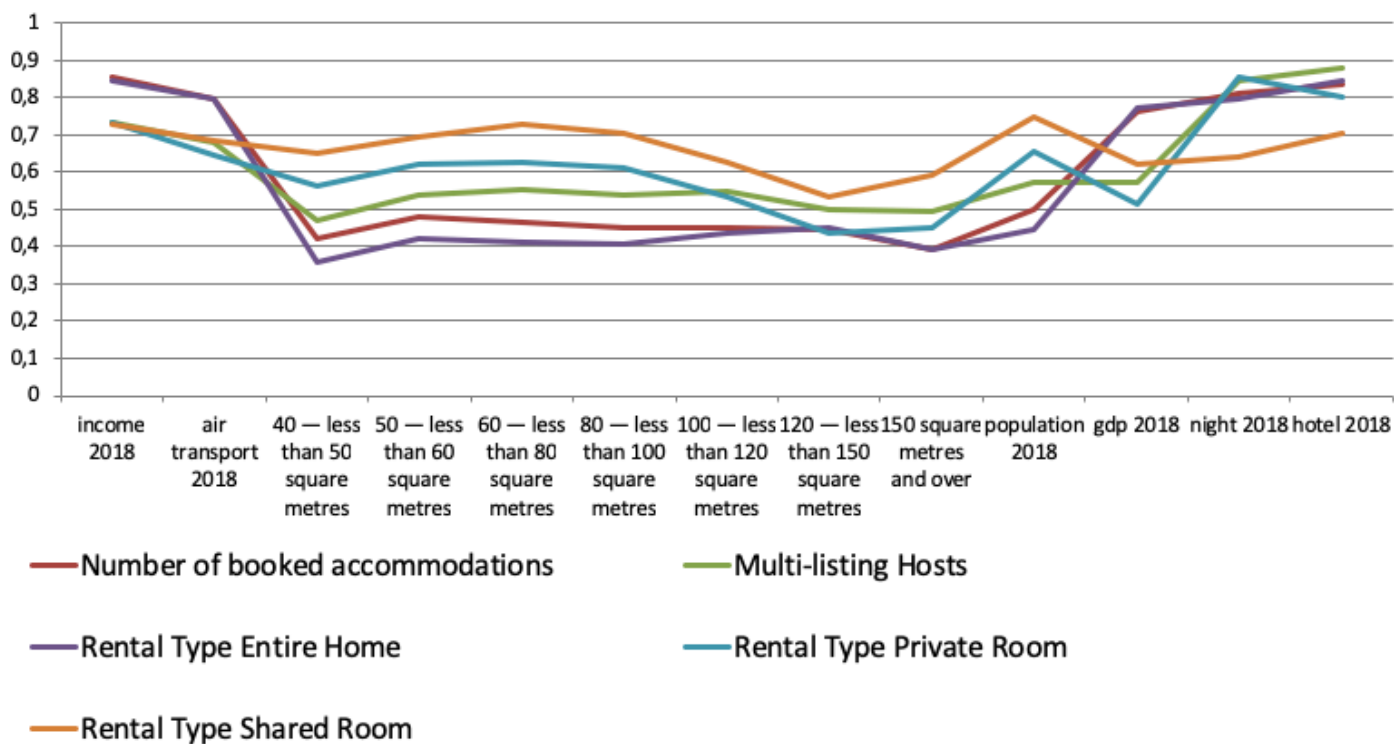


	Supply Growth 2015		Supply Growth 2016		Supply Growth 2017		Supply Growth 2018	
	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)	Pearson Correlation	Sig. (2-tailed)
Nights spent at tourist accommodation establishments	0,664	,000	0,750	,000	0,817	,000	0,856	,000
Number of hotel rooms 2018	0,839	,000	0,858	,000	0,874	,000	0,865	,000
Owner, with and without mortgage or loan	-0,336	,024	-0,303	,043	-0,278	,064	-0,235	,121
Tenant	0,336	,024	0,302	,043	0,279	,064	0,235	,120

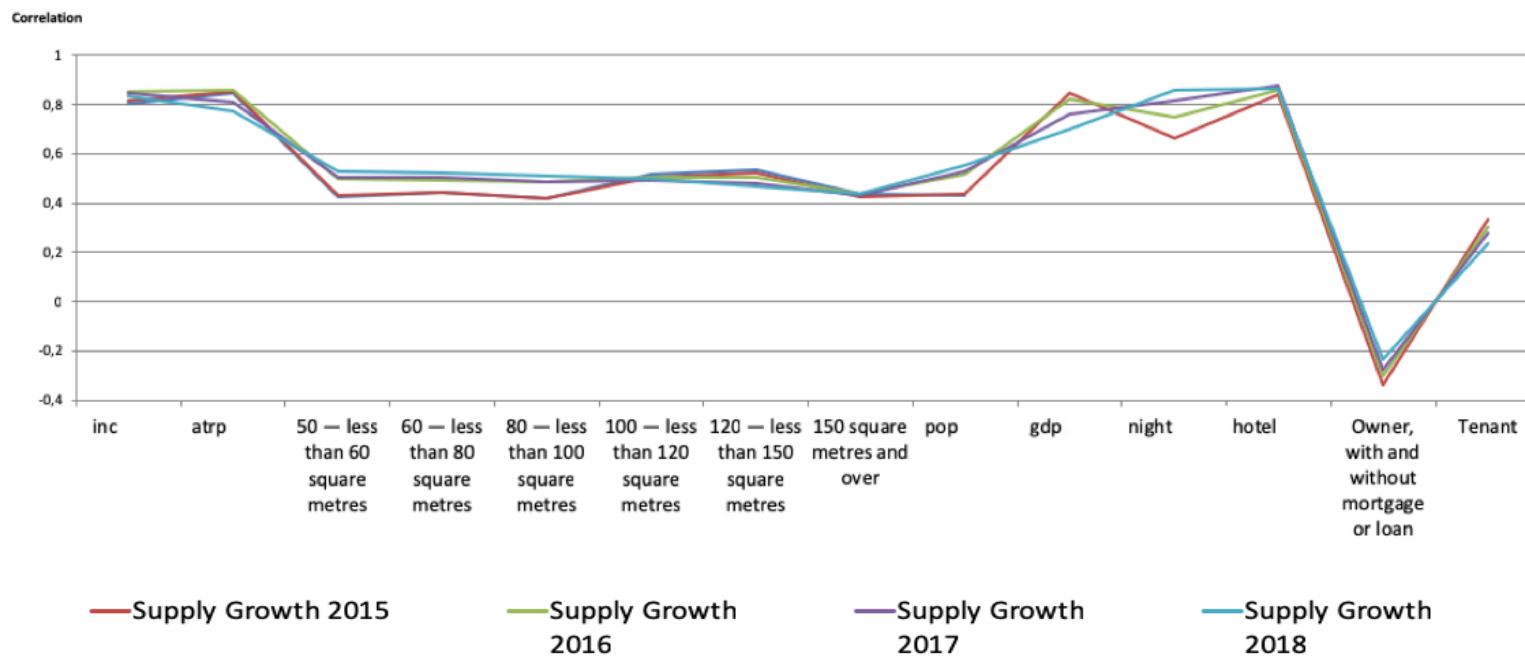


Results of correlation analysis in case of Airbnb dependent variables (own elaboration)

Correlation



Time series correlations of Airbnb supply (2015-2018; N=45) (own elaboration)



Correlation table of variables in panel data regression (own elaboration)

```
. corr
(city ignored because string variable)
(obs=180)
```

	id	year	Airbnb	Income	Airtra~t	Popula~n	GDP	Unempl~t	nights~n	HDI	Hotelr~s	ownerw~a	ownern~s	own~2015	ten~2015	Y2015	Y2016	Y2017
id	1.0000																	
year	0.0000	1.0000																
Airbnb	-0.1489	0.2093	1.0000															
Income	-0.0074	0.0268	0.8030	1.0000														
Airtransport	-0.1851	0.0757	0.7878	0.8294	1.0000													
Population	-0.2025	0.0101	0.4940	0.3290	0.4334	1.0000												
GDP	-0.0190	0.0301	0.7339	0.9526	0.8396	0.2335	1.0000											
Unemployment	-0.0714	-0.1838	-0.0036	0.0762	0.1525	0.1801	0.0969	1.0000										
nightspent~n	-0.0559	0.0389	0.7600	0.7789	0.6372	0.4121	0.6317	0.2063	1.0000									
HDI	-0.1569	0.0835	0.1557	0.2841	0.2709	-0.2480	0.3117	-0.1478	0.1491	1.0000								
Hotelrooms	-0.0269	0.0407	0.8333	0.7746	0.7499	0.4936	0.7153	0.0496	0.6900	0.0723	1.0000							
ownerwitha~a	0.2025	-0.0039	-0.2648	-0.3258	-0.3232	-0.2169	-0.3458	0.0069	-0.1798	-0.5809	-0.2582	1.0000						
ownernooout~s	0.1934	0.0001	-0.1794	-0.2567	-0.3348	0.0208	-0.2915	0.0473	-0.1158	-0.8285	-0.0747	0.7441	1.0000					
ownerwi~2015	-0.1343	-0.0028	0.0733	0.1403	0.2506	-0.1731	0.1755	-0.0612	0.0414	0.7658	-0.0679	-0.3696	-0.8958	1.0000				
tenant2015	-0.2026	0.0040	0.2649	0.3256	0.3231	0.2172	0.3454	-0.0071	0.1801	0.5809	0.2580	-1.0000	-0.7442	0.3698	1.0000			
Y2015	0.0000	-0.7746	-0.2139	-0.0208	-0.0569	-0.0080	-0.0218	0.1381	-0.0290	-0.0694	-0.0297	0.0045	-0.0006	0.0038	-0.0043	1.0000		
Y2016	0.0000	-0.2582	0.0038	-0.0059	-0.0224	-0.0023	-0.0099	0.0557	-0.0146	-0.0165	-0.0135	-0.0024	-0.0002	-0.0013	0.0016	-0.3333	1.0000	
Y2017	0.0000	0.2582	0.0935	0.0051	0.0200	0.0025	0.0075	-0.0512	0.0160	0.0256	0.0109	0.0014	0.0019	-0.0017	-0.0006	-0.3333	-0.3333	1.0000
Y2018	0.0000	0.7746	0.1165	0.0217	0.0593	0.0078	0.0241	-0.1426	0.0276	0.0603	0.0323	-0.0035	-0.0011	-0.0008	0.0033	-0.3333	-0.3333	-0.3333
_est_fixed	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
_est_random	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Y2018	_est_f~d	_est_r~m															
Y2018	1.0000																	
_est_fixed	.	.																
_est_random	.	.	.															



Descriptive statistics of the panel regression test (own elaboration)

Variable	Obs	Mean	Std. Dev.	Min	Max
Airbnb	180	9236.344	12860.95	48	85095
Airtransport	180	22558.38	21389.79	1404	104508
Population	180	1676269	2596371	5876	1.50e+07
GDP	180	117653.7	122105	9628	729103
Unemployment	180	8.562833	5.84814	1.3	31.5
nightspent~n	180	1.45e+07	1.97e+07	41198	1.20e+08
Hotelrooms	180	39228.06	41444.2	15.238	214214
ownerwi~2015	180	27.76944	16.36389	.9	64.7
tenant2015	180	26.885	10.87641	3.2	58.7
Y2015	180	.25	.4342205	0	1
Y2016	180	.25	.4342205	0	1
Y2017	180	.25	.4342205	0	1
Y2018	180	.25	.4342205	0	1

Test for time fixed-effects

```
. testparm i.year

( 1) 2016.year = 0
( 2) 2017.year = 0
( 3) 2018.year = 0

F( 3, 124) = 10.54
Prob > F = 0.0000
```

Results of panel data regression with Fixed-effect model (own elaboration)

Fixed-effects (within) regression
Group variable: id

Number of obs = 180
Number of groups = 45

R-sq:

within = 0.7074
between = 0.3629
overall = 0.3397

Obs per group:

min = 4
avg = 4.0
max = 4

corr(u_i, Xb) = -0.9713

F(11,124) = 27.25
Prob > F = 0.0000

	Airbnb	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
	Airtransport	.5400247	.2333795	2.31	0.022	.0781013	1.001948
	Population	.0134778	.005466	2.47	0.015	.002659	.0242966
	GDP	-.2065299	.0540979	-3.82	0.000	-.3136047	-.0994551
	Unemployment	79.18872	307.9713	0.26	0.798	-530.3727	688.7501
nightspentattouristaccommodation		.0002779	.0003171	0.88	0.383	-.0003497	.0009054
	Hotelrooms	.4708823	.065719	7.17	0.000	.340806	.6009585
ownerwithmortgageorloan2015		-31.04437	296.6628	-0.10	0.917	-618.2231	556.1343
tenant2015		-54.80735	506.4009	-0.11	0.914	-1057.117	947.502
	Y2015	-3672.21	1274.476	-2.88	0.005	-6194.755	-1149.665
	Y2016	38.66045	1021.875	0.04	0.970	-1983.916	2061.236
	Y2017	617.7728	765.2941	0.81	0.421	-896.9586	2132.504
	Y2018	0 (omitted)					
	_cons	-21332.21	22390.14	-0.95	0.343	-65648.58	22984.16
	sigma_u	42943.371					
	sigma_e	3127.9726					
	rho	.99472241	(fraction of variance due to u_i)				

F test that all u_i=0: F(44, 124) = 7.71

Prob > F = 0.0000



Multicollinearity tests in Stepwise regression (own elaboration)

Test 1

. vif

Variable	VIF	1/VIF
average	78.32	0.012768
Population	76.84	0.013013
Airttransport	5.79	0.172654
big	5.25	0.190373
GDP	4.40	0.227065
small	4.36	0.229229
HotelRooms	3.99	0.250506
NightsSpent	3.11	0.321898
OwnerWithMore	1.96	0.509627
tenant2018	1.70	0.589765
Unemployment	1.42	0.706264
Mean VIF	17.01	

Test 2

. vif

Variable	VIF	1/VIF
Population	7.58	0.131865
Airttransport	5.47	0.182783
GDP	4.38	0.228365
small	4.31	0.231854
big	4.08	0.244812
HotelRooms	3.96	0.252768
NightsSpent	3.10	0.322326
OwnerWithMore	1.95	0.512080
tenant2018	1.56	0.641099
Unemployment	1.41	0.707138
Mean VIF	3.78	

Examination of belonging to Eurozone and Airbnb regulation by nominal by interval relationship (own elaboration)

Report								
		Supply Growth 2018	Number of booked accommodations in 2018	Multi-listing Hosts (host db) 2018	Rental Type Entire Home (db) 2018	Rental Type Private Room (db) 2018	Rental Type Shared Room (db) 2018	
Euro zone	N	Mean	12738,313	10284,313	1248,938	8296,688	4310,750	130,875
	N		16	16	16	16	16	16
	Std. Deviation		19946,6845	14528,1278	1858,6161	10976,6247	9079,3789	173,0021
	Y	Mean	11321,621	9316,966	1160,310	7908,793	3289,586	123,241
	N		29	29	29	29	29	29
	Std. Deviation		11285,5710	9786,0170	1088,5359	8341,2492	3562,1825	132,1175
	Total	Mean	11825,333	9660,911	1191,822	8046,711	3652,667	125,956
	N		45	45	45	45	45	45
	Std. Deviation		14736,2748	11537,5846	1390,5140	9240,4570	6035,0774	146,0299

		Supply Growth 2018	Number of booked accommodations in 2018	Multi-listing Hosts (host db) 2018	Rental Type Entire Home (db) 2018	Rental Type Private Room (db) 2018	Rental Type Shared Room (db) 2018
Regulated	Mean	5387,000	4830,800	575,400	4409,000	899,800	78,200
	N	5	5	5	5	5	5
	Std. Deviation	5645,8715	5290,3336	653,5995	4732,6419	860,1550	69,4457
Y	Mean	12630,125	10264,675	1268,875	8501,425	3996,775	131,925
	N	40	40	40	40	40	40
	Std. Deviation	15354,1703	11997,7735	1443,1905	9598,2893	6318,4462	152,4306
Total	Mean	11825,333	9660,911	1191,822	8046,711	3652,667	125,956
	N	45	45	45	45	45	45
	Std. Deviation	14736,2748	11537,5846	1390,5140	9240,4570	6035,0774	146,0299