Paper

Recording of cross-border transactions related to digitized products and services

Experimental study

Eurostat Grant ESTAT 2017 ESA2010 act. 4 ENR

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[1)] The views expressed in this paper are those of the author(s) and do not necessarily reflect the policies of Statistics Netherlands. The Hague/Heerlen, 2019

August 2019

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26 August 2019, Final report

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Content

1. Introduction and background

Against a backdrop of slowing rates of measured productivity growth, questions have been raised about the conceptual basis of GDP and output and whether current compilation methods are adequate to capture output and productivity. In a time where more and more economic activities take place digitally these questions are especially relevant. This experimental study looks into the export of so-called digitized products and services of the Dutch economy. Demand for and supply of digitized products and services has increased rapidly over the last few years, which underlines the importance of specifying and quantifying the effect of digitalisation on the Dutch economy.

The objective of this study is to specify figures on the export of certain specific 'digitized' products. Additionally, if possible turnover figures will also be specified. The results will be used to comply with future questionnaires on the subject and to understand the development and importance of these relative new digitized activities for the Dutch economy. It is important to have a better picture of what happens in the digital economy. The study will be positioned as a feasibility study and the goal is to compile statistics for a few digitized products and/or services for the years 2010 through 2016. National accounts concepts and definitions (SNA2010 and BPM6) will be used in order to quantify export figures of digitized products.

The following specific 'digitized' products are in scope of this study:

Digital intermediation and activities facilitated by digital intermediation:

(1) Platform enabled accommodation services

(2) Digital intermediation services of accommodation services

(3) Travel services digitally intermediated

(4) Platform enabled taxi services

Export of 'characteristic' digital products:

(5) Database services

(6) Licensing of digital database originals

E-commerce:

(7) goods via e-commerce as a sales channel

This study does not quantify the *extra* turnover or export triggered by digitalisation. It only attempts to make transactions related to digitalisation more visible in existing statistics and to explore where data issues exist in existing statistics. This study is an explorative attempt to quantify a few of these relevant digitized activities. It has not the intention to give a complete overview of all exports of all digitized products. Feedback on the study is very welcome.

2. General definition and concepts

The main economic aggregates that are estimated in this study are exports, and wherever possible turnover estimates are also given.

Exports are defined according to the international SNA2010/BPM6 definition.
In national accounts exports[2] consist of transactions in goods and services (sales, barter, gifts or grants) from residents to non-residents:
• An export of a good occurs when there is a change of ownership from a resident to a non-resident.
• Export of services consist of all services rendered by residents to non-residents. In the national accounts any direct purchases by non-residents in the economic territory of a country are recorded as exports of services; therefore all expenditure by foreign tourists in the economic territory of a country is considered as part of the exports of services of that country. Also international flows of illegal goods and services must be included.

Turnover[3], in the context of structural business statistics, comprises the totals invoiced by the observation unit during the reference period, and this corresponds to the total value of market sales of goods and services to third parties. Turnover includes:
•all duties and taxes on the goods or services invoiced by the unit with the exception of the value-added tax (VAT) invoiced by the unit vis-à-vis its customer and other similar deductible taxes directly linked to turnover;
•all other charges (transport, packaging, etc.) passed on to the customer, even if these charges are listed separately on the invoice. Reductions in price, rebates and discounts as well as the value of returned packing must be deducted.
Excluded are:
•income classified as other operating income, financial income and extraordinary income in company accounts;
•operating subsidies received from public authorities or the institutions of the European Union (EU).

The scope of this study is quite broad so different kind of activities are included, like digital intermediation itself but also certain specific activities facilitated by digital intermediation. Characteristic digital products, like database originals, are also included. Last but not least e-commerce activities are in scope of this study. The precise scope for measurement of the turnover and export differs per specific activity in this study; for some activities only the intermediation fee is included while for other activities the turnover of the underlying good or service which is digitally ordered is in scope. See chapter 3 for a precise description of the scope and the definition used to quantify the different activities relevant for this study.

The digital activities described in this study are further categorized using the international EBOPS (extended balance of payments services) standard. The EBOPS classification[4] recognizes the following twelve categories for services.

[2] http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Export
[3] http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Turnover_-_SBS
[4] EBOPS 2010 is a primarily product-based classification of types of services, which in many cases may be described in terms of international classification of products as contained in CPC Ver. 2. However, the

1. Manufacturing services on physical inputs owned by others
2. Maintenance and repair services n.i.e.
3. Transport
4. Travel
5. Construction
6. Insurance and pension services
7. Financial services
8. Charges for the use of intellectual property n.i.e.
9. Telecommunications, computer and information services
10. Other business services
11. Personal, cultural and recreational services
12. Government goods and services n.i.e.

classification also includes transaction-based criteria (for example, Travel, Government services, Manufacturing Services on inputs owned by others).

3. Digitized Activities

3.1 Platform enabled accommodation services, exports and turnover

Definition

These activities are defined as accommodation services provided by Dutch residents as a result of digital intermediation platforms. For classification of these activities the EBOPS classification is used. Under which these activities are classified under category 4: travel. This category is defined in the EBOPS 2010 classification as follows:

"Travel is defined as covering goods and services for own use or to be given away, acquired from an economy, by non-residents during visits to that economy. It covers stays of any length, provided that there is no change in residence. Travel includes goods and services acquired by persons undertaking study or medical care while outside the territory of residence. It also includes acquisitions of goods and services by seasonal, border and other short-term workers in the economy of employment. (MSITS 2010, paras. 3.115 and 3.116)".

Concepts

Multiple concepts have to be taken into account when integrating these activities into the National Accounts framework. The first of which is that simply adding the total output of accommodation services to the economy would lead to double counting. Usage of owner occupied dwellings is already imputed into the national accounts framework using an assumed 100 percent capacity utilization rate.

Based on sources of a large digital accommodation platform that provide an estimate of the number of rented nights in the Netherlands and additional information on dwellings from the National Accounts a correction factor has been estimated. This correction factor is used in the estimation to correct for double counting. Because these bookings in the Netherlands are mostly made in the city of Amsterdam and other popular cities that have higher average housing prices compared to the rest of the Netherlands a second correction factor is calculated. These two correction factors combined with total output figures lead to an estimation of the output that can be integrated into the National Accounts framework.

Scope

Accommodation services due to digital intermediation include the export and turnover generated by persons who rent out dwellings on digital platforms. It does not include the commission fee or any additional turnover or export that is generated by the digital platforms themselves. This part is already captured in a different area of the National accounts, namely intermediation services.

Methods and sources

The total turnover in accommodation services as a result of digital intermediation platforms has been researched as part of a revision project at Statistics Netherlands in 2017[5]. The results of that paper are the basis for the results shown here. By combining several different sources related to this topic estimations were constructed for the years 2010-2016. Because there are multiple digital intermediation platforms that facilitate accommodation services in the Netherlands, the results have been upscaled based on an estimated market share of the largest

[5] Hiemstra, L.,(2017), *Measuring challenges of the sharing economy: the case of Airbnb*

platform. In addition to turnover from renting out houses, guests are also charged cleaning costs during their stay. These costs have also been estimated and added on top of the estimated turnover. Furthermore, a correction is made on the total turnover numbers because of the difference in housing prices between the most popular cities in the Netherlands and the rest of the country.

From the turnover results export numbers are calculated. To calculate the exports of accommodation services a ratio between foreign (83%) and domestic guests (17%) is used. This ratio is provided in a 2016 report[6] by one of the largest accommodation platforms and provides the best estimate of the ratio of foreign versus domestic guests available. This ratio is based on 2016 data. However, since no other data on the origins of guests making bookings on these platforms is available this ratio is also used for the estimations of the other years.

Results

Table 1: Platform enabled accommodation services turnover and exports, Netherlands, 2010-2016

		2010	2011	2012	2013	2014	2015	2016
Exports	*Million euro*							
1. Manufacturing services on physical inputs owned by others								
2. Maintenance and repair services n.i.e.								
3. Transport								
4. Travel		2	2	9	28	55	136	160
5. Construction								
6. Insurance and pension services								
7. Financial services								
8. Charges for the use of intellectual property n.i.e.								
9. Telecommunications, computer and information services								
10. Other business services								
11. Personal, cultural and recreational services								
12. Government goods and services n.i.e.								

		2010	2011	2012	2013	2014	2015	2016
Turnover	*Million euro*							
1. Manufacturing services on physical inputs owned by others								
2. Maintenance and repair services n.i.e.								
3. Transport								
4. Travel		3	3	11	34	66	164	193
5. Construction								
6. Insurance and pension services								
7. Financial services								
8. Charges for the use of intellectual property n.i.e.								
9. Telecommunications, computer and information services								
10. Other business services								
11. Personal, cultural and recreational services								
12. Government goods and services n.i.e.								

Origins of guests in Netherlands	
Foreign	83%
Dutch	17%

[6] AirBnB., (2016), *The Airbnb community, the Netherlands*

Discussion
The results rely heavily on earlier research done on this topic. Because statistics on these activities are only released sporadically by the relevant intermediation platforms, a number of assumptions have to be made to estimate results for all years.

Use of webscraping for estimation of turnover and exports
Because there is no regular time interval in which the sources for the beforementioned estimations are made available, this method of estimation is not suitable for repeated production purposes. Another possible method of obtaining the data needed for estimations in regular time intervals would be to make use of a webscraper. This webscraper could gather data about the number of listings, average length of stay and price per night. Based on this data a model could be constructed to estimate the turnover and exports of these activities.

As part of this study the possibilities for the use of such a webscraper have been explored. After evaluating the API (application programming interface) structure of the website of a large digital intermediation platform with a webscraping expert a number of rudimentary scraping attempts were conducted. Some basic information about average prices and the number of listings per cities in the Netherlands was extracted. Extracting information about the number of rented nights, which is needed for the estimation of turnover numbers, remains a big challenge. Further research and effort would be required to produce usable results based on this method. This however falls outside of the scope of this study.

3.2 Digital intermediation services of accommodation services, exports and turnover

Definition
The digital intermediation services of accommodation services are investigated because enterprises are increasingly engaged in transactions facilitated by an internet-based platform. The digital firms that provide the platforms are often collectively referred to as belonging to the "sharing" or "collaborative" economies. However, this research is not about sharing or collaboration, but about platforms that behave as *fare aggregator* or *online travel agencies*, or *metasearch engines* to find lodging or a holiday accommodation.

Metasearch engines are used by travellers to find the ideal hotel and price, but not to book the hotel. The metasearch engine simply compares all available hotels and redirects travellers to a booking site they choose. As such, the website of metasearch engine does not charge commissions to hotels, but instead charges the booking sites directly for clicks or visits sent to them. By contrast, an online travel agent (OTA) is just that: a travel agent. At an online travel agent, users can research information and make bookings for various aspects of their trip, from single-night hotel stays to all-inclusive packages.

Concepts and scope
Companies that behave as fare aggregator, online travel agency or metasearch engine for lodgings or holiday accommodations are included in the research. Within this research the turnover and exports of these enterprises are investigated.

Methods and sources
The following data has been used or is available:

- International trade statistics

- Short-term business statistics (STS)
- Structural business statistics (SBS)
- National accounts data

1. The population of enterprises for this research is delineated by the business register of Statistics Netherlands. In this business register all enterprises in classification NACE Rev 2 7911 *Travel agency activities* are included, plus a few enterprises that are manually added from other NACE classifications, because they obviously act as fare aggregator, online travel agency or metasearch engine.
2. The export-ratio of this NACE Rev 2 7911 population is used to divide the turnover of travel agency activities into domestic and export. For the export, the assumption has been made that all travel agency activities abroad are performed digitally.

Results
Figures have been compiled for this activity. For confidentiality reasons these results have been combined with the results of activity 3.3: Travel services digitally intermediated. These results are shown in table 2.

Discussion
There are some uncertainties in these values. First of all the export-value that has been applied is not specific for travel agency activities but based on the turnover of all activities of the enterprises in the dataset. The bias is not that large because the revenues for the travel agency activities is over 90% in 2016. Second, we have made the assumption that all activities are digitally executed, especially when the activities are from abroad. The turnover of larger companies is mostly digitally generated. Overall, the results give a good indication about the scale of turnover and exports.

3.3 Travel services digitally intermediated, exports and turnover

Definition
Nowadays many travel services are ordered and booked online. From a policy perspective the magnitude and development of these so-called underlying digitally ordered flows are both interesting to monitor. The digital flows can (partly) be a substitute for traditional economic activities, like for example the travel agency on the corner of the street. In this paragraph, so-called digitally ordered travel services are explored for the years 2010-2016.

Concepts and scope
Travel services included in this part of the study include the following product groups: hotel services, other accommodation services and guides. Only the expenditures of non-residents in the Dutch economy are taken into account here as export. All online booking of travel services is included; direct via a (hotel) website as well as indirect via an intermediate.

Methods and sources
Information on expenditures of non-residents in the Dutch economy is available in the national accounts. Here the information of the product groups ‘hotel services’, ‘other accommodation services’ and ‘guides’ is used. These figures are the starting point for the analysis.
These expenditures include both digital as well as non-digital ordered services.

The next step is to specify the digital part of these total expenditures. Unfortunately, there is no direct information available for the export side of the market. However, there is information available on digitalisation for other sides of the market.

Information on digitally ordered travel related expenditures is available in the statistic 'Ongoing Holiday Research' (Continue Vakantie Onderzoek, CVO), but unfortunately only for the import side of market and only for the year 2017.

The Statistics Netherlands statistic 'Online Shopping' also entails information on online purchases of travel related services. This statistic contains information on the (percentage) share of people (>=12year) that have digitally purchased travel services. This statistic is available for the years 2012-2017. Other relevant information that can be used to compile time series for the digital fraction is Eurostat information on individuals who have purchased online (percentage share of persons in between 16-74 years). This information is, among others, available for the years 2010-2012.

As mentioned before, a very important step is to estimate digital shares for the years 2010-2016. Because we do not have accurate information for the export market, we have to make a few additional assumptions. Firstly, we assume that the digital share for the import side of the market is representative for the export side of the market. Secondly, we assume that the development of the digital share of Dutch consumption (travel related, 2012-2017) is representative for the development of the digital share for the export side of the market. Lastly, we assume that the development of Eurostat information on individuals who have purchased goods and services online during the years 2010 through 2012 is representative for the development of the last part of the time series. Combining these three different sources and applying a few assumptions, we can construct a time series for the digital share for the export market for travel services.

Finally, for every single year the estimated digital share can be multiplied with total expenditure of non-residents on travel related services.

Results

Figures have been compiled for this activity. For confidentiality reasons these results have been combined with the results of activity 3.2: Digital intermediation services of accommodation services.

The results are shown in table 2.

Table 2, Digital intermediation services of accommodation services, and Travel services digitally intermediated, exports and turnover, Netherlands, 2010-2016[7]

		2010	2011	2012	2013	2014	2015	2016
Exports	*Million euro*							
1. Manufacturing services on physical inputs owned by others								
2. Maintenance and repair services n.i.e.								
3. Transport								
4. Travel								
5. Construction								
6. Insurance and pension services								
7. Financial services								
8. Charges for the use of intellectual property n.i.e.								
9. Telecommunications, computer and information services								
10. Other business services		1185	1852	2888	3599	4803	6046	8466
11. Personal, cultural and recreational services								
12. Government goods and services n.i.e.								

		2010	2011	2012	2013	2014	2015	2016
Turnover	*Million euro*							
1. Manufacturing services on physical inputs owned by others								
2. Maintenance and repair services n.i.e.								
3. Transport								
4. Travel								
5. Construction								
6. Insurance and pension services								
7. Financial services								
8. Charges for the use of intellectual property n.i.e.								
9. Telecommunications, computer and information services								
10. Other business services		890	1408	2594	3187	4003	5109	7500
11. Personal, cultural and recreational services								
12. Government goods and services n.i.e.								

Discussion

The method for compiling statistics on digitally ordered travel services relies heavily on already existing information. Unfortunately, this information is imperfect for the goal of this study; so we need a few assumptions in order to construct the data. A recommendation for future work would be to gather survey information on the digital share for the export side of the market. The results for digital travel services are still experimental and therefore they will off course need further refinement in the future. Still, the order of the magnitude and the development over time seem plausible. Both the digital share and total expenditures on travel by non-residents have grown over time, resulting in a sharp increase of digitally ordered travel services by non-residents.

[7] For confidentiality reasons two activities have been merged in this table and put under the same category: other business services. A smaller part of this number is related to travel services however and not to other business services. Furthermore export numbers for this activity are higher than turnover numbers because for one of the merged activities we were unable to estimate turnover numbers.

3.4 Platform enabled taxi services, exports and turnover

Definition

Since the launch of the first major digital taxi intermediation platform in July 2010, and later competing platforms, the market has seen major growth in many countries around the world. In the U.S, introduction of these platforms lowered the barriers for entering the taxi market as a self-employed driver and thus led to an expansion of taxi services, and a shift from wage-employed to self-employed taxi drivers[8]. In the Netherlands the adoption of digital intermediation platforms for taxi services has been less rapid mainly due to legal reasons. There are strict regulations in place that set the rules for entering the market as a taxi driver. For the purpose of this research the focus will be on the size of gross bookings of rides through digital taxi platforms in the Netherlands. This is different from the revenue that the platforms themselves collect, which is mostly a fixed percentage of the gross bookings. Bookings of taxi services outside of digital intermediation platforms, such as via websites of taxi companies are also excluded from this number.

The before mentioned activities are defined as digital platform enabled taxi services provided by Dutch residents. For classification of these activities the EBOPS classification is used. Under which these activities are classified under category 3.7.1: road transport - passenger. This category is defined in the EBOPS 2010 classification as follows:

"Passenger services covers the transport of people. It includes all services provided in the international transport of non-residents by resident carriers (export of services) and that of residents by non-resident carriers (import of services). Also included are passenger services performed within an economy by non-resident carriers (that is, via internal flights). (MSITS 2010, paras. 3.88 and 3.94)".

Concepts, methods and sources

The objective of this study is to estimate the size of taxi services booked through digital taxi intermediation platforms in the Netherlands in the years 2010 through 2016.

Because country specific information on turnover and export of platform enabled taxi services for the Netherlands is very scarce, a combination of sources within the National Accounts, proxy variables and news sources have been used to construct estimations for the years 2010-2016. A source on the number of active digital taxi platform users in the Netherlands in 2017 has been combined with information on average spending of the Dutch active population (between 15 and 75 years old) on taxi services per year to construct an estimation for that year. Information about worldwide gross bookings of major taxi intermediation platforms has been used to construct estimations for the years 2010 through 2016. To determine the export ratio of these services information on tourist spending on taxi services in the Netherlands has been used.

Scope

The estimation of the value of taxi services includes the export and turnover generated by persons who provide these services through digital taxi platforms. It does not include the any additional turnover or export that is generated by the digital platforms themselves. It also does not include taxi services booked through other means outside the digital intermediation platforms. For example, bookings of taxi services done directly via websites of taxi companies are not included in this estimation.

[8] Berger, T. (2017), Chen, C., Benedikt Frey, C. *Drivers of disruption? Estimating the Uber effect*.*

Results

Table 3: Digital platform enabled taxi services, exports and turnover, Netherlands, 2010-2016

		2010	2011	2012	2013	2014	2015	2016
Exports	*Million euro*							
1. Manufacturing services on physical inputs owned by others								
2. Maintenance and repair services n.i.e.								
3. Transport		0	0	0	0	0	2	4
4. Travel								
5. Construction								
6. Insurance and pension services								
7. Financial services								
8. Charges for the use of intellectual property n.i.e.								
9. Telecommunications, computer and information services								
10. Other business services								
11. Personal, cultural and recreational services								
12. Government goods and services n.i.e.								

		2010	2011	2012	2013	2014	2015	2016
Turnover	*Million euro*							
1. Manufacturing services on physical inputs owned by others								
2. Maintenance and repair services n.i.e.								
3. Transport		0	0	0	1	4	13	29
4. Travel								
5. Construction								
6. Insurance and pension services								
7. Financial services								
8. Charges for the use of intellectual property n.i.e.								
9. Telecommunications, computer and information services								
10. Other business services								
11. Personal, cultural and recreational services								
12. Government goods and services n.i.e.								

Discussion

Because direct statistics on turnover and export of platform enabled taxi services for the Netherlands were not available, estimations have been constructed based on a number of sources. These estimations come with a number of assumptions. For example, it is assumed that turnover and export numbers in the Netherlands show a similar growth path as global gross bookings. Furthermore, the assumption is made that average spending of the total active Dutch population on taxi services is representative of the typical average active digital user of online taxi intermediation platforms in the Netherlands. Additionally, upscaling for other digital taxi intermediation providers outside of the major platforms is not done as their market share is assumed to be negligible in the Netherlands. These assumptions should be taken into account when interpreting these results. However, the main conclusion is that the turnover and especially export of these types of digital services did not represent a major part of the Dutch economy in the years 2010 through 2016.

3.5 Database services, exports and turnover

Definition

One of the obstacles in estimating the turnover and export purely associated with database related services is determining the population of companies that offer these types of services. A second obstacle is the fact that many companies that offer these services do so side by side with a multitude of other computer services.

Concepts and scope

The main focus of this research is on activities like *data processing, web hosting* and *management of computer facilities*.

Methods and sources

To determine the population and narrow down the turnover strictly related to database services a number of steps have been taken. First the total population of enterprises at Statistics Netherlands is filtered based on the following NACE-codes:

- 6201 (Developing, producing and publishing software)
- 6202 (Consultancy and support on information)
- 6203 (Management of computer facilities, system and network management)
- 6209 (Other service activities in the field of information technology)
- 6311 (Data processing, web hosting and related activities)
- 6312 (Webportals)

For this population of enterprises, URL's are collected from a database that is available at Statistics Netherlands. To determine if these enterprises are active in *data processing, web hosting* and *management of computer facilities*, the websites (URL's) of these enterprises are crawled by a web crawler to count these specific keywords:

- clouddiensten (translation: *cloudservices*)
- webhosting
- streaming
- opslag (translation: *storage*)
- storage

Enterprises that have at least one or more hits on one of these keywords are considered to be active within our scope, and are selected. Turnover VAT-data of enterprises and SBS-data are added to the enterprises. Because larger firms tend to offer many other services (such as ICT-consultancy services) in addition to database related services there is a need to correct for this non-relevant production. To correct for this, turnover and export numbers for these larger firms are filtered for specific posts from the production statistics related to database services. These posts are the following:

- Management of computer facilities
- Data processing, webhosting and related activities

Coverage of the url-database containing the websites linked to the business register is incomplete. It is reasonable to assume that almost all business who offer database services will also have a website. Coverage for large companies seems to be more complete than for smaller companies. For this reason turnover of small and medium-sized companies (size class 0-6) is

upscaled using a ratio of the number of enterprises per size category in the url-database and in the business register. Exports are derived from the VAT-data.

Results

Using the method described above the following turnover numbers have been estimated for enterprises that have one or more hits on their websites for the keywords, for the period 2010-2016 (Table 4). The turnover increased from 1.4 billion euro's in 2010 to 3.4 billion euro's in 2016. The share in the total turnover of NACE 62 was 6,2% in 2010 and 10,4% in 2016.
Export data is derived from the VAT-data, which distinguishes between domestic sales and foreign sales. For the last seven years the export-ratio has been around 17-20%.

Table 4: Database services, exports and turnover, Netherlands, 2010-2016.

		2010	2011	2012	2013	2014	2015	2016
Exports	*Million euro*							
1. Manufacturing services on physical inputs ow ned by others								
2. Maintenance and repair services n.i.e.								
3. Transport								
4. Travel								
5. Construction								
6. Insurance and pension services								
7. Financial services								
8. Charges for the use of intellectual property n.i.e.								
9. Telecommunications, computer and information services		241	265	289	383	447	545	688
10. Other business services								
11. Personal, cultural and recreational services								
12. Government goods and services n.i.e.								

		2010	2011	2012	2013	2014	2015	2016
Turnover	*Million euro*							
1. Manufacturing services on physical inputs ow ned by others								
2. Maintenance and repair services n.i.e.								
3. Transport								
4. Travel								
5. Construction								
6. Insurance and pension services								
7. Financial services								
8. Charges for the use of intellectual property n.i.e.								
9. Telecommunications, computer and information services		1416	1585	1719	2066	2444	2671	3438
10. Other business services								
11. Personal, cultural and recreational services								
12. Government goods and services n.i.e.								

Discussion

In our opinion, the results best reflect turnover and exports of database services in The Netherlands. However, there are some uncertainties in the results.

First, the results are based on the experimental use of web crawling / webscraping. This is one of the first times we have used this technique to define a population, but the technique is not yet fully developed. Besides, Statistics Netherlands does not have all URL's available and therefore a part of the results are obtained by estimation.

Second, for the smaller enterprises (size class 0 – 4) all turnover and exports were defined as Database services. For middle-sized enterprises (size class 5 and 6) the ratio of database services to total turnover of the larger enterprises (size class 7 – 9) is used to adjust turnover and export results. For the larger enterprises only those turnover and exports that are specific in the SBS to database services-activities are included. As a consequence, enterprises that did not receive the SBS-questionnaire specific for NACE 62 and 63 did not have the option to return data to Statistics Netherlands on specific database services-activities. As a result, turnover and

exports of database services activities for enterprises in size class 7 – 9 and outside NACE 62 and 63 are not in this estimation.

Furthermore we recognize that database services as a category can be hard to define. Our choices for the categories of services we chose to include or exclude are justified in our opinion but are certainly open for discussion.

3.6 Licensing of digital database originals, exports and turnover

Definition, concepts and scope

Licensing of digital database originals is one example of lease of non-financial intangible assets. In this paragraph we try to quantify licence activities of films, series, television formats and music

Activities of interest are associated by using the classification (Statistics Netherlands) SK11Y *Licensing fees on audio-visual and artistic products* and SH4 *Licenses to reproduce and/or distribute audio-visual and related products*. Using these codes, it was possible to identify part of the relevant population. Within this selected population, we analysed the largest enterprises in terms of turnover. Based on this analysis, we were then able to determine the relevant units for this specific activity.

Methods and sources

As a first step we identified by using the data of the Statistics of International trade the possible relevant population by selecting enterprises that have recorded trade related to codes SK11Y and SH4 (*Licensing fees on audio-visual and artistic products* and SH4 *Licenses to reproduce and/or distribute audio-visual and related products)*. For this population, it was examined whether the activities of the selected enterprises meet the definition and therefore fall within the scope. If not, those enterprises were omitted from this research. Turnover VAT-data of the relevant population of enterprises was retrieved via VAT data registers, and exports were derived from these VAT-data.

Results

Because only three years of data are available, the series starts at 2014. The turnover has increased from 2014 to 2016, from 624 million euros to 1708 million euros. The export ratio was equal to 41% in 2014, 58% in 2015 and 71% in 2016.

Table 5: Licensing of digital database originals, exports and turnover, Netherlands, 2014-2016.

		2010	2011	2012	2013	2014	2015	2016
Exports	*Million euro*							
1. Manufacturing services on physical inputs owned by others								
2. Maintenance and repair services n.i.e.								
3. Transport								
4. Travel								
5. Construction								
6. Insurance and pension services								
7. Financial services						253	437	1215
8. Charges for the use of intellectual property n.i.e.								
9. Telecommunications, computer and information services								
10. Other business services								
11. Personal, cultural and recreational services								
12. Government goods and services n.i.e.								

		2010	2011	2012	2013	2014	2015	2016
Turnover	*Million euro*							
1. Manufacturing services on physical inputs owned by others								
2. Maintenance and repair services n.i.e.								
3. Transport								
4. Travel								
5. Construction								
6. Insurance and pension services								
7. Financial services						624	759	1708
8. Charges for the use of intellectual property n.i.e.								
9. Telecommunications, computer and information services								
10. Other business services								
11. Personal, cultural and recreational services								
12. Government goods and services n.i.e.								

Discussion

The results give an impression of the size of activities in the area of licensing of digital database originals. Because it was difficult to clearly define the activity, it is also difficult to determine the relevant population, and therefore it is difficult to determine the precise turnover and exports numbers. Using the codes SK11Y and SH4 results in a population including producers of TV-formats. It is open to discussion or modification if these licenses must be included. Sometimes these TV- formats are embodied in a digital blueprint and sometimes these formats are embodied in a non-digital blueprint. One can also discuss the choice for using the selection criteria 'export of licenses fees of' instead of the criteria 'export web streaming services'. This choice is defended by the fact that the relevant 'big players' in this field record their turnover as license fees instead of turnover related to web streaming.

3.7 Goods via e-commerce as a sales channel, exports and turnover

Definition, concepts and scope

E-commerce, also known as internet commerce, refers to the buying and selling of goods or services using the internet, and the transfer of money and data to execute these transactions. The term E-commerce is often used to refer to the sale of physical goods online, but it can also describe any kind of commercial transaction (services) that is facilitated through the internet. In this research the sale of goods online is included and the sale of services online is excluded.

Methods and sources

The population of this research consists of the entire *Retail trade (except of motor vehicles and motorcycles*) NACE 47 in The Netherlands, except enterprises in NACE 473 *Retail sale of automotive fuel*. Enterprises that do not belong to NACE 47 are excluded, despite that they could have e-commerce activities of goods.

First, SBS-data for the years 2010 through 2016 was used to obtain information about the retail sales and retail sales by e-commerce, which both are variables in the SBS-questionnaire. Because SBS is based on a survey not all enterprises in Retail trade are included in the data. For enterprises that are in the survey, the ratio between *retail sales by e-commerce* and *retail sales* was calculated per size class and NACE level 3.
Second, VAT-data that contains information about the total turnover of an enterprise and the exports were used for all enterprises in the population. For the VAT-data the ratio between *exports* and *total turnover* was calculated per size class and at NACE level 3. Data from both sources were combined to calculate the turnover of retail trade by e-commerce and the share of it that has been exported.

Results

The turnover of sales of goods by e-commerce has increased from 3081 million euros in 2010 to 8481 million euros in 2016. The export ratio was quite stable over the years with an average of 16%. In 2016 the export ratio was 17%.

Table 6: Goods via e-commerce as a sales channel, exports and turnover, Netherlands, 2010-2016.

		2010	2011	2012	2013	2014	2015	2016
Exports	*Million euro*							
1. Manufacturing services on physical inputs owned by others								
2. Maintenance and repair services n.i.e.								
3. Transport								
4. Travel								
5. Construction								
6. Insurance and pension services								
7. Financial services								
8. Charges for the use of intellectual property n.i.e.								
9. Telecommunications, computer and information services								
10. Other business services								
11. Personal, cultural and recreational services								
12. Government goods and services n.i.e.								
13. Goods via e-commerce as a sales channel		519	838	760	517	802	1 128	1 410

		2010	2011	2012	2013	2014	2015	2016
Turnover	*Million euro*							
1. Manufacturing services on physical inputs owned by others								
2. Maintenance and repair services n.i.e.								
3. Transport								
4. Travel								
5. Construction								
6. Insurance and pension services								
7. Financial services								
8. Charges for the use of intellectual property n.i.e.								
9. Telecommunications, computer and information services								
10. Other business services								
11. Personal, cultural and recreational services								
12. Government goods and services n.i.e.								
13. Goods via e-commerce as a sales channel		3 081	3 819	4 179	4 653	5 781	7 238	8 481

Discussion

Despite having data on e-commerce in retail trade and data about the exports, it is not possible to determine exactly what share of the e-commerce has been exported so this is calculated by approximation. This is because 1) the export ratio based on the VAT is for the total turnover and not specific for e-commerce retail sales, and 2) SBS is survey-based so data is not available for the entire population. However, by combining the data we get a reliable indication of the magnitude of the phenomena.

4 Conclusions, discussion and recommendations

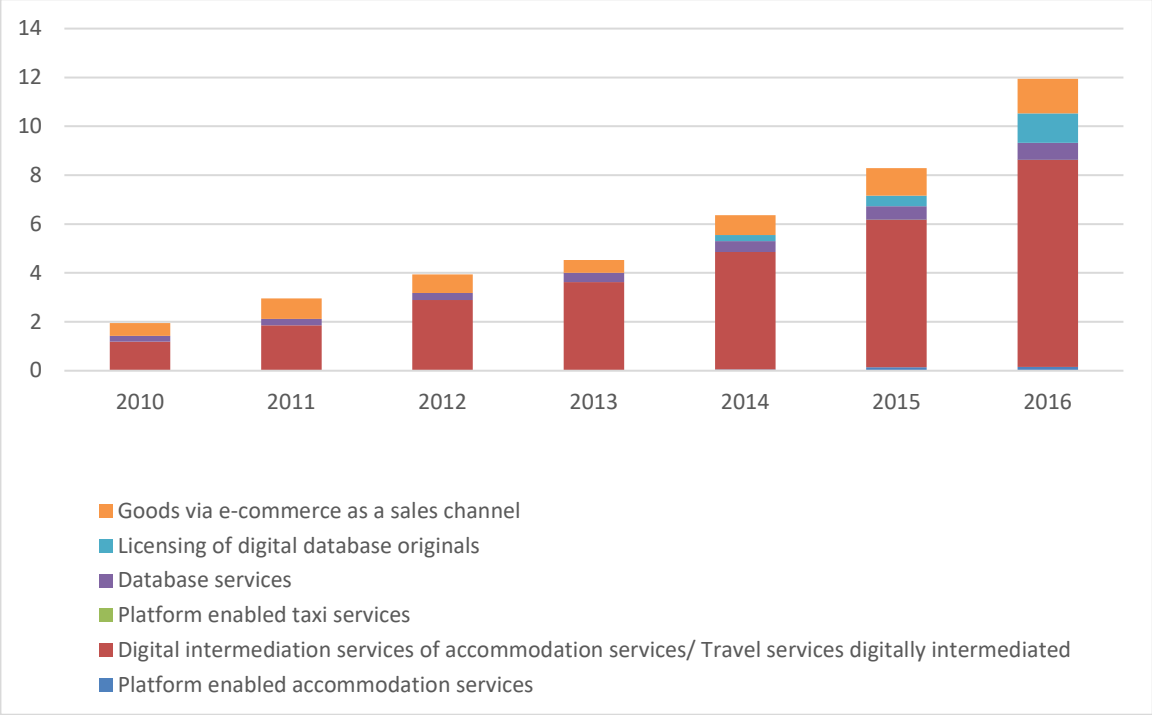
The term 'Digitized products and services' covers a wide spectrum of activities within the present economic landscape. Because this spectrum is so wide and sometimes a bit vague, it was very challenging to define which activities fall within the scope and which do not. Furthermore, many of the statistics available today and the different categories they recognise are not yet well suited for distinguishing between 'regular' offline economic activities and their more 'digital' counterparts.

This problem is compounded when trying to identify cross border transactions of digital products and services. Because in a digital economy 'borders' are often much less relevant and clear. While economically speaking this has had an enormous stimulating effect on cross border transactions it has also made identifying many of these transactions more and more difficult (information paradox). A change of ownership of a good or purchase of a service increasingly happens by a simple touch of a mouse button. But whether the transaction is digital is not always accurately reported.

Despite these difficulties it is possible to provide reasonable estimates for a few activities explored in this research. Often this was done by combining available statistical data sources, augmented with external sources and further refining them by applying relevant assumptions.

In most cases the estimates can be based on already existing statistical data sources, providing a solid foundation to work with. In other cases, such a source simply is not available and we must therefore rely on external sources and sometimes more experimental innovative techniques to generate an estimation. In other cases data techniques such as 'webscraping' have been used to define the population of businesses that engage in the export of particular digitized activities.

Graph 4.1: Size of exports of digitized products and services in billion euros



The exports of all activities are shown in Graph 4.1 and show in most cases a clear growth path for the activities examined in this study. The size of the digitized activities can be substantial, as is the case with e-commerce activities. In other cases, such as digital platform enabled taxi services, the size is very small when compared to the size of the entire Dutch economy. In the case of the Netherlands there are a few explanatory reasons for this, which are discussed in the relevant chapters of these activities. Because of such country specific effects care must be taken when trying to extrapolate these results to other economies, where the legal boundaries in place can be different. In most cases the part of estimated turnover[9] that is exported is stable over time. In is important to interpret these results with care, because the observed stability can be the result of underlying assumptions in the estimations due to a lack of properly available data sources.

This study does not quantify the *extra* turnover or export triggered by digitalisation. It only attempts to make transactions related to digitalisation more visible in existing statistics and to explore where data issues exist in existing statistics. This study is an explorative attempt to quantify a few of these relevant digitized activities. The intent behind the study is not to give a complete overview of all exports of all digitized products.

In conclusion this study provides a first reasonable experimental overview of the size of a few digitised activities in the Dutch economy. The status of this study is experimental. Feedback on the study is therefore very welcome.

Further research will be needed to improve these estimates. This research could focus on possible improvements in survey design for better specification of digital activities. Alternatively, innovative methods such as use of webscraping and machine learning are very promising and could be further explored in the future.

[9] Graph 5.1 in chapter 5: Annex shows turnover estimations for most activities

5 Annex

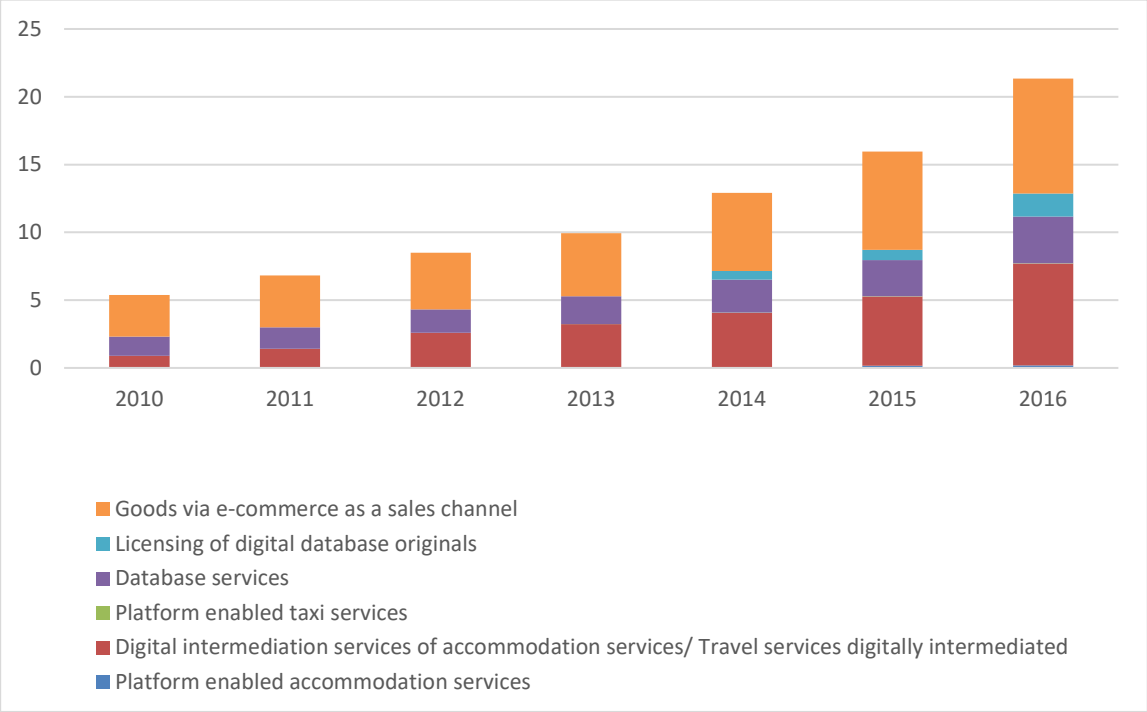
Table 7: Total exports and turnover of digitised goods and services, Netherlands, 2010-2016[10].

		2010	2011	2012	2013	2014	2015	2016
Exports	*Million euro*							
1. Manufacturing services on physical inputs owned by others		0	0	0	0	0	0	0
2. Maintenance and repair services n.i.e.		0	0	0	0	0	0	0
3. Transport		0	0	0	0	0	2	4
4. Travel		2	2	9	28	55	136	160
5. Construction		0	0	0	0	0	0	0
6. Insurance and pension services		0	0	0	0	0	0	0
7. Financial services		0	0	0	0	253	437	1215
8. Charges for the use of intellectual property n.i.e.		0	0	0	0	0	0	0
9. Telecommunications, computer and information services		241	265	289	383	447	545	688
10. Other business services		1185	1852	2888	3599	4803	6046	8466
11. Personal, cultural and recreational services		0	0	0	0	0	0	0
12. Government goods and services n.i.e.		0	0	0	0	0	0	0
13. Goods via e-commerce as a sales channel		519	838	760	517	802	1128	1410

		2010	2011	2012	2013	2014	2015	2016
Turnover	*Million euro*							
1. Manufacturing services on physical inputs owned by others		0	0	0	0	0	0	0
2. Maintenance and repair services n.i.e.		0	0	0	0	0	0	0
3. Transport		0	0	0	1	4	13	29
4. Travel		3	3	11	34	66	164	193
5. Construction		0	0	0	0	0	0	0
6. Insurance and pension services		0	0	0	0	0	0	0
7. Financial services		0	0	0	0	624	759	1708
8. Charges for the use of intellectual property n.i.e.		0	0	0	0	0	0	0
9. Telecommunications, computer and information services		1416	1585	1719	2066	2444	2671	3438
10. Other business services		890	1408	2594	3187	4003	5109	7500
11. Personal, cultural and recreational services		0	0	0	0	0	0	0
12. Government goods and services n.i.e.		0	0	0	0	0	0	0
13. Goods via e-commerce as a sales channel		3081	3819	4179	4653	5781	7238	8481

[10] For confidentiality reasons two activities have been merged in this table and put under the same category: other business services. A smaller part of this number is related to travel services however and not to other business services. Furthermore export numbers for this activity are higher than turnover numbers because for one of the merged activities we were unable to estimate turnover numbers.

Graph 5.1: Size of turnover of digitized products and services in billion euros



[11] Note that turnover for the combined activity: Digital intermediation services of accommodation services and travel services digitally intermediated is lower than the reported export in graph 4.1. As mentioned before this is because for a large part of this combined activity we were unable to estimate turnover numbers, but were able to estimate export numbers.

Explanation of symbols

Empty cell	Figure not applicable
.	Figure is unknown, insufficiently reliable or confidential
*	Provisional figure
**	Revised provisional figure
2018–2019	2018 to 2019 inclusive
2018/2019	Average for 2018 to 2019 inclusive
2018/19	Crop year, financial year, school year, etc., beginning in 2018 and ending in 2019
2016/17–2018/19	Crop year, financial year, etc., 2016/17 to 2018/19 inclusive

Due to rounding, some totals may not correspond to the sum of the separate figures.

Colophon

Publisher
Statistics Netherlands
Henri Faasdreef 312, 2492 JP The Hague
www.cbs.nl

Prepress: Statistics Netherlands
Design: Edenspiekermann

Information
Telephone +31 88 570 70 70
Via contact form: www.cbs.nl/information