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SPATIAL ISSUES OF SHARING ECONOMY IN POLISH ACCOMMODATION MARKET

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ABSTRACT: The enormous growth of sharing economy in the second decade of the twenty-first century undoubtedly revolutionized the tourism and accommodation market around the world. The current research focuses on the sharing economy development, and it is mostly limited to popular cities and metropolis while its development and impact on other areas are neglected. The main aim of this article is to examine a relationship between the current size of sharing economy and population density, urbanization, development of professional hospitality base and tourism attractiveness. The research was based on the data from Statistics Poland and AirDNA. The results show that the number of sharing economy active rentals is not correlated with population and population density, but it is correlated with the number of traditional accommodation establishments and tourism attractiveness index. Moreover, the number of active rentals per capita is five times higher in urban than in other counties. The spatial distribution of sharing economy rentals is much more concentrated than a traditional hospitality market.

KEY WORDS: sharing economy, Airbnb, HomeAway, AirDNA, tourism attractiveness

Introduction

Renting spare rooms to strangers is not a new phenomenon, and it was common in the tourism market far before the advent of the Internet. However, the emergence of innovative platforms that were able to reduce transaction costs and endemic information asymmetry led to the exponential growth of this market which is contemporary referred to as a sharing economy. At the beginning, the sharing economy was associated with social and environmental benefits of usage of idle resources but very soon supply-side became dominated by professional players. Although the sharing economy is widely credited to a change of the competitive environment of many tourism markets, it lacks a common and universally accepted definition. The contemporary sharing economy is usually referred to as a peer-to-peer service market, and it is associated with intermediaries – platforms that facilitate market exchanges between providers and customers.

Sharing economy platforms have been established in hundreds of markets, but only two of them are referred to as iconic: Airbnb in the hospitality market and Uber in a taxi market. The major difference between those platforms is their operational area: Uber is operating only in major cities as in its case network externalities are essential, whereas the supply of Airbnb can be provided theoretically everywhere. The sharing economy in the accommodation market represents a wide and growing study area for economists, geographers, sociologists, and other academics. The current research focuses mainly on its impact on the economy and on social aspects of exchange between peers. Still, its spatial distribution remains under-researched, and the main question, where to expect sharing economy growth and which factors play a role in its development remains unanswered. In this paper, authors try to look at the distribution of sharing economy accommodation supply across one country, Poland. The main research question is therefore focused on determinants of its spatial distribution.

Spatial issues of sharing economy development

Given the fact that hospitality supply offered on sharing economy platforms is determined by the activity of individual investors and not platforms themselves, it is surprising how little academic attention is given to their spatial distribution. As the sharing economy is a relatively new market, so a list of potential factors that may explain variations of its spatial development is created on the base of theoretical studies, a research which was done on the traditional hospitality market and available studies linking spatial aspects of

sharing economy and pricing. This analysis led to an identification of three major factors that potentially can be related to sharing economy development:

- population density/urbanization,
- traditional hospitality,
- tourism attractiveness.

Population density

The sharing economy, not only within the hospitality market, is treated in the literature as an urban phenomenon (Deng, 2016; Stabrowski, 2017; Wegmann & Jiao, 2017). This can be, usually theoretically, explained by the inherent features of cities as places where an exchange is made, and it is connected with innovation which is a response to imminent city congestion. In this way, e.g. sharing economy platforms that enable car sharing is just an innovative response capitalizing upon structural inefficiencies in contemporary urban transportation services. As Davidson and Infranca (2016) point “sharing economy is actually thriving (...) because it recombines assets and people in a decidedly grounded, place-based way”. In relation to the hospitality industry, the dominance of cities can also be explained in a similar way the OTAs (online travel agencies) developed in the first decade of the twenty-first century as a primary distribution channel on the traditional hospitality market. OTAs which are (similarly to the sharing economy platforms) intermediaries in the hospitality market also capitalize in the urban market, where tourism is a short-term, decisions are often spontaneous, customers value standardized product, and there are relatively little repeated visits (Pawlicz, 2019). It is important to observe that both OTAs and the sharing economy platforms have an immense negotiating power not only in relation to their providers but also in dealing with regulating bodies (Carroll & Sileo, 2014; Schegg, 2015). Cities are usually chosen as a research area for most of the academic papers about sharing economy development. E.g. Adamiak (2018) research base consisted only of the cities with a population over 100 000 while Ayoba et al. (2019) use a base of eight largest French cities. Moreover, there are almost no studies about the development of sharing economy in rural areas (Comp. Falk, Larpin & Scaglione, 2019; Pawlicz & Kubicki, 2017). As urban areas are primarily characterized by a high population density following hypotheses emerge:

H1a There is a strong positive relationship between the number of sharing economy active rentals and population across counties in Poland.

H1b There is a strong positive relationship between the number of sharing economy active rentals and population density across counties in Poland.

H1c A number of sharing economy active rentals per 1000 inhabitants is higher in urban counties than in rural counties in Poland.

Traditional hospitality base

Another group of research treats problems of the location of traditional accommodation establishments (e.g. Cró & Martins, 2018; Puciato et al., 2019). Using the evidence from Opole region, Poland Puciato et al. (2019) shows that the presence of new hotels is related to the supply of tourist services and to the intensity of competition within the industry. The likelihood of establishing a new budget hotel decreased with the rise of competition as those accommodation establishments compete mainly in price whereas the relationship between new locations for high-end hotels and the level of industry competition is positive. Another study conducted in Madrid, Spain, also shows that both agglomeration and differentiation strategies can be seen simultaneously (Urtasun & Gutiérrez, 2006).

There are studies which link the location of hotels and sharing economy providers usually within cities (Gutiérrez et al., 2017; Xu et al., 2019) but also within larger areas (Adamiak et al., 2019). Another study conducted in Spain shows a much more intense correlation between the number of sharing economy rentals and the number of tourist apartments than on the number of hotels (Martín et al., 2019). As the cost is a major factor for choosing sharing economy providers, so the correlation between the number of active rentals and all accommodation establishments is expected to be higher than with the number of hotels, motels and pensions.

H2 Correlation between the number of active rentals and the number of all accommodation establishments is higher than that between the number of active rentals and the number of hotels, motels and pensions across counties in Poland.

Tourism attractiveness

Visiting tourism attractions is traditionally the main motive for travelling, so the relationship between the emergence of sharing economy providers should be expected within areas of their intensity. Tourism attractiveness is, however, a complex and ambiguous term that is difficult to measure. It is either measured from a demand-side (in this way number of tourists or a survey among tourists are signs of tourism attractiveness) (Ritchie & Zins, 1978), both demand and supply (Formica & Uysal, 2006) and solely from supply-side (Milewski, 2004). As motives are very different starting from a basic distinction between leisure and business, any tourism attractiveness index is a weighted average of different approaches as, e.g. tourism attrac-

tiveness can be enhanced by development of a new transportation connection (Masson & Petiot, 2009), preservation of natural sceneries (Lee et al., 2010) or even a crime reduction (Altindag, 2014).

The relationship between the location of tourist attractions and the location of hospitality establishments might not always be correlated. Based on the study from Lisbon, Portugal, Cró & Martins (2018) point out that both accessibility to transport and proximity to tourist attractions are not crucial factors for the location of new hotels. Those findings were supported by the paucity of new land and safety of new districts, even if they are located away from nightlife attractions. Those results can be partly explained by business motives of hotel guests and, although Airbnb is aggressively pushing the business segment, still, a majority of their customers are leisure (Lutz & Newlands, 2018). Recent studies of participation motives in the sharing economy show that costs factors and social interaction play a major role (Guttentag et al., 2018; So, Oh & Min, 2018). The difference between the location of a traditional and a sharing economy accommodation establishments is also visible in the results of available research about various aspects of the spatial position of providers and their prices. Using a hedonic price model, price variations are explained by a variation of two main groups of variables: those linked to attributes of the supplier (e.g. the number of rooms, amenities, traits of standard, rating, etc.) and those linked to its location. The former includes the first and foremost distance to the city centre, transportation hub or even congress centre (e.g. Gutiérrez et al., 2017). In the case of sharing economy, the distance between tourist attraction and an accommodation establishment can explain the variation of prices (Deboosere et al., 2019; Dornier & Selmi, 2018; Napierała & Leśniewska, 2014) whereas those factors are hardly considered in hedonic models for traditional hospitality prices. Therefore:

H3a There is a strong positive relationship between the number of sharing economy active rentals and tourism attractiveness index across counties in Poland.

H3b Correlation between the number of active rentals and the cultural tourism attractiveness index is higher than the one between the number of active rentals and the business tourism attractiveness index.

Methodology

To conduct our analysis, data from two main data sources were used: AirDNA for sharing economy development and Statistics Poland (Official Polish Statistical Office) for remaining variables.

As data for sharing economy is not available in official statistics and sharing economy platforms themselves are not publishing any reliable numbers (Comp. Agarwal, Koch & McNab, 2019), it was necessary to be based on data provided by AirDNA, a company which business model is based on monitoring a website activity of two main sharing economy platforms in the accommodation sector (Airbnb and Homeaway) and selling aggregated or detailed data mostly to business in the accommodation sector. AirDNA uses a common freemium model, as they allow to access basic data publicly, whereas more detailed information is available only for paid premium users. It is also possible to purchase a specific set of information for a given region. The data derived from AirDNA are increasingly used in scientific research (Comp. Adamiak, 2018; Agarwal et al., 2019; Ayouba et al., 2019; Dogru & Pekin, 2015; Karakas, 2017). There are three ways in which AirDNA data is obtained: it is either scrapped using specific software (Deboosere et al., 2019), it is purchased (Agarwal et al., 2019; Ayouba et al., 2019), or, and this is the most popular due to simplicity and cost factor, manually collected (Karakas, 2017; Lane & Woodworth, 2016). The other problem of using AirDNA data is its constantly changing methodology: e.g. the main difference between previous studies and the present one is based on the inclusion of HomeAway as a second sharing economy platform apart from Airbnb in the second part of the year 2019.

The main advantage of using AirDNA data is the fact that they are aggregated at a NUTS-4 level which in Poland means data is available for 380 counties (in Polish – *powiat*). Out of those 380 counties in Poland, 66 are city counties which is vital from the goal of the study as those counties represent typical urban areas. Still, numbers are not available for every region as AirDNA does not provide data for regions where there is no sharing economy activity. Moreover, while collecting data, certain biases were also found, as for two regions only partial data was available (for example, in Tatrzański region only data for one city – Zakopane was available). Furthermore, in Poland among 380 counties there are 10 pairs of counties with the same name and the data were available only for one of the counties from each pair. The missing data from those counties were collected manually from Airbnb and HomeAway websites.

There is a small discussion about the reliability of AirDNA data among scholars. Airbnb itself claims that this company simply monitors the activity of their website and as such, it must produce biased results due to the availability of expensive services which are never rented. A representative of Airbnb claims that AirDNA results overestimate the actual size of sharing economy and are frequently used by the hospitality industry as a rationale for the introduction of public regulation that limits this P2P market. In a similar

vein, research conducted in Virginia Beach (tourist city in the USA – population of ca. 430 thousand) showed that AirDNA metrics are biased. According to their study, AirDNA data from one side underestimates the actual size of sharing economy as they utilize only booked listings and, on the other side, it overestimates its profitability for the same reason. Moreover, the authors are of the opinion that AirDNA data cannot be compared to other hospitality measures produced, e.g. by STR, due to inconsistent methodology (Agarwal et al., 2019). Still, those reservations are irrelevant for the present research, where attention is given to spatial diversity of sharing economy and relative, not absolute, numbers are essential.

The second major source of information was Statistics Poland. From their resources data about population across counties, a number of hotel establishments and the total number of accommodation establishments were retrieved. Although the reliability of official statistics is increasingly questioned among practitioners and scholars due to the fact that the number of accommodation establishments operating without, e.g. official classification is on the rise in Poland, it is still considered to be the best source of hospitality market data. Also, data about tourism attractiveness of counties was derived from a special Statistics Poland report. Tourism attractiveness was a sum of cultural, natural and business attractiveness which was computed at the county level in 2014 (Foremska et al., 2015). Each of four coefficients (tourism, cultural, natural and business attractiveness) varies between 0 and 100 where 0 stands for no attractiveness and 100 for perfect attractiveness.

A correlation between variables is calculated using Spearman's rank correlation coefficient as available data does not meet the bivariate normal distribution condition to use Pearson coefficient. Moreover, sharing economy active rentals are concentrated in cities which implies that a few records would have extreme values that may affect Pearson coefficient. A Spearman's coefficient value over .8 will be considered as a very strong and the value between .6 and .79 a strong one.

Results

This study uses descriptive statistics to determine which factors influence the presence of sharing economy providers in the Polish accommodation market. Importantly and unlike previous research, the study includes not only areas where sharing economy flourishes, but also peripheral locations where it is in a nascent stage. Hence data for all 380 counties in Poland were collected in September 2019.

The data about active rentals were available for 274 out of 380 counties (72%). The total number of active rentals in Poland was 43 451 (out of which Warsaw – 7,8k, for a comparison, number of active rentals in three top sharing economy destinations: London – 73k, Paris – 47k, New York – 37k, Budapest – 12,6k, Prague – 13,1k, Kiev – 8,6k).

Warsaw and Krakow were the counties with the highest number of active rentals (7878 and 7424 respectively). The sharing economy accommodation market in Poland seems to be highly concentrated as the top 4 counties (i.e. 1% of all counties) account for 51% of all active rentals and top 10 for 68%. This is confirmed by the relation between mean and median value: median value is 16 active rentals while an average (mean) value is 116. Table 1 presents a general overview of the sharing economy in the Polish accommodation sector.

Table 1. Active rentals in Poland

Total number of counties	380
Counties with >0 active rentals	274
Counties with >=10 active rentals	203
Counties with >=20 active rentals	123
Counties with >=40 active rentals	81
Counties with >=100 active rentals	39
Counties with >=200 active rentals	27
Total number of active rentals	44 128
Mean	116
Q1	9
Q2	16
Q3	50
Active rentals in top4 counties/all active rentals	51%
Active rentals in top10 counties/all active rentals	68%

Source: author's work.

The spatial distribution of active rentals is similar to the traditional hospitality market with the highest number in major metropolises, Baltic coast (North-West Poland) and mountains (southern part of Poland) (figure 1).

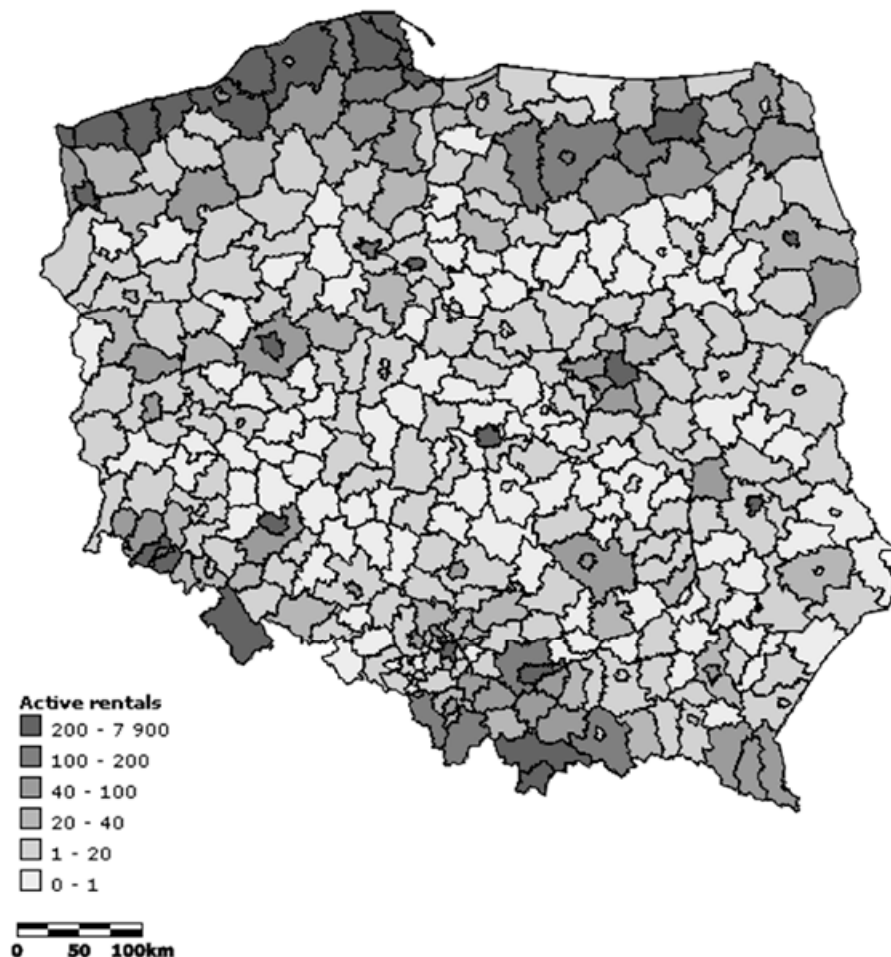


Figure 1. Active rentals on sharing economy in Polish accommodation market across counties

Source: authors' work based on Statistics Poland, 2019.

To show spatial clustering across Poland, a GIZ score was calculated for all counties (figure 2).

There are four major clusters: the first one in North Poland around the city of Gdańsk, the second one around the capital city of Warsaw, the third one across Krakow a major tourist destination and the fourth in the south in Zakopane which is a well-known mountain resort.

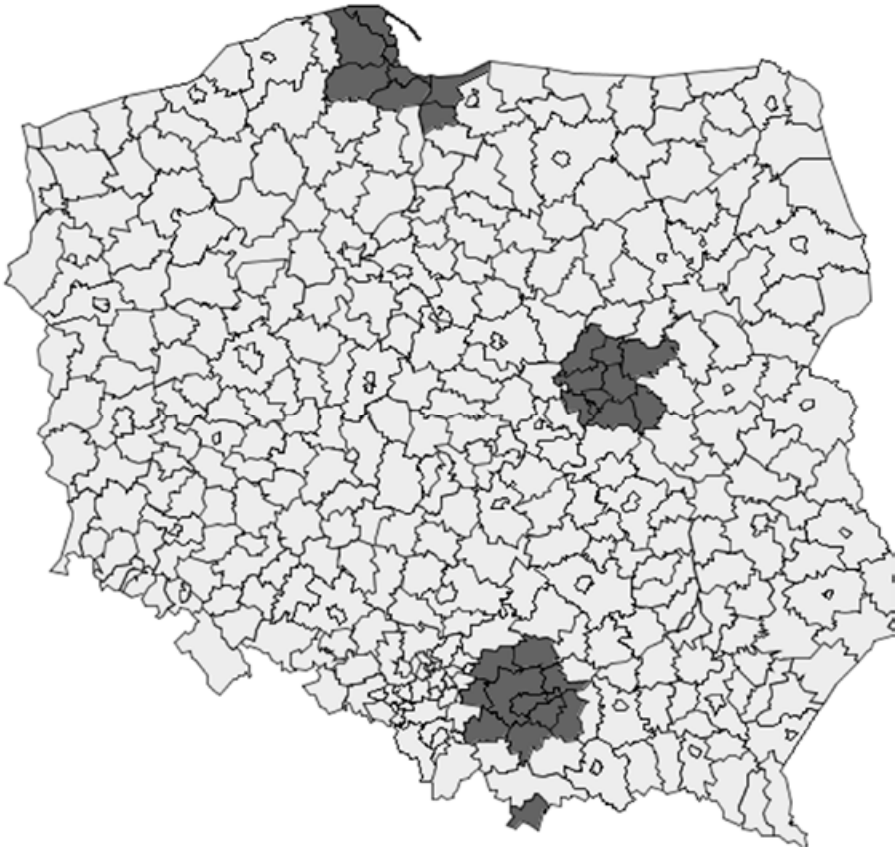


Figure 2. GIZ scores

Light coloured counties represent a score between $<-1,64;1,64>$, Dark coloured counties represent a score above $1,94$.

Source: authors' work.

Population

A county population and the number of active rentals across counties are only moderately positively correlated (Spearman = .41). However, a strong positive correlation can be observed among top destinations, e.g. for top 10 sharing economy counties (i.e. for counties with top 10 values of active rentals Spearman is .77, which means a strong correlation). On the other hand, it is difficult to see any correlation between population and the number of active rentals among less populated counties where the sharing economy market is still not developed. Figure 3 presents a scatter graph showing the relationship between the number of active rentals and the population for

counties with a population under 200 000 and the number of active rentals less than 200 (which represents 343/380= 90% of all counties).

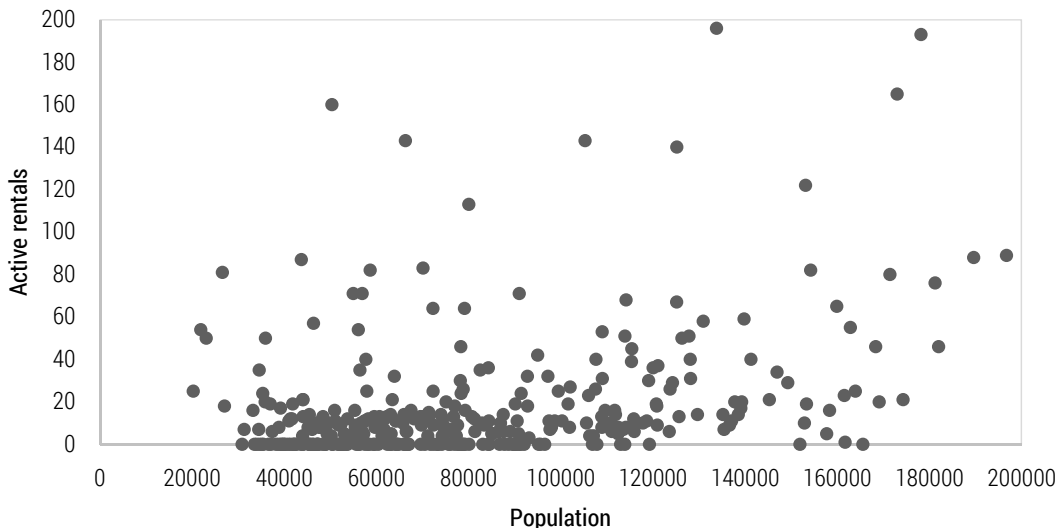


Figure 3. Relationship between population (X) and the number of active rentals (Y)

Source: author's work.

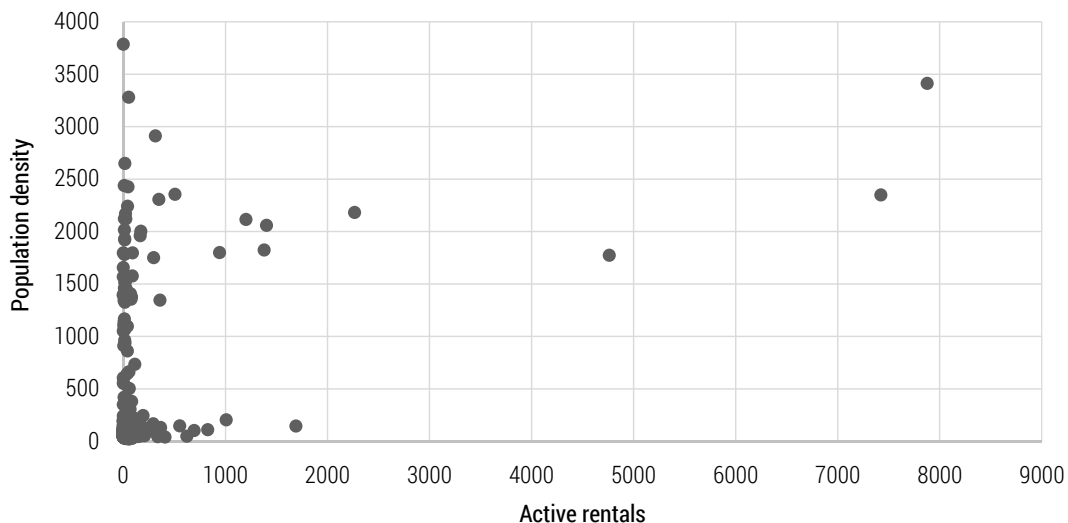


Figure 4. Relationship between the number of active rentals (X) and population density (pop. per km²) (Y)

Source: author's work.

Although sharing economy is widely considered as an urban phenomenon, there was no evidence that the population density and the number of active rentals are correlated (figure 4).

As it is expected from figure 3 Spearman coefficient shows almost no correlation between those two variables (Spearman = .23). The population density in Poland is, however, very diverse: a region with the highest population density is Silesia due to its industrial character whereas North and West (the Baltic Sea coast) regions are traditionally much less populated.

According to the result of an analysis presented in table 2 sharing economy is also in Poland a typical urban phenomenon as 72% of all active rentals in Poland are present in urban counties which represent 33% of the Polish population. So the number of average active rentals per 1000 inhabitants in urban counties is 5 times more than in non-urban counties.

Table 2. Active rentals in urban versus non-urban areas

	Urban	Non-urban
Number of counties	66	314
Number of counties with >0 active rentals	57	217
%	86%	69%
Number of active rentals	31 668	12 460
% of all	72%	28%
Population	12 601 338	25 832 220
%	33%	67%
AR/1000inh	2,51	0,48

Source: author's work.

Sharing economy and traditional hospitality business

According to the Statistics Poland data, there is at least one hotel (or a motel or a pension) in 363 counties and at least one accommodation establishment in all but one county. All in all, there are 11 076 accommodation establishments in Poland out of which 3122 are classified as hotels, motels, and pensions. Both numbers of all accommodation establishments and a number of hotels, motels, and pensions are correlated to the number of active rentals. Spearman coefficient for all establishments is .74 while for hotels, motels and pensions .62, so hypothesis 2 has been supported.

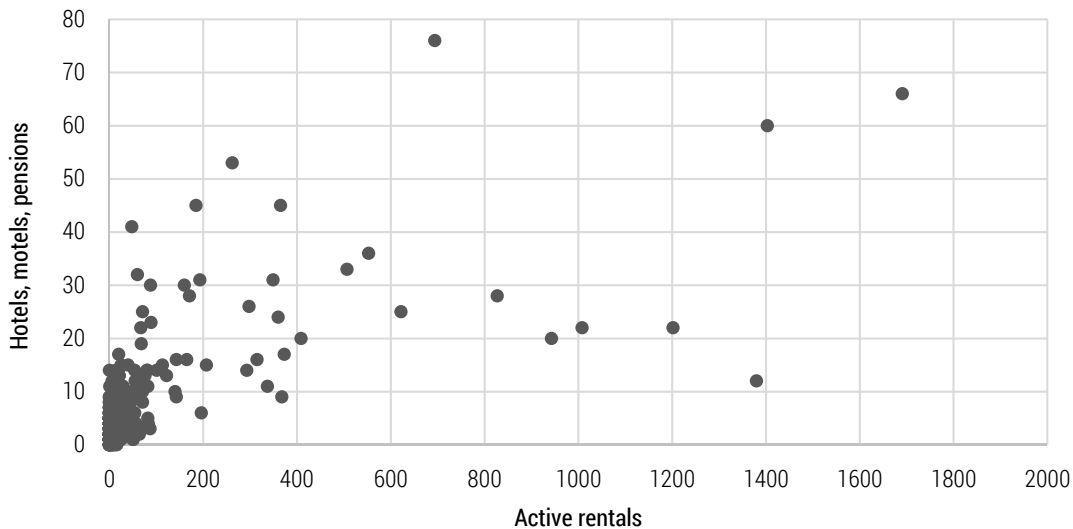


Figure 5. Correlation between the number of active rentals (X) and the number of hotels, motels and pensions (Y) across counties in Poland

Data for 376 counties with active rentals <2000 and number of hotels, motels, and pensions <80.
Source: author's work.

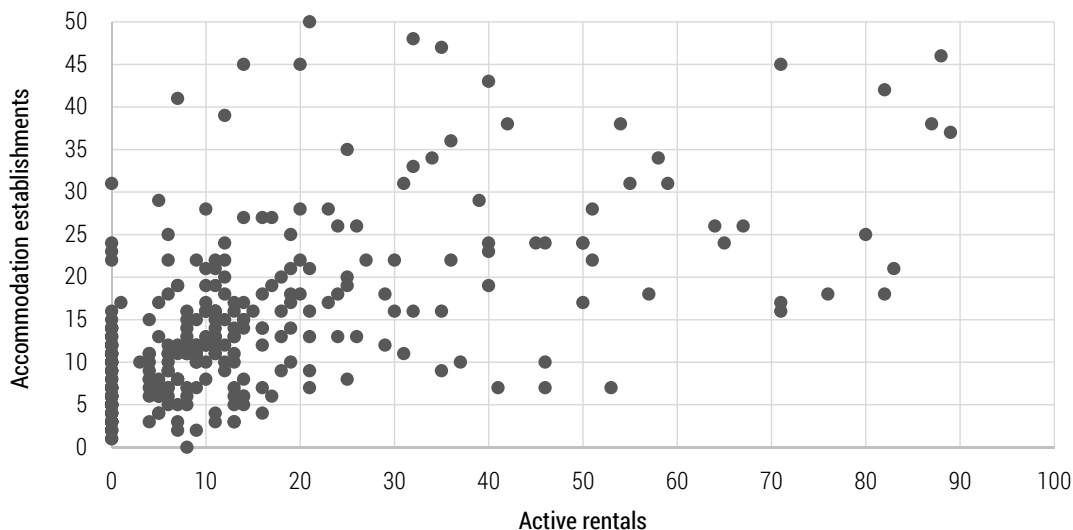


Figure 6. Correlation between the number of active rentals (X) and the number of all accommodation establishments (Y)

The data for 327 counties with the number of active rentals <100 and number of accommodation establishments <50.
Source: author's work.

Figures 5 and 6 suggest that providers on the sharing economy are much more concentrated than in the traditional market as there are more counties with no providers and more counties with exceptionally many. To measure concentration in those three populations Herfindahl-Hirschman Index (HH Index) was calculated. HH index is defined as the sum of the squares of the market shares of the organizations within the industry and ranges from 0 (equal distribution or perfect competition) to 1 (perfect monopoly). The results are shown in table 3.

Table 3. Herfindahl-Hirschman Indices

Active rentals	0,080
Hotels, motels, pensions	0,010
All accommodation establishments	0,013

Source: author's work.

As it can be seen from the table 3 sharing economy establishments are much more concentrated than a traditional hospitality base and, as it can be seen in the figures 4 and 5, its distribution is also correlated. From the country perspective, the emergence of sharing economy led to more concentration in the hospitality market. So the claim held by sharing economy platforms of diversifying spatial distribution of hospitality base is not justified at the country level.

Tourism attractiveness

Tourism attractiveness is measured using four Statistics Poland indices which basic statistics are depicted in table 4. Tourism attractiveness index is computed using the following formula:

$$TAI = 0,4 \cdot CAI + 0,4 \cdot EAI + 0,2 \cdot BAI. \quad (1)$$

Table 4. Tourism attractiveness indices for Polish counties

Index	Tourism attractiveness index	Cultural attractiveness index	Environmental attractiveness index	Business attractiveness index
Acronym	TAI	CAI	EAI	BAI
Mean	4,05	3,75	4,58	3,58
St. deviation	4,97	6,31	6,56	8,22
Max	50,65	74,90	38,98	100,00
Min	0,08	0,18	0,00	0,00

Source: Foremska et al., 2015.

The two most attractive Polish counties are Warsaw and Krakow, which are also the top sharing economy destinations. Figure 7 illustrates the spatial distribution of tourism attractiveness among Polish counties.

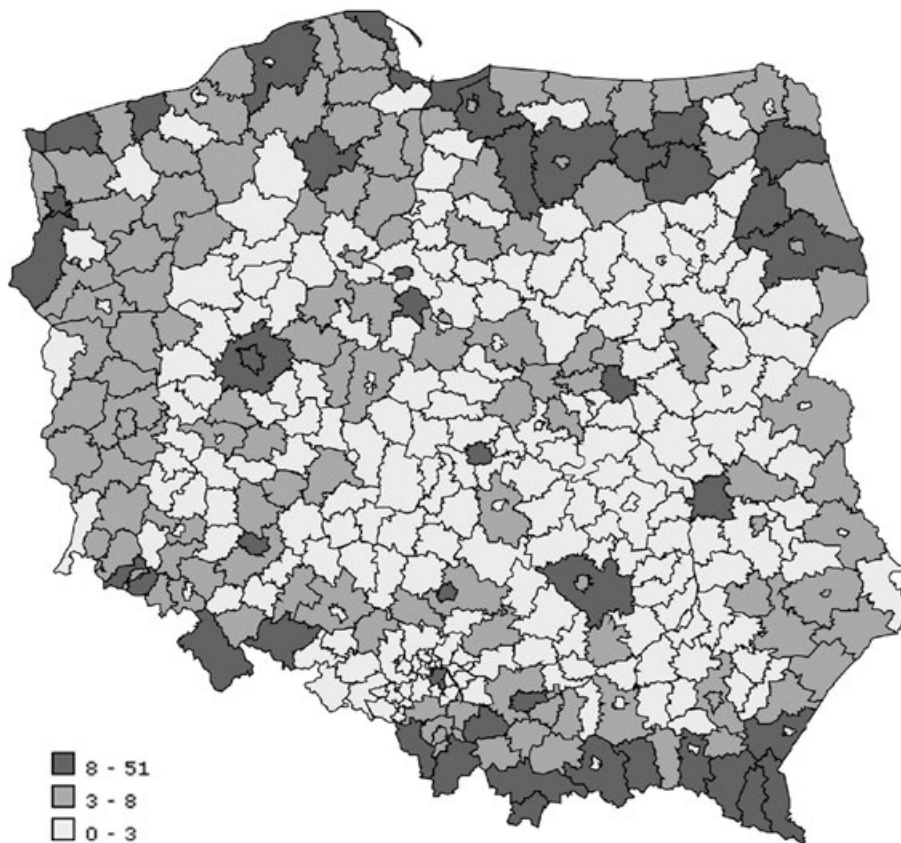


Figure 7. Tourism attractiveness across counties in Poland

Source: author's work based on Foremska et al., 2015.

The most attractive counties in Poland with a few exceptions are major cities, coastline (the West-North of Poland), mountains (the Southern border) and the great lakes (North-East). This, by large, resembles the spatial distribution of sharing economy providers depicted in figure 1. Spearman's correlation coefficient between the number of active rentals and tourism attractiveness index is positive and strong (.65).

All three other tourism attractiveness indices are also positively correlated with tourism attractiveness, however, surprisingly only business index was strongly correlated (.66) while cultural only moderately (.43) and environmental weak (.36).

The sharing economy is, therefore, an urban phenomenon as qualitative studies predicted. The number of active rentals is strongly correlated with the number of traditional accommodation establishments, particularly in the classified hospitality base area. The emergence of sharing economy providers is also correlated with tourism attractiveness (table 5).

Table 5. Results summary

Hypotheses	Result	Supported?
H1a There is a strong positive relationship between the number of sharing economy active rentals and population across counties in Poland	.41	No
H1b There is a strong positive relationship between the number of sharing economy active rentals and population density across counties in Poland	.23	No
H1c A number of sharing economy active rentals per 1000 inhabitants is higher in urban counties than in rural counties in Poland.	2.51 (urban) > 0.48 (non-urban)	Yes
H2 Correlation between the number of active rentals and the number of all accommodation establishments is higher than the one between the number of active rentals and the number of hotels, motels and pensions (HMP) across counties in Poland.	.74 (HMP) > .62 (all)	No
H3a There is a strong positive relationship between the number of sharing economy active rentals and tourism attractiveness index across counties in Poland	.65	Yes
H3b Correlation between the number of active rentals and the cultural tourism attractiveness (CTA) index is higher than the one between the number of active rentals and the business tourism attractiveness (BTA) index.	.43 (CTA) < .66 (BTA)	No

The correlation is calculated as Spearman's coefficient

Source: author's work.

Conclusions and limitations

Several significant findings emerged from this study for future theoretical development efforts in the sharing economy literature. Firstly, based on the previous research studies, a set of potential factors influencing the spatial distribution of sharing economy providers has been built. Sharing economy flourishes in urban areas, and its development is correlated with tourism attractiveness. Other hypotheses, however, were not supported. Still, correlations are much more visible in areas where sharing economy is developed, i.e. when calculations are made only for counties where sharing economy is developed (which supports the findings of Martín et al., 2019).

In evaluating the significant findings from this study, several limitations need to be acknowledged. Firstly, in assessing the size of sharing economy in

the Polish accommodation market, a number of active rentals were used. Alternatively, a number of rooms or places could be used. In case of sharing economy where each room (even in hospitality businesses using sharing economy platforms as a distribution channel) is marketed independently on platforms, this should not produce different results, but certain differences might be observed when analysing data for traditional hospitality business where an average number of rooms and beds across various establishments can vary over space. This shortcoming should be addressed by future research.

Similar considerations should be given to the fact that traditional hotels may use the sharing economy platforms as another way to market their products. Although most of them are independent boutique hotels, B&Bs, and hostels which, according to previous qualitative research are either not included in the official register or constitute just a fraction of supply available through sharing economy platforms, there is no quantitative research in these areas, which is an obvious research gap which need to be amended by future research.

Finally, this study uses data from Poland, and the results cannot be generalized to other regions. The future research could be based on data from other countries which may be different in terms of attractiveness, the structure of the hospitality market, etc. This research is based mostly on data derived from Statistics Poland, which, especially in terms of measuring attractiveness and classifying hospitality market, are specific for Poland, which does not render any direct comparison of results.

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The contribution of the authors

Adam Pawlicz – 50% (concept and objectives, research, reviewed the final manuscript).

Ana-Marija Vrtodusic Hrgovic – 50% (concept and objectives, literature review, reviewed the final manuscript).

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