

**STATISTICS DIRECTORATE
COMMITTEE ON STATISTICS AND STATISTICAL POLICY**

Working Party on National Accounts

Measuring challenges of the sharing economy: the case of Airbnb

**To be held on 9-10 November 2017
OECD Conference Centre
Beginning at 9:30 am on the first day**

This document has been prepared by Leo Hiemstra – Statistics Netherlands and will be presented under item 13 of the draft agenda.

The complete document is only available in PDF format.

JT03421837

Measuring challenges of the sharing economy: the case of Airbnb

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Paper presented at:
OECD Working Party on National Accounts
9-10 November 2017, Paris

Remarks:

The views expressed in this paper are those of the author and do not necessarily reflect the policies of Statistics Netherlands.

Date: 25 October 2017

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1. Introduction

The rapid emergence of the sharing economy is made possible by modern information technology. Originally the sharing of goods was mostly a social phenomenon, but recently more and more commercial applications have arisen. One of the most striking features of the sharing economy is the fading of the traditional role of economic players. Examples are crowdfunding platforms, taxi services provided by households and renting out of private houses. The last-mentioned example is one of the most prominent examples of the sharing economy. Although many platforms exist, Airbnb is by far the largest one and almost worldwide active. There is much to be said about the sharing economy, both positive and negative. This paper will focus on the measurement aspects of renting private houses: how to get the information needed and how to fit this information in the existing national accounts framework.

Airbnb is an American company. It is an online marketplace enabling people to rent short term lodging from private house owners. The company was established in 2008 and is active in the Netherlands since 2009. The use of Airbnb has grown fast in the Netherlands. For the 2010 benchmark revision no specific estimates were made for Airbnb; for the 2015 benchmark revision it was necessary to do so.

2. Available information

At the moment Statistics Netherlands does not directly collect information on the supply of housing services by Airbnb. The information used is obtained from articles in the press and on internet, studies and reports from universities, municipalities, etc. (see annex 3). Luckily in the press and other media a lot of attention is paid to Airbnb and other online platforms, not seldom to the negative aspects. Often this information is restricted to the city of Amsterdam, since the supply of accommodations is very much concentrated in and around Amsterdam.

The usual problems occur when data from this type of information sources is combined: A lot of information is qualitative instead of quantitative, definitions differ between sources or are not specified, figures for different time periods are given, etc¹. Nevertheless, by combining the available information estimates can be made for the number of rooms and the total value of rents. Although Airbnb is by far the biggest platform in the Netherlands in this field, it is not the only one. In a special report by the municipality of Amsterdam 17 different platforms active in the Amsterdam area were identified. According to this report 75% of the houses in Amsterdam that are offered for short term renting can be found on Airbnb and 25% on other websites. This does not necessarily mean that the market share of Airbnb is 75%. Many house owners advertise on more than one site. Moreover the number of available houses on a site does not necessarily reflect the number of bookings.

¹ See annex 1 for an impression of the sources used and the way they have been combined.

3. Estimation of production value

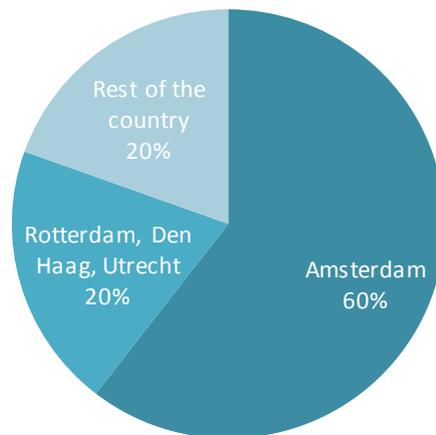
Combining several sources (see annex 1) has resulted in an estimate of the number of rented accommodations and the rent revenues for the period 2009-2016 for Airbnb (table 1). As can be seen from table 1 the use of Airbnb has grown very fast in this period; between 2011 and 2015 the rent revenues almost tripled every year.

Table 1: Rented accommodations and revenues

Year	Number of nights	Revenue (mln €)
2009	0,0	0,0
2010	30,4	3,4
2011	30,4	3,4
2012	91,1	10,1
2013	284,8	31,5
2014	569,7	63,0
2015	1424,2	157,5
2016	1700,0	188,0

In 2016 the growth rate seems to slow down somewhat. This may have several reasons. Firstly, the fast growth of Airbnb has led to several negative side-effects. For that reason municipalities (especially Amsterdam) have taken control measures to limit the further growth. Secondly, up till now Airbnb was mostly used in the Amsterdam region. There is not much room for further growth there. However, in more recent years the use of rented accommodations is also growing in other parts of the country. Therefore it is likely that it will continue to grow further in the coming years, probably at a somewhat slower pace.

Figure 1: Number of available rooms in the Netherlands on Airbnb, July 2015



Source: Business insider.nl

4. Estimation of other transactions

Most information that can be gathered from the press and other public sources is limited to the data presented above: the number of rooms and the total rental revenues. Of course, for national accounts purposes other information needs to be collected. For example:

- Intermediate consumption of Airbnb hosts: The use of goods and services purchased by the house-owners for their rental activities. This can for example be costs for heating, electricity and water, but also costs of food and drinks to provide breakfast to the guests. The fee to be paid to Airbnb should also be included here.
- The final consumption by guests of the produced lodging services (in case the guests are residents) and of the fee to be paid to Airbnb.
- The export of lodging services (in case the guests are non-residents).

A complicating factor is, as is the case in many applications of the sharing economy that the traditional role of producer and consumer fades and becomes mixed. In the national accounts house owners are already seen as producers of services (self-produced housing services for their own final use). Renting out their house means that corrections have to be made on their own consumption of self-produced housing services to avoid double counting. The same is true for other transactions like intermediate consumption. Payments made by households for heating, water, food and drinks that are fully counted as final household consumption should be corrected for the part that is in fact intermediate consumption.

This mixture of roles of economic players is typical for many cases of the sharing economy. For example in the case of Uber taxi services (at the moment forbidden in the Netherlands) private car owners use their car to provide taxi services. Their cars, fully counted as household final consumption in the national accounts should in fact partly be regarded as investment goods and their expenditures on fuel, maintenance, etc. as intermediate consumption of NACE 49 instead of final household consumption. Another example is Snappcar: households renting out their private car. Again, part of final household consumption should be transferred to investment and intermediate consumption of NACE 77.

Production value

The value that should be added to the production of accommodation services to account for Airbnb can be found in table 1. For 2015 (the benchmark revision year of the Dutch national accounts) this amounts to 158 mln. euro.

As mentioned before, the housing services produced by owner occupiers of houses are already registered as production in the national accounts. This means that a correction has to be made. The amount of the correction is of course much lower than the 158 charged to the guests. The value is estimated to be 41 mln. euro. The estimation method is described in annex 2.

Cleaning services are charged separately to guests and should be added to the production value. Some research on the Airbnb website shows that the cleaning costs differ between 20€ and 50€ for each booking. In case of 1,4 mln. overnight stays and an average length of stay of 3 nights, average cleaning costs of 30€ leads to a value of $1,4 \text{ mln.} / 3 * 30€ = 14 \text{ mln.}$ euro.

Intermediate consumption

The intermediate consumption connected with renting out private homes consists of:

Small households purchases on for example toilet paper, food and drinks for breakfast,

- Cleaning products,
- Costs for water, heating and electricity,
- The Airbnb mediation fee.

For the first item no data are available. The assumption made is that these costs amount to 5€ per guest per night. With 1,4 mln. overnight stays and an average group size of 2,5 persons the total value is 18 mln. euro

Cleaning costs are estimated to be 14 mln. euro (see above).

Costs for water heating and electricity are derived from the total consumption value by households in the Netherlands (8398 mln. € in 2015). The ratio of Airbnb houses/total housing stock is $15000/7211229$ and the maximum number of days per year house owners are allowed to rent out their house is 60 days. This means that the water and energy costs can be estimated as follows $(15000/7211229) * (60/365) * 88398 = 3 \text{ mln. €}$.

The fee charged by Airbnb to the owners 3% of the rent charged to the guests, i.e. 5 mln. euro.

Other transactions

The supply of accommodation services produced by house-owners needs of course also to be matched by the use of these services. According to the country report published by Airbnb 83% of the Airbnb guests in the Netherlands are foreigners. This means that $83% * 172 \text{ mln. euro} = 143 \text{ mln. euro}$ of the accommodation services is export of services. The remaining part (29 mln. euro) is final consumption of households.

Airbnb service charges. Airbnb charges to house owner as well as the guests. The service fee charged to the house owners is estimated above. The fee charged to the guest is 6 to 12% of the rent to be paid (depending on the amount). Here a percentage 10% is used. The fee paid by resident guests is added to final household consumption 10% of 29 mln. euro = 3 mln. euro); the fee paid by non-residents is not registered in the Dutch national accounts, because it is a transaction between non-residents.

Import of services: Since Airbnb is a foreign company the service charge paid by house owners and guests concerns an import of services (resp. 5 and 3 mln. euro).

5. Overview of transactions

Table 2 shows the transaction that should be added to the national accounts. Because all the previous estimates were made especially for Airbnb, the figures in table 2 are raised by 25%.

Table 2: Transactions to be included, 2015

Production value	215
<i>Of which:</i>	
<i>Accommodation services</i>	215
Intermediate consumption	50
<i>Of which:</i>	
<i>Several goods</i>	40
<i>Commission paid to Airbnb</i>	6
<i>Electricity, gas</i>	4
Gross value added	165
<i>Of which:</i>	
<i>Tourist taxes</i>	10
<i>Gross operating surplus</i>	155
Imports of services:	10
<i>Of which:</i>	
<i>Commission paid to Airbnb by households and homeowners</i>	10
Exports of services:	179
<i>Of which:</i>	
<i>Accommodation services to foreign tourists</i>	179
Consumption of households:	40
<i>Of which:</i>	
<i>Accommodation services to domestic tourists</i>	36
<i>Commission paid to Airbnb</i>	4

As argued before some correction have to be made to avoid double counting or misclassification of transactions. These corrections can be found in table 3.

Table 3: Corrections to be made, 2015

Production value	-51
<i>Of which:</i>	
<i>Use of own house by owner occupier</i>	-51
Consumption of households:	-95
<i>Of which:</i>	
<i>Use of own house by owner occupier</i>	-51
<i>Several goods</i>	-40
<i>Electricity, gas</i>	-4

6. Concluding remarks.

Including transactions for Airbnb (and other parts of sharing economy) is a challenging job. Not only the gathering of information is a difficult job, but also using the information within the statistical framework. Nevertheless it is a fast growing part of the economy that has to be included in some way or another. Some remarks on the gathering of information for Airbnb transactions (very likely also applicable to other parts of the sharing economy):

- Airbnb is a foreign company and is not very willing to supply information. The suppliers of accommodation services are households that are (at least for statistical offices) hard to find and to contact.
- Most information is obtained from newspaper articles, research by municipalities, universities etc.
- Very often the definitions used (if given at all) are not clear and/or differ between different publications.

This makes reliable estimations difficult.

Some concluding remarks on the use of the gathered information in official statistics:

- Very often the information is only available for one period, making comparable estimations in time difficult.

Grossing up is difficult; the use of Airbnb is highly concentrated in some areas.

The traditional role division of consumers/producers fades; transaction may be counted double or end up in the wrong place in the national accounts.

Despite the limitations of the estimates described in this paper, they will be used in the 2015 benchmark revision of the Dutch national accounts. Other commercial applications of the platform economy are not yet included, but considering the fast growth of these activities they will have to be included in the near future.

Annex 1: Information on Airbnbn from different sources

Variable:	Source	Misset	NRC		1Limburg	Airbnb		VPRO	De Groene A'dammer	Colliers int.		Combination of sources													
	Year	2015	2014	2015	2015	2012	2016	2015	2015	2015	2016	2012	2013	2014	2015	2016	2009	2010	2011	2012	2013	2014	2015	2016	
Rental income (mln €):																									
Total		---	---	---	---	---	188	---	---	---	---				188		0	3,4	3,4	10,1	31,5	63,0	157,5	188,0	
of which Amsterdam		---	---	---	---	---	---	110	100	105	---			105									105		
Number of accommodations																									
Total		15000	6000	14820	---	---	31000	---	---	---	32000			6000	15000	31000	0	320	320	959	3000	6000	15000	31000	
Of which in:																									
Amsterdam		0	---	---	---	---	---	---	11000	---	---			10000											
Other cities		---	---	---	---	---	---	---	---	---	---														
Of which in:																									
Den Haag		---	---	---	---	---	---	---	---	---	---														
rotterdam		---	---	---	---	---	---	---	---	---	---														
Utrecht		---	---	---	---	---	---	2700	---	---	---														
Maastricht		---	---	---	1000	---	---	350	---	---	---														
Groningen		---	---	---	---	---	---	600	---	---	---														
Number of nights (mln)																									
Total		---	---	---	---	---	1,7 (**)	---	---	---	1,7			1,7			0	30	30	91	285	570	1424	1700	
Amsterdam		---	---	---	---	---	---	---	---	0,736	---														
Den Haag		---	---	---	---	---	---	---	---	---	0,126														
Average length of stay (nights)		---	---	---	---	---	3	---	---	---	---														
Average group size		---	---	---	---	---	2,5	---	---	---	---														
Number of guests (guest arrivals, mln *)																									
		---	---	---	---	0,075	1,4	---	---	---	---	0,075			1,4										

(*) In combination with other data the number of nights, the number of bookings and the average room rate is calculated.

(**) Deducted information:

Guest arrivals * number of nights / average group size = booked number of nights in accommodations: 1,4 mln * 3 * 2,5 = 1,68 mln

Price per night 188 mln / 1,68 mln = 112 euro.

Annex 2: Correction on own-account production of housing services by owner-occupiers

a	own-account production value of housing services by owner-occupiers	36239	mln. €
b	Number of owner-occupied houses	4118866	houses
c	Average production / house (= a / b* 1000000)	8798	€
d	Number of rented houses using Airbnb	15000	houses
e	Occupancy rate		
	Theoretical maximum: 15000 houses * 365 days = 5,475 mln.		
	Actual number 1,424 mln (see table 1)		
	Percentage 5,475 / 1,424 = 0,26	26%	
f	Correction on production value	-34	mln. €

The average value of houses in Amsterdam and other cities is higher than the national average of the Netherlands. Assuming that especially houses in Amsterdam and other cities are rented out (2/3 in Amsterdam, 1/3 in other cities) a raise of this figure of 34 mln. can be calculated:

Average sales price of houses in 2015	Price	Weight	Price * weight
Amsterdam	303925	2/3	202617
Rotterdam	189302	} 1/3	21034
Utrecht	245900		27322
Den Haag	231302		25700
g Average value Airbnb house			276673
h Average value of a house in the Netherlands			230194
i Factor (= g / h) :	1,20		
j Raised figure (= i * f)			-41 mln. €

Annex 3: Information sources used:

- *Missethoreca* (online magazine: www.missethoreca.nl). Several online articles.
- *NRC* (Dutch newspaper), several articles.
- *Limburg.nl*. Online news platform, combining several regional newspapers and a public local broadcasting company; Several online articles.
- *VPRO* (Dutch national television and radio broadcasting company): Tegenlicht-television documentary about Airbnb broadcasted on 18 September 2016.
- *De Groene Amsterdammer* (Dutch news magazine) nr 15, Article “Een luchtbedje met ontbijt”, published 13 April 2016.
- *Colliers international* (www.Colliersinternational.nl), Several online articles.
- *Inside Airbnb.com*, online research site.
- *Airbnb*, “The Airbnb community - The Netherlands”. Airbnb country report for *the Netherlands for 2016*.
- *Algemeen Dagblad* (Dutch newspaper), Article “Verhuursite Airbnb ook in Den Haag populair”, published 3 May 2017.
- *Gemeente Amsterdam*: “Evaluatie toeristisch verhuur woningen”, report of the municipality of Amsterdam, July 2016.