

# Measuring Collaborative Economy: a case study in tourism statistics

Dr Vasiliki Benaki-Kyprioti

Hellenic Statistical Authority (ELSTAT)

## Abstract

*The collaborative economy has been receiving much policy interest in recent years due to the fact that this phenomenon is growing fast. Digital Economy and Collaborative Economy, being highly interrelated, have created new challenges for businesses, labour market and consumers.*

*In the context of this new environment, there is a need to frame the collaborative economy from the statistical point of view, in order to provide evidence for analysis, as well as statistical indicators that can better inform policy makers and citizens.*

*This calls for the development of new indicators for a wide spectrum of policies in many areas, such as economy, transport, labour market, consumer protection and environment. The challenge for statisticians is to develop a strategy to adapt the existing statistical domains to new circumstances resulting from the complex phenomenon of digital collaborative economy; this can be achieved by transforming the traditional data production cycle, which is usually based on single-source information, into multiple new data sources production, incorporating new data science techniques, acquiring new platforms and making algorithms, all in all, moving from a vertical value chain towards an integrated one, promoting new sources, methods and partners.*

*The purpose of this paper is to present the ongoing actions in Greece as regards the development of a system to measure collaborative economy combining data from different data sources, such as administrative data with data derived from existing surveys.*

*The presentation will mainly focus on the conclusions of a feasibility study on the use of administrative data for compiling accommodation statistics of shared establishments in Greece, including the main opportunities and challenges along with the first experimental statistics as regards the supply side.*

**Key words:** collaborative economy, tourism statistics, accommodation statistics

## I. Introduction

Collaborative economy has been receiving much policy interest in recent years due to the fact that it is a fast growing phenomenon, providing to consumers a new marketplace in order to meet their wants and needs. It is an economic model often defined as a peer-to-peer (P2P) based activity of acquiring, providing or sharing access to goods and services that are facilitated by a community based on-line platform. Digital Economy and Collaborative Economy, being highly interrelated, have created new challenges for businesses, labour market and consumers.

The notion of “sharing” is a historical practice where people were lending or renting out goods to family and friends, because they were known and trusted social contacts. Certain forms of sharing economy are as old as humanity, and historically have their roots in the barter economy of primitive societies.

Nowadays, digital platforms are a widespread practice providing people the opportunity to distribute goods and services to strangers thereby extending an existing practice to a larger social scale, while consumers’ access to goods and services are considerably enhanced. The transactions are regularized via standard contracts and online payment systems, resulting to a significant reduction of the transaction costs. In addition, such digital platforms provide valuable information as regards the overall behaviour of the providers and the features of transactions, thus ensuring users’ trust.

The economic effects of collaborative economy are complex and largely unknown. Although the direct economic benefits are obvious from the large volume of monetary transactions taking place, the distributional effects may be quite skewed.

The direct economic effects of sharing economy are indisputably positive. Millions of transactions now take place that did not happen in the past, because the transaction costs involved in stranger sharing were simply too high. The rise in income or consumer welfare can be understood as a direct consequence of lowering the transaction costs. Studies show that the rise of p2p sharing markets has indirect effects on other markets, such as hotel and car rentals market, as well as on the earnings of their workers, while effects on the supply and price of housing rentals in the areas where home sharing is popular have also been identified.

Besides the above mentioned economic effects, there are also social benefits that mostly refer to the fact that people from different countries and cultures have the opportunity to mingle. Environmental effects, associated with collaborative economy, have also been claimed, since collaborative economy is thought to be eco-friendly and less resource intensive. Nevertheless, there is not yet empirical evidence.

Furthermore, a consideration that may arise refers mainly to the macro-economic impacts of collaborative economy. Although the advent of sharing-economy platforms is recent, the volume of activity on some of these platforms is already sizeable and is growing expansively. The vast majority of digital platforms are creating new markets that expand the volume of commerce and inject additional purchasing power into the economy.

It should be acknowledged that the heterogeneous nature of collaborative economy activities, its conceptual and practical divergences and the lack of a legal framework have caused confusion for addressing this issue.

As noted by the European Commission (2016), the distinction between peers and professional service providers is decisive in determining which regulatory obligations apply to collaborative economy activities.

The need for a concrete regulatory framework is considered extremely important given the negative externalities caused by home sharing and the unfair competition between platforms and traditional operators, in sectors like tourism and transport.

The lack of available data regarding the activities of the collaborative economy hampers the enforcement of regulations and, consequently, policy evaluation. The existing information is based, mostly, on articles in the press, commercial data bases, digital platforms and various studies, but there are no relevant official statistical data.

It is acknowledged that the collaborative accommodation sector is the largest collaborative economy market in Europe, both in terms of volume of transactions and its peer base. The European Commission (2017) has estimated that this sector generates EUR 6.6 billion in peer expenditure and EUR 4.1 billion in peer revenues each year. The same study indicates that the sector accounts for 8.2% of all collaborative economy consumers in the EU and for 5.4% of all peer providers. Another study conducted by PwC (2016) estimates that the accommodation sector accounts for more transaction value than the sectors of transport, collaborative finance and on-demand services combined, with a total of EUR 15.1 billion. As regards platform revenues, it is estimated that it brings in EUR 1.15 billion each year, although it occupies the second place after the transport sector.

Given the fact that the tourism sector is one of the main drivers for the development of the Greek economy which affects, directly or indirectly, main macroeconomic aggregates, such as GDP, BoP, employment, investment, consumption, imports, etc., as well as the relevant national and regional policies, it proves to be a decisive component for the development and, subsequently, the sustainability of the economy and society.

Taking into account the importance of the tourism sector for the Greek economy and since it was revealed that the most widespread activity in the framework of collaborative economy, from both the demand and the supply side, is accommodation in private lodgings that is facilitated by digital platforms, the activities of the Hellenic Statistical Authority (ELSTAT) focused on the development of the relevant statistical system for capturing this phenomenon.

The purpose of this paper is to present the ongoing actions in Greece as regards the development of a system to measure collaborative economy in the tourism accommodation sector, combining data from different data sources, such as administrative data and data derived from existing surveys.

The presentation will mainly focus on the conclusions of the relevant feasibility study on the use of administrative data for compiling capacity and occupancy statistics of shared tourist accommodation establishments in Greece, including the main opportunities and challenges along with the first experimental statistics as regards the supply side.

## **II. Measuring Collaborative Economy in the tourist accommodation sector**

In the context of this new environment, there is a need to frame the collaborative economy from the statistical point of view in order to provide evidence for analysis, as well as statistical indicators that can better inform policy makers and citizens, especially in the tourist accommodation sector, since it appears that the collaborative accommodation sector represents the largest collaborative economy market in Europe in terms of both the volume of transactions and its peer base.

The starting point was a literature review, aiming at defining the scope of the collaborative economy focusing on the tourist accommodation sector and adapting it into the statistical framework.

### **1. Need to define the concept of collaborative economy**

In the international literature, a lot of terms can be met such as "sharing economy", "collaborative economy", "collaborative consumption", "peer economy", "access economy", "social economy", "economy of solidarity", "cyclical economy", "functional economy", "green economy", "economy blue", "economy of solutions", "horizontal economy", "tailor-made economy", "economy of platforms", "economy of the occasional employment" (gig economy). In essence, all of the above terms are used to describe an identical concept referring to a hybrid market model based on the business model of peer-to-peer exchanges. Such transactions are often conducted between members of online communities via web pages, specifically designed for that purpose.

Until now, many efforts have been made to develop and define this phenomenon. Given the variety and diversity of collaborative business models, it is difficult to provide a single definition. Actually, this is why it is not easy to define in a comprehensive manner the phenomenon of collaborative economy.

As a first step, it was attempted to elaborate all the relevant definitions provided about collaborative economy, at international and national level.

### *EU Definition*

Recently, the European Commission, in an attempt to define the phenomenon of collaborative economy, presented at its Communication of 2<sup>nd</sup> of June 2016 the following definition:

"Collaborative economy" refers to business models where activities are facilitated by collaborative platforms that create an open marketplace for the temporary usage of goods or services often provided by private individuals. The collaborative economy involves three categories of actors: (i) service providers who share assets, resources, time and/or skills — these can be private individuals offering services on an occasional basis ('peers') or service providers acting in their professional capacity ("professional services providers"); (ii) users of these; and (iii) intermediaries that connect — via an online platform — providers with users and that facilitate transactions between them ('collaborative platforms'). Collaborative economy transactions generally do not involve a change of ownership and can be carried out for profit or not-for-profit.

### *National definition*

There are not many countries that have provided a national definition for collaborative economy. In Greece the concept of collaborative economy is defined in the Law 4446/2016, art. 113 that has been adopted in December 2016, with the aim to regulate the short-term leases of property in the framework of collaborative economy.

The national definition is in line with the one adopted by the European Commission Communication: "Collaborative economy" refers to business models where digital platforms create an open market place for the temporary usage of goods or services often provided by private individuals".

Moreover, the abovementioned national legal framework defines the concept of "short-term lease", "manager of the property" (who is the peer provider) and "digital platform", in the context of collaborative economy in the short-term lease sector.

## **2. Exploring possible data sources**

In the context of the production of tourist accommodation statistics, the possibility of using various data sources was explored. The use of available administrative data is an important perspective to measure tourist accommodation from the supply side, while the collection of additional data through existing surveys offers the possibility to measure this phenomenon from the demand side.

### **2.1 Administrative data sources**

The challenges for using administrative data for compiling statistical indicators are that full coverage of the reference population could be achieved, while at the same time, the production of new statistical indicators to meet growing users' needs could be accomplished without any additional burden on respondents and at lower production cost. Nevertheless, there are also considerations due to the fact that the administrative data are collected for non-statistical purposes and the relevant authorities control the data collection and processing, while changes in the regulatory framework may lead to breaks in statistical data series, while sometimes there are restrictions to their access due to confidentiality issues.

At national level, a regulatory framework has been set up for the collaborative economy in the sector of tourist accommodation, with the aim to integrate, monitor and control the relevant activities and address identified shadow economy phenomena, as well. In particular, a legal

framework for the regulation of short-term leases in the context of collaborative economy was adopted in December 2016 (Article 111 of the Law No 4446/2016 “Arrangements for short-term lease property in the context of collaborative economy”). This legislation was amended in May 2017 (Article 84, Law No 4472/2017) and, in addition to the provisions of the Income Tax Code governing taxation of short term Rentals’ income (Article 39A, Law 4172/2013 as in force), sets up the current regulatory framework governing the short-term property leases, in the context of the collaborative economy in Greece.

The aforementioned legal framework, on the one hand, defines the scope of application of its provisions<sup>1</sup> and, on the other hand, sets the limits between business activity and the exploitation of property by natural or legal persons, by placing restrictions on the services offered by short-term property leases in the context of collaborative economy. In particular, the short-term tourist accommodation of the collaborative economy may be leased furnished but without any other services, except from the provision of bed linen. If any other services are provided, then the activity is considered to be a business activity.

In addition, the regulatory framework defines the obligations of the tourist accommodation services providers within the framework of the collaborative economy, which include the obligation to register the properties that are offered for lease using digital platforms, as well as the obligation to submit a lease declaration for each relevant transaction. The main objective is to create a register of properties leased through digital platforms, as well as to monitor the relevant leases, by creating a database where lease declarations will be submitted. A web application system was developed by the tax authorities and is operating since August 2018.

Furthermore, the aforementioned regulatory framework provides for the imposition of fines in the cases where the obligations arising from the legislation are not fulfilled.

#### *Tax Register of Short-Term Lease Properties*

Any natural or legal person who post a property for lease on the digital platforms of the collaborative economy have to register each property to the Tax Authority system. The register is updated on a daily basis. Once a property is registered, a unique number, “Property Registration Number”, is assigned to it. The Property Registration Number should be clearly indicated on the digital platforms where the property is posted for lease.

#### *Data base of “short term lease” declarations*

A “Short Term Lease” declaration has to be submitted to the tax authority system for every short-term lease contract that is performed via the digital platforms. The declaration should be submitted within 20 days after the end of the month following the end of each lease.

##### 2.1.1 Analysis of the structure and the content of the tax data on collaborative accommodation

###### 2.1.1.a Identification of the variables that could be derived from the administrative data

A study was conducted in order to identify the characteristics of statistical relevance for tourist accommodation in private lodgings that could be derived from the tax data.

---

<sup>1</sup> The current legislative framework defines the concepts of the digital platform, the sharing economy and specifies the conditions for qualifying a lease transaction as a lease of immovable property in the context of the sharing economy.

Tax Register of Short-Term Lease Property. The characteristics included in the register are:

- Property Registration Number
- Tax identification number of the property manager (administrator)
- Status of the manager (owner, co-owner, lessee, etc)
- Rental type (entire or partial leasing)
- Rental size (in square meters)
- Location of the property (region, municipality, post address, etc.)

Database of the “short-term property lease”. The information included in each record of short-term residential rental contains the following information:

- Property Registration Number
- Arrival date
- Departure date
- Total agreed rental
- Mode of payment
- Name of the digital platform that performed the intermediation transaction
- For domestic lessees, the tax identification number
- For foreign lessees, the passport number (for third countries) or the number of ID card ( for EU countries)

2.1.1.b Comparative analysis between statistical characteristics and characteristics from tax data in order to identify differences in definitions

In turn, a comparative study was carried out between the statistical characteristics and the characteristics of the tax authority data. It has been observed that the reference population is the same, since the tax data do cover the short-term property leases through digital platforms, excluding booking with regard to licensed tourist accommodation, even if such bookings are carried out via digital platforms. Moreover, as regards the content of the characteristics the study revealed that the statistical characteristics are grouped into 3 categories: characteristics completely identical, partially identical and characteristics for which there is no available information.

In particular, it was pointed out that the statistical variables for tourist accommodation on private lodgings that could be derived from the tax data are the following:

From the Tax Register of Short-Term Lease Property information regarding the accommodation capacity could be derived, at national and regional level, such as:

- the number of private properties,
- the size in terms of square meters of the private properties and
- location of the property (region, municipality, post address, etc.)

From the Database of the “short-term property lease”, information regarding the occupancy of tourist accommodation of private lodgings by country of residence of the guests, at national and regional level could be derived, such as:

- number of leases
- number of days of lease
- income generated
- all information is available broken down by digital platform

However, there are some drawbacks, such as missing characteristics i.e. number of beds and rooms, as well the number of guests for each lease, etc. The study shows that additional information is possible to be derived from other administrative sources or/and alternative data sources, such as web scraping of digital platforms.

### 2.1.2 Experimental statistics

In the context of the analysis of the available tax data for the short-term property leases through digital platforms, a set of data was provided by the tax authorities in order for ELSTAT to make a first assessment on the quality of information provided, in terms of importance, relevance and plausibility.

In this framework, official statistics on the tourism sector are presented below, along with tax data on short-term property leases in order to showcase the perspective of producing statistics on tourist accommodation in the context of collaborative economy in Greece, from the supply side.

It should be noted that the tax data that were provided in the context of this exercise are provisional due to the fact that the primary data have not been exhaustively processed either by the tax authorities or by ELSTAT, since the web system on the collaborative economy for tourist accommodation of the tax authorities was put into operation on 30 August 2018 and it is still open for the submission of the declarations for the properties leases for the period January-October 2018, with a deadline of 30 November 2018.

**Table 1. Capacity of tourist accommodation establishments by type of establishment, 2017**

	Hotels and similar establishments	Short-stay accommodation establishments	Tourist campsites	Total
<b>Establishments</b>	9,772	25,645	302	35,719
<b>Bedrooms</b>	409,873	173,200*		
<b>Bed places</b>	794,507	397,460	81,509	1,273,476

\*: Estimation

Source: ELSTAT

**Table 2. Accommodation statistics by type of establishment and by resident and non-resident tourists, 2017**

		Hotels and similar establishments	Short-stay accommodation establishments*	Tourist campsites	Total
<b>All guests</b>	Arrivals	20,936,316	4,831,783	367,819	26,135,918
	Nights spent	87,628,373	21,968,111	1,674,998	111,271,482
	Average nights spent per guest	4.2	4.5	4.6	4.3
<b>Residents</b>	Arrivals	6,105,805	1,967,906	133,184	8,206,895
	Nights spent	14,154,141	7,028,557	804,398	21,987,096
	Average nights spent per guest	2.3	3.6	6.0	2.7
<b>Non residents</b>	Arrivals	14,830,511	2,863,877	234,635	17,929,023
	Nights spent	73,474,232	14,939,554	870,600	89,284,386
	Average nights spent per guest	5.0	5.2	3.7	5.0

\*: Estimation

Source: ELSTAT

According to the official statistics, in Greece there are 9,772 hotels and similar establishments accounting for 409,873 bedrooms and 794,507 bed places and 25,645 short stay accommodation establishments accounting for 173,200 bedrooms and 397,460 bed places. The average nights spent per guest is 4.2 for hotels and 4.5 for short stay accommodation establishments, while the corresponding average is much lower for residents (amounting to 2.3 nights spent in hotels and 3.6 in short stay accommodation) compared with non residents for which the average number of nights spent is 5.0 and 5.2, respectively.

On the basis of the latest available tax data, on 9 November 2018, it is observed that 27,912 private properties are registered to the Short-Term Lease Property Register. The majority of them was declared for entire property leasing, while approximately 1 out of 4 registered properties was declared for partial leasing (not entire home). The manager of the majority of the registered properties was the owner or co/owner of the property, while for the rest the manager was a lessee or other types of private ownership (i.e. heir, etc.).

The average days per lease amounts to 6 days, with residents scoring an average of 9.2 days, while non residents only 5.5 days. The average rent per day amounts to 61.5 €. Residents usually choose cheaper leases amounting to an average of 35.8 € rent per day, while for non residents the average seems to be higher, at 69.1 €.

Interesting findings resulted also from the analysis of the distribution of these properties by regional unit, approximately at NUTS 3 level. As presented in Map 1, there is a high concentration of more than 4,000 private lodgings in the area of Athens (capital of Greece), followed by the surrounding areas of Athens, mostly at the coastal areas of Attiki region (NUTS 2) where the capital of Athens is located. A similar pattern is observed for the area of Thessaloniki regional unit that is the second biggest city of Greece in terms of population and Chalkidiki regional unit that is a coastal area located next to Thessaloniki. A general conclusion could be that the high concentration of the short term lease properties is observed around urban and semi-urban areas, as well in the biggest Greek islands, which are the most popular tourist destination.

Another interesting observation from the first figures based on short-term lease declarations concerns the digital platforms via which the transactions take place. The most widespread platform in terms of number of leases and days of lease is *Airbnb*, followed by *Booking.com*, while *Home away* platform accounts for a very low share (Graph 1). This is an expected finding, which is also in accordance with references in relevant articles.

**Table 3. Short-term lease properties by rental type and by status of the manager**  
(provisional data – reference date 9/11/2018)

<b>Total number of registered properties</b>	<b>27,912</b>
<b>Rental type</b>	
Entire home	20,201
Partial leasing	7,711
<b>Status of the manager</b>	
Owner or co-owner of the property	21,483
Other, such as lessee, etc	6,429

Source: Tax authorities (IAPR)

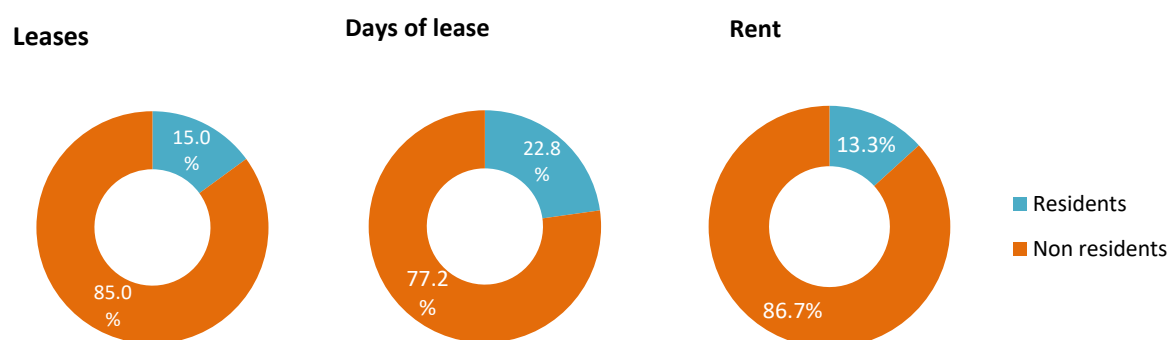


**Table 4. Average days of lease and average rent per day of lease, by resident and non-resident tourists in short-term lease properties, 2018 (provisional data)**

	Average days per lease	Average rent per day of lease (Euro)
<b>Total leases</b>	6.0	61.5
<b>Leases by residents</b>	9.2	35.8
<b>Leases by non residents</b>	5.5	69.1

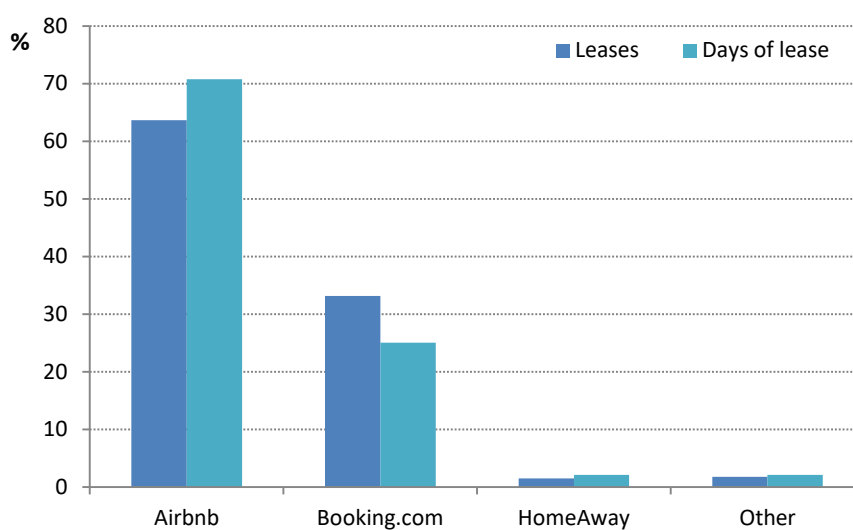
Source: Tax authorities (IAPR)

**Graph 1. Leases, days of lease and rent paid by residents and non-residents (%), 2018 (provisional data)**



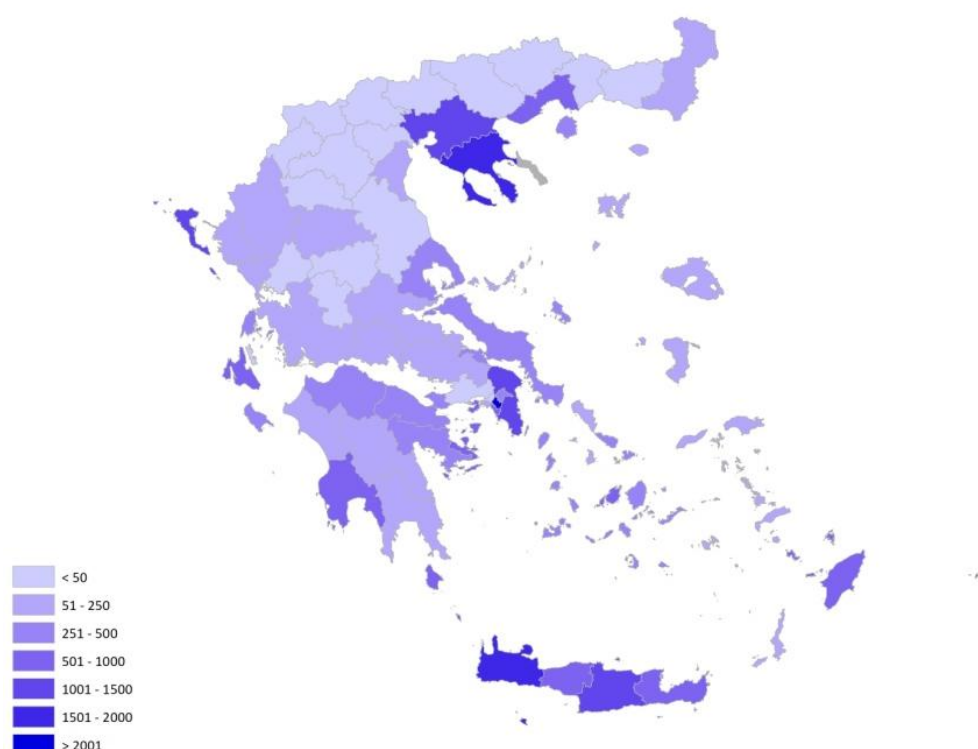
Source: Tax authorities (IAPR)

**Graph 2. Leases and days of lease by digital platform (%), 2018 (provisional data)**



Source: Tax authorities (IAPR)

**Map 1. Short-term lease properties by regional unit, 2018**  
(provisional data)



Source: Tax authorities (IAPR)

## 2.2 Existing surveys

ELSTAT could harness the administrative data and combine them with data from existing surveys or censuses conducted on household and individuals (Tourism demand survey, Survey on the use of ICT, HBS, population and housing census, etc.) with the aim to compile new statistical indicators as regards qualitative and quantitative characteristics on collaborative economy in the tourism accommodation sector.

ELSTAT is already using existing surveys to collect information on collaborative tourist accommodation from the demand side. In particular, since the reference year 2017, ELSTAT produces collaborative economy indicators in the frame of the ICT usage survey and measures, on a pilot basis, via the Tourism Demand Survey, the use of private accommodation booked via digital platforms, as a main means of accommodation of the trips made by resident tourists.

## III. Future challenges

On the basis of the analysis of the structure and the content of the tax data on collaborative accommodation, it is considered that this source could provide a good base for measuring the collaborative tourist accommodation. To this end, collaboration with the tax authorities is ongoing in order to arrange the formalities to get access to their data base.

The Hellenic Statistical Authority has developed all the necessary technical infrastructure and acquired the required expertise to receive and process administrative data in order to compile relevant statistical indicators. It should be noted that, cooperation has already been established,

since 2016, with tax authorities for the regular transmission of tax data for the compilation of Business Statistics.

ELSTAT will continue to explore the use of the available administrative data for producing statistics on tourist accommodation in the context of the collaborative economy and will further its work towards integrating variables of statistical interest from various administrative sources, mainly from tax authorities.

In addition, ELSTAT explores the possibility to collect data on digital accommodation platforms with the use of web-scraping techniques. In this framework, ELSTAT is participating to a European project with a network of countries with the aim to develop the relevant methodology for web scraping and the methodology for combining data from different sources.

The challenge for statisticians is to develop a strategy to adapt the existing statistical domains to new circumstances resulting from the complex phenomenon of digital collaborative economy; this can be achieved by transforming the traditional data production cycle, which is usually based on single-source information, into multiple new data sources production, incorporating new data science techniques, acquiring new platforms and making algorithms, all in all, moving from a vertical value chain towards an integrated one promoting new sources, methods and partners.

## References

- [1] Art. 111 'Arrangements for short-term rental of real estate in the context of the sharing economy.' of Greek Law 4446/2016 'Bankruptcy Code, Administrative Justice, Fees-Fees, Voluntary Reveal of Taxable Matter of Past Years, Electronic Transactions, Amendments to Law 4270/2014 and other provisions'.
- [2] Art. 84 'Amendments to Article 111 of Law 4446/2016' of Greek Law 4472/2017 'Public pension provisions and amendment of the provisions of Law 4387/2016, measures for the implementation of fiscal targets and reforms, social support measures and labour regulations, Medium-term Financial Strategy Framework 2018-2021 and other provisions'.
- [3] Benkler, Y. (2004). Sharing nicely: On shareable goods and the emergence of sharing as a modality of economic production. *Yale LJ*, 114, 273-358.
- [4] Botsman, R., & Rogers, R. (2011). *What's mine is yours: how collaborative consumption is changing the way we live*. London: Collins.
- [5] European Commission (2016a). A European agenda for the collaborative economy. COM(2016) 356 final. Available at: <https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-356-EN-F1-1.PDF>
- [6] European Commission (2016b). Opinion of the European Economic and Social Committee on the 'Sharing economy and self-regulation' (exploratory opinion). *OJ C 303*, p. 36–44.
- [7] European Commission (2017). Exploratory study of consumer issues in online peer-to-peer platform markets. Available at: [http://ec.europa.eu/newsroom/just/item-detail.cfm?&item\\_id=77704](http://ec.europa.eu/newsroom/just/item-detail.cfm?&item_id=77704)
- [8] European Commission (2018). Study to monitor the business and regulatory environment affecting the collaborative economy in the EU. Available at:

<https://publications.europa.eu/en/publication-detail/-/publication/79bee7ad-6d22-11e8-9483-01aa75ed71a1/language-en/format-PDF/source-72448577>

[9] PwC (2016). Assessing the size and presence of the collaborative economy in Europe. Assessment prepared for DG Internal Market, Industry, Entrepreneurship and SMEs. Available at: <http://ec.europa.eu/DocsRoom/documents/16952/attachments/1/translations/en/renditions/native>

[10] Frenken, K., & Schor, J. (2017). Putting the sharing economy into perspective. *Environmental Innovation and Societal Transitions*, 23, 3-10.

[11] Wengronowitz, R., & Schor, J. B. (2017). The new sharing economy: enacting the eco-habitus. In *Social Change and the Coming of Post-consumer Society* (pp. 47-64). Routledge.