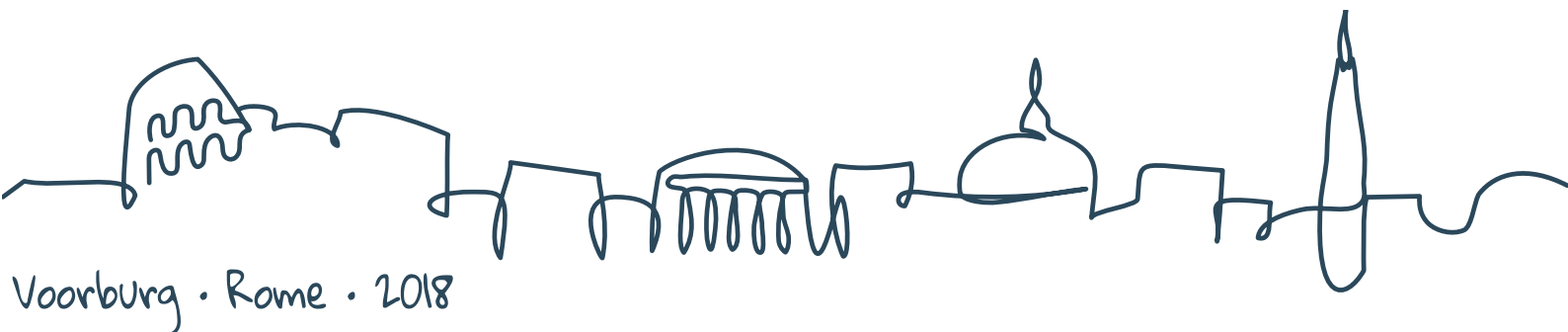




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Measurement challenges of the digital economy

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MEASUREMENT CHALLENGES OF THE DIGITAL ECONOMY

1. Introduction

Digitalization is transforming the economic activity, involving production, consumption, fixed-capital formation and cross-border flows. Rapid technological change has led to the improvement of product quality, the rise of new services and the growth of online transactions.

Increasingly, rigorous discussion is taking place in and amongst international organizations regarding the challenges posed by digitalization for the measurement of economies.

IMF¹ recognizes that digitalization has exacerbated certain weaknesses in compilation methods and provoked emerging data needs. They also suggest international organizations should work on updating classification systems for digital activities and products and develop guidelines for digital transaction measurement. For example, IMF recommends:

- improving the coverage of digital platforms and services linked to them in the main classifications system;
- improving the coverage of digital platforms and linked services in the main classifications system
- expanding the use of administrative data and new data sources linked to digitalization (Big Data)
- regarding price index compilation:
 - improving quality adjustment procedures for ICT goods and services
 - timely inclusion of new digital product varieties and suppliers in the detailed indexes and weight structures of the high-level index
 - covering adequately e-commerce in price samples since online prices may have different growth rates
 - including the sharing economy prices in the CPI and PPI with weights that reflect its importance in spending patterns
- national accounts compilers and price statisticians should work collaboratively to align the composition of the deflators for digital products with the composition of the aggregates that need to be deflated

In line with the international interest for the measurement of the digital economy, the 2017 Voorburg Group (VG) meeting dedicated a session to discuss the progress and practices in use when

¹ IMF (2018).

measuring e-commerce in four countries; USA², Canada³, Mexico⁴ and Italy⁵. This was preceded by a joint OECD/IMF⁶ presentation on digital economy measurement. A summary of the issues raised at the meeting is presented in a second paper by the same authors as this paper⁷.

However, e-commerce may be conceptualized as just one aspect of the digital economy. Therefore the VG might need to expand its focus to the broader issues of the digital economy.

In order to structure the analysis of the work the VG needs to address in the coming years regarding digital economy measurement, section 2 of this paper is based on the recent work of the OECD and IMF⁸ to provide definitions and a conceptual framework for the analysis.

In section 3, we identify issues concerning digital economy measurement regarding classifications, output measurement and price measurement which are described and analyzed within the conceptual framework established in section 2.

Finally, in section 4 we contextualize VG's work on this field with other international working groups and initiatives and propose criteria for its prioritization in the future.

2. Conceptual framework for the analysis of E-commerce and digital economy.

Definitions

As noted by the IMF⁹, if **digital economy** is defined by the use of digitalized data, it would include a huge part of most economies, even the entire economy in the case of some modern economies.

Rather than attempting to cover the broad concept of digital economy, IMF focuses on the **digital sector** comprising the producers at the core of digitalization: online platforms, platform-enabled services, and suppliers of **ICT** goods and services. According to IMF, platform-enabled services include the sharing economy, whose main components are peer-to-peer short-term property rentals and peer-to-peer labor services (e.g. taxi service). Collaborative finance (e.g. peer-to-peer lending) may also be included in the sharing economy. Platform-enabled services to businesses in the 'gig economy' include crowdsourcing platforms.

² Murphy, J. and Baer, A. (2017).

³ Garneau, M. (2017).

⁴ Bravo, R. (2017).

⁵ Cecconi, C.; Cacciaglia, R. and Cecconi, F. - Istat (2017).

⁶ Ribarsky, J. (2017).

⁷ Garneau et al. (2018), "E-commerce Issues Paper".

⁸ IMF (2018); Ahmad N. and Ribarsky J. (2017).

⁹ IMF (2018).

IMF's digital sector definition is not restricted to ICT sector and products definitions on International Standard Industrial Classification of All Economic Activities (ISIC) and Central Product Classification (CPC).

ISIC defines an Information and Communications Technology (ICT) sector and a Content and Media Sector. Similarly, the CPC includes ICT products, and content and media products. However, according to IMF¹⁰, revisions to these classifications have not kept up with the recent growth of digital activities and products:

“Coverage of “online platforms” (e.g., Google, Facebook, Alibaba) and their products is incomplete.¹¹ Also, platform-enabled services” (e.g., Airbnb) are not explicitly covered. Another open question is the treatment of data as a product—under current international guidelines, databases are products, but not data itself.”

An alternative approach to determine the focus of interest in the measurement of the digital economy is provided by the OECD's advisory group on measuring GDP in a digitalized economy¹². This approach recognizes that focusing on digital producers or digital products alone would ignore important aspects of the digital economy, therefore, it chooses to focus on **digital transactions**. The possible criteria for distinguishing digital transactions include how the transaction is made (digitally ordered, enabled or delivered), what is transacted (goods, services or data), and who is involved (consumers, businesses or governments).

The advisory group's current working definition of **digital transactions** includes those that are digitally-ordered, digitally-delivered, or platform-enabled. This definition of digital transactions relates to, but it is not equivalent to the OECD definition of **e-commerce**, which emphasizes in digitally-ordered transactions.

According to OECD¹³, “an **e-commerce transaction** is the sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing of orders. The goods or services are ordered by those methods, but the payment and the ultimate delivery of the goods or services do not have to be conducted online. An e-commerce transaction can be between enterprises, households, individuals, governments, and other public or private organizations. To be included are orders made over the web, extranet or electronic data interchange. The type is defined by the method of placing the order. To be excluded are orders made by telephone calls, fax or manually typed e-mail.”

Figure 1 shows a scheme of the digital economy, given the previous definitions. The digital economy comprises digital industries (digital sector), digital products and digital transactions. In general, digital industries may or may not involve digital transactions. For example, a computer

¹⁰ IMF (2018).

¹¹ “Platform products covered by the CPC include searches, content and media, and e-commerce. But matching services and cloud computing are not covered”.

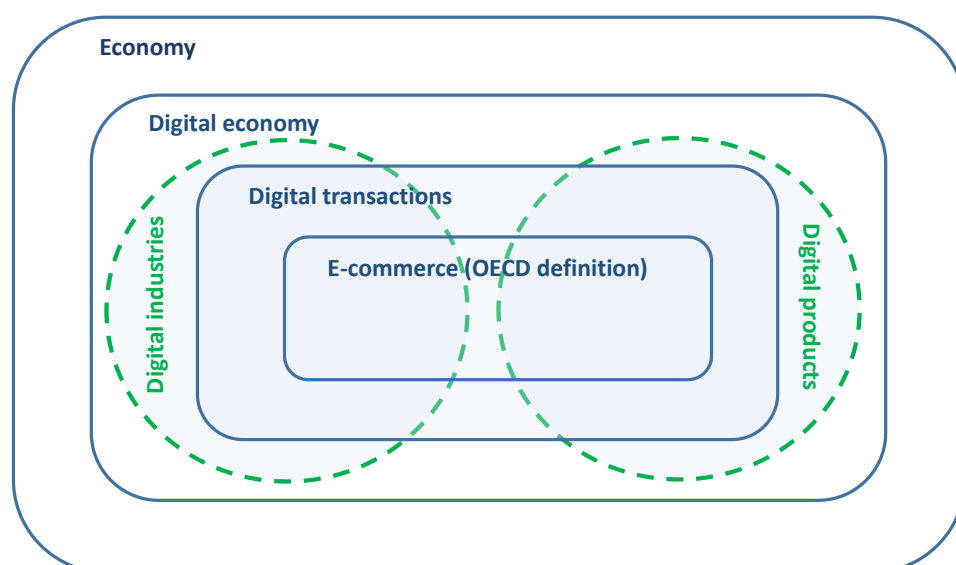
¹² Ahmad and Ribarsky (2017).

¹³ OECD (2011)

manufacturer may sell its products in stores only¹⁴. On the other hand, digital transactions may or may not involve digital industries or products. For example, an airline may sell tickets online to households. Finally, digital transactions comprise E-commerce.

FIGURE 1

Diagram of the digital economy and scope for Voorburg Group work



The Voorburg Group should address the classification and measurement not only of the digital industries and products but also the digital transactions, since they may have important effects on prices.

Conceptual Framework

The OECD's advisory group on measuring GDP in a digitalized economy provides a useful conceptual framework for the measurement of the digital economy¹⁵, distinguishing its different dimensions: producers, products, nature of transactions, users and enablers (see Figure 2).

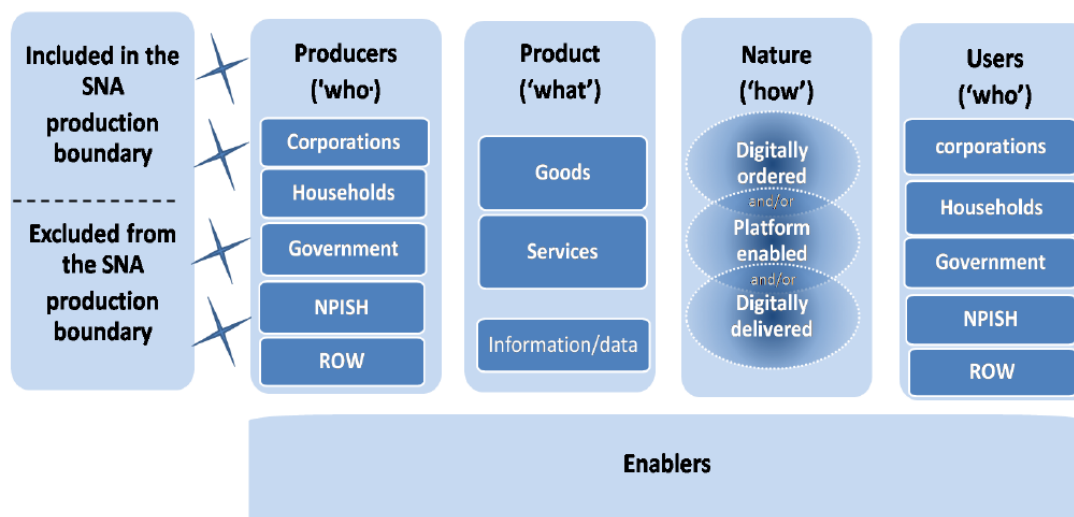
Firstly, this framework recognizes that not all digital economy transactions are encompassed within the System of National Accounts (SNA) production boundary. For example, services and data provided for free using digital means would be outside the SNA production boundary, but they could be considered in the development of a satellite account and, therefore, data would be needed for this purpose. Even when of the measurement of activity outside de SNA production boundary may

¹⁴ It could not be the case for service digital industries, which may have only digital transactions related to their main activity.

¹⁵ Ahmad and Ribarsky (2017).

not be a priority, or its priority may have not been defined by national statistics offices (NSOs) yet, it is worth bearing this dimension in mind for eventual future developments.

FIGURE 2
Dimensions of the digital economy



Source: Ahmad and Ribarsky (2017)

Regarding **producers**, they could be broken down into institutional sectors; Corporations, Households¹⁶, Government, NPISH and the Rest of the World¹⁷. They could also be divided into industrial categories; non-digital industries, digital-enabling industries (basically the same as the ICT sector¹⁸) and digital platforms (digital intermediaries and other types of platforms).

Regarding **products**, they can be digital and non-digital goods and services, and also information/data in non-monetary transactions.

The **nature of transactions** is the key defining feature of OECD's expert group framework. It includes transactions that are digitally-delivered, digitally-ordered or platform-enabled.

The **users** can be broken down into institutional sectors; Corporations, Households, Government, NPISH and the Rest of the World.

Finally, the **enablers** of digitalization refer to the investment and infrastructure channels that help drive digital transformation.

¹⁶ It allows an analysis of goods and services provided by households within the sharing economy.

¹⁷ It is important to highlight the rest of the world due to the relevance of cross border digital trade transactions.

¹⁸ The ICT sector includes ISIC 261, 262, 263, 264, 268, 4651, 4652, 5820, 61, 62, 631, and 951.

3. Analysis of issues for digital economy measurement

Using the above conceptual framework, we preliminarily identify the cases that need to be addressed for digital economy measurement within the scope of VG's work (classification, output and prices measurement of services):

1. Non-digital services intermediated by digital platforms (peer-to-peer)
 - 1.1. Sharing economy services (peer-to-peer transactions) intermediated via digital platforms
 - 1.2. Digital intermediation services for the sharing economy
2. Non-digital services intermediated by digital platforms (B2All)
 - 2.1. Non-digital service ordered online
 - 2.1.1. Via own-website
 - 2.1.2. Via intermediary platform
 - 2.2. Digital intermediation for corporate non-digital services
3. Online product sales
 - 3.1. Online retailers
 - 3.2. Online sales by storefront retailers
4. ICT Service Sector
 - 4.1. ICT Trade
 - 4.2. Software publishing
 - 4.2.1. For a fee
 - 4.2.2. For free
 - 4.3. Telecommunications
 - 4.4. Computer programming, consultancy and related activities
 - 4.5. Data processing, hosting and related activities; web portals
 - 4.6. Computer and communication equipment repair
5. Digitally delivered content and media
 - 5.1. For a fee
 - 5.2. For free

In Table 1 these cases are classified according to the type of industry (non-digital, digital enabling and digital platforms), transaction (digitally delivered, digitally ordered or platform enabled) and products (non-digital services, digital services and information/data). A distinction is also made between transactions within or outside the SNA production boundary.

In Table 2 the analysis is completed by categorizing producers and users as per institutional sector (Corporations, Households, Government, NPISH, and Rest of the World).

Finally, in Table 3 challenges for measurement regarding classifications, output and prices and the current status of VG's work are identified.

TABLE 1
Digital economy cases by type of industry, product and transaction

	Case	Examples	SNA Production boundary		Type of industry			Transaction			Product		
			Within	Outside	non-digital	digital enabling	digital platforms	digitally delivered	digitally ordered	platform enabled	non-digital services	digital services	information/data
1	Non-digital services intermediated by digital platforms (peer-to-peer)												
1.1	Sharing economy services (peer-to-peer transactions) intermediated via digital platforms	Accommodation on Airbnb, taxi service on Uber	x		x				x	x	x		
1.2	Digital intermediation services for the sharing economy	Airbnb, Uber	x				x	x	x			x	
2	Non-digital services intermediated by digital platforms (B2All)												
2.1.1	Non-digital service ordered online	Air transport/accommodation, ordered via airline/hotel own website	x		x				x		x		
2.1.2		Air transport/accommodation, ordered via intermediary platform	x		x				x	x	x		
2.2	Digital intermediation for corporate non-digital services	Edreams, Despegar, Booking, Hotels.com	x				x	x	x			x	
3	Online product sales												
3.1	Online retailers	Amazon	x				x	(x)	x			x	
3.2	Online sales by storefront retailers	Department stores selling a portion of their sales via own website.	x		x				x		x		
4	ICT Service Sector												
4.1	ICT Trade	Wholesale of software , telecom, computers and peripheral equipment	x			x			x		x		
4.2.1	ICT Services: Software publishing	For a fee	x			x			x			x	
4.2.2		For free (open source)		x		x			x			x	
4.3	ICT Services: Telecommunications		x			x			x			x	
4.4	ICT Services: Computer programming, consultancy and related activities		x			x			x			x	
4.5	ICT Services: Data processing, hosting and related activities; web portals	Web portals: Google, Facebook. Cloud computing	x			x			x			x	
4.6	ICT Services: Computer and communication equipment repair		x			x			x			x	
5	Digitally delivered content and media												
5.1	Paid	For a fee: Spotify, Netflix, eBooks	x				x	x	x			x	
5.2	Free	For free-colaborative: Wikipedia, Reddit		x		x		x	x			x	x

TABLE 2
Producers and users by institutional sector

#	Case	Examples	Producers (Institutional sector)					Users (Institutional sector)					
			Corporations	Households	Government	NPISH	RoW	Corporations	Households	Government	NPISH	RoW	
1	Non-digital services intermediated by digital platforms (peer-to-peer)												
1.1	Sharing economy services (peer-to-peer transactions) intermediated via digital platforms	Accommodation on Airbnb, taxi service on Uber		x						x			
1.2	Digital intermediation services for the sharing economy	Airbnb, Uber	x					x		x			x
2	Non-digital services intermediated by digital platforms (B2All)												
2.1.1	Non-digital service ordered online	Air transport/accommodation, ordered via airline/hotel own website	x						x	x	x	x	x
2.1.2		Air transport/accommodation, ordered via intermediary platform	x						x	x	x	x	x
2.2	Digital intermediation for corporate non-digital services	Edreams, Despegar, Booking, Hotels.com	x					x	x	x	x	x	x
3	Online product sales												
3.1	Online retailers	Amazon	x					x	x	x	x	x	x
3.2	Online sales by storefront retailers	Department stores selling a portion of their sales via own website.	x						x	x			
4	ICT Service Sector												
4.1	ICT Trade	Wholesale of software , telecom, computers and peripheral equipment	x					x	x	x	x	x	x
4.2.1	ICT Services: Software publishing	For a fee	x					x	x	x	x	x	x
4.2.2		For free (open source)	x	x				x	x	x	x	x	x
4.3	ICT Services: Telecommunications		x						x	x	x	x	x
4.4	ICT Services: Computer programming, consultancy and related activities		x					x	x	x	x	x	x
4.5	ICT Services: Data processing, hosting and related activities; web portals	Web portals: Google, Facebook. Cloud computing	x					x	x	x	x	x	x
4.6	ICT Services: Computer and communication equipment repair		x						x	x	x	x	
5	Digitally delivered content and media												
5.1	Paid	For a fee: Spotify, Netflix, eBooks	x					x		x			x
5.2	Free	For free-colaborative: Wikipedia, Reddit	x	x	x	x		x	x	x	x	x	x

TABLE 3: Challenges for measurement and status of VG's work.

#	Case	Examples	Challenges for measurement			Already covered by VG	
			Classifications	Output	Prices	Yes	No
1	Non-digital services intermediated by digital platforms (peer-to-peer)						
1.1	Sharing economy services (peer-to-peer transactions) intermediated via digital platforms	Accommodation on Airbnb, taxi service on Uber	ISIC Classification varies by service provided. Need for distinction between services intermediated and non intermediated by platforms?	Distinction between services intermediated and non intermediated by platforms (weights for price index). Lack of data sources on C2C services	Distinction between services intermediated and non intermediated by platforms. Distinction between the intermediation service and the underlying service.		2018 meeting
1.2	Digital intermediation services for the sharing economy	Airbnb, Uber	ISIC Classification varies by intermediary service provided	Service is output only for the economy where the platform is resident	Distinction between the intermediation service and the underlying service		2018 meeting
2	Non-digital services intermediated by digital platforms (B2All)						
2.1.1	Non-digital service ordered online	Air transport/accommodation, ordered via airline/hotel own website	ISIC Classification based on the the service provided (airline transport, short term accommodation, etc.)	Distinction between services ordered and not ordered online (weights for price index).	Distinction between services ordered and not ordered online. Dynamic pricing.	Y	
2.1.2		Air transport/accommodation, ordered via intermediary platform	ISIC Classification of the intermediary platform based on Expert Group Guidance. See reservation services. Service provider classified in ISIC based on the actual service provided.	Distinction between services ordered and not ordered online (weights for price index).	Distinction between services ordered and not ordered online. Distinction between the intermediation service and the underlying service. Dynamic pricing.	Y	
2.2	Digital intermediation for corporate non-digital services	Edreams, Despegar, Booking, Hotels.com	ISIC Classification of the intermediary platform based on Expert Group Guidance. See reservation services.	Service is output only for the economy where the platform is resident	Distinction between the intermediation service and the underlying service		2018 meeting
3	Online product sales						
3.1	Online retailers	Amazon	ISIC 4791. But an alternative classification in some countries follows a breakdown by the type of good sold.	Service is output only for the economy where the platform is resident	Distinction between the intermediation service and the underlying service		N
3.2	Online sales by storefront retailers	Department stores selling a portion of their sales via own website.	ISIC Classification based on store component. Need for separate detail on in-store vs. on-line?	Service is an output only for the economy where the platform and the bussines are resident	Distinction between online sales and brick and mortar sales. Dynamic pricing.		N
4	ICT Service Sector						
4.1	ICT Trade	Wholesale of software , telecom, computers and peripheral equipment	ISIC 465, 4651-Wholesale of comptuters, computer peripheral equipment and software, 4652-Wholesale of electronic and telecommunications equipment and parts	Output as total operating revenue, includes the sales of goods purchased for resale	Distinction between the intermediation service and the underlying good. Quality adjustment needed for the price of goods.	y	
4.2.1	ICT Services: Software publishing	For a fee	ISIC 5820 - Software publishing		Pricing of software	y	
4.2.2		For free (open source)	ISIC 5820 - Software publishing	Open source software can not be recorded on market price.	No market price	Y*	
4.3	ICT Services: Telecommunications		ISIC 61 - wired, wireless, satellite, other	Bundling Output measurement should consider different ways in which services are offered, for example, individual services or in package (bundling) on a contract basis.	Bundling. Quality adjustment needed.	Y	2018 meeting
4.4	ICT Services: Computer programming, consultancy and related activities		ISIC 62 - Computer programming, consultancy and related activities based on actual services provided.	Output measurement should consider different ways in which services are offered, for example, individual services or in package (bundling) on a contract basis.	Direct pricing (Pricing of software). Bundling. Indirect pricing. Quality adjustment needed.	Y	
4.5	ICT Services: Data processing, hosting and related activities; web portals	Web portals: Google, Facebook. Cloud computing	ISIC 6312 Web portals. Cloud computing ISIC 6311.	Indirect value of the service. Output measurement should consider different ways in which services are offered, for example, on contract basis,rates or fees, project, etc.	Indirect pricing. Quality adjustment needed.	Y	
4.6	ICT Services: Computer and communication equipment repair		ISIC 951. 9511- Repair of computers and peripheral equipment, 9512 - Repair of consumer electronics	Output as total operating revenue, includes the sales of goods purchased for resale	Time based methods		N
5	Digitally delivered content and media						
5.1	Paid	For a fee: Spotify, Netflix, eBooks	ISIC currently treats audio and video differently. VG recommendation for similar treatment in 2017 India.	Service is output only for the economy where the platform is resident	Distinction between the intermediation service and the underlying service	Y	
5.2	Free	For free-colaborative: Wikipedia, Reddit	ISIC 6311 - web portals	Free-colaborative activities can not be recorded on a market price, however, it may be necessary an output estimation.	No market price	Y*	

Y*: focused on market transactions, not free provision.

From Tables 1 and 2, some general conclusions may be made. First, most of the relevant transactions in the digital economy are within the **SNA production boundary**. The exceptions refer to the collaborative production of information and software digitally available for free, as open source software and content platforms as Wikipedia.

Second, **industries** participating in the digital economy include some non-digital industries, which production is enabled by digital platforms, such as peer to peer transactions on the sharing economy, or which transactions are partly made online, such as retail or service industries (e.g. air transport, hotels and others).

Third, not all the relevant **transactions** in the digital economy meet the OECD definition of e-commerce (digitally ordered). A broad definition of digital transactions includes also those digitally delivered and platform enabled.

Regarding the **institutional sectors** involved in digital transactions, it is necessary to note that some of them involve mainly households, not only as consumers but as producers in the context of the sharing economy, implying new challenges for measurement since traditional data sources do not cover properly the activity of households as producers (if any). New data sources will be needed, as credit card transactions, employment data/and or data from intermediary services platforms.

Additionally, it is important to consider that several digital transactions are made between residents and non-residents of the economy, which makes the measurement more complex and also suggests the search of new data sources and agreements with private and public institutions.

In Table 3 we identify some of the challenges for measurement of the cases identified within the digital economy regarding classification, output and prices. A summary of the challenges in each area follows.

Classifications

With regard to classifications, it is necessary to agree on the concepts applied and the actual ISIC classification of activities that have arisen but are not explicitly included within the ISIC Rev. 4 definitions. The Expert Group on Classifications from the United Nations addressed intermediaries in services transactions at the September 2018 meeting in New York. The expert group endorsed a conceptual approach that will provide consistent classification based on the actual activities performed.

The classifications of various services included in Table 3 are based on the adopted conceptual approach. The Expert Group also provided some measurement guidance for when gross or net measurement is appropriate and highlights that this may result in more than one basis of measurement for output within a single ISIC class¹⁹. This paper and a related discussion are scheduled for the 2018 Voorburg Group meeting in Rome, Italy.

¹⁹ Murphy, J. (2017).

Each of the cases described in Table 3 can present a mixture of measurement and classification issues. For example, the publishing of software as an activity is classified in ISIC 5820. There is no classification impact or change if the software is sold to a customer on media, provided by subscription access, or provided without direct cost and supported by advertising revenue or even by donations from users. These transactional differences have significant impact on the measurement of output and prices but do not alter the classification. As a second example, intermediary services performed to bring together owners and short term renters of residential property are classified in ISIC to reservation services. The owners who actually provide accommodation services to customers are classified to short term accommodations in ISIC. Measurement of the output for these individual owners can be problematic for output surveys but the provision of accommodation services is the basis for ISIC classification. The key concept applied by the Expert Group is that ISIC classification decisions are based on the actual activities that are being undertaken.

Output measurement

The identification of companies' production is essential for understanding the structural changes in the economy and the trend in the short term indicators. However, the digital economy poses several challenges for compiling basic information.

In addition to the correct identification of the companies and their classification, there are several challenges for the output measurement of non-digital services intermediated by digital platforms; ICT service sector and content and media digitally delivered. These challenges include, among others:

- The distinction between services intermediated and non-intermediated by platforms (weights for price index)
- The identification of each producer's residency, in order to register the service as an output only for the economy where the producer is resident.
- The distinction between services ordered and not ordered online (weights for price index).
- Output as total operating revenue includes the sales of goods purchased for resale.
- Output measurement should consider different ways in which services are offered, for example, individual services or in package (bundling) on a contract basis; rates or fees, projects, etc.
- Some web portals don't charge a direct value for the service (for example, search services), therefore they need to be measured using the indirect value of the service.
- Open source software and free-collaborative activities cannot be recorded on a market price. However, it may be necessary an output estimation.

Another important difficulty for the output measurement is the access to data:

- Depending on tax regimes, accounting data from administrative tax records are not always available or companies that operate entirely through digital platforms.
- There is lack of data sources on Consumer to Consumer services, especially if they are not taxable. This problem could be solved through the use of data from intermediary platforms, but these companies are non-resident for most of countries, making difficult gathering data.

Price measurement

With regards to **price measurement**, it is important to keep in mind that digitalization promotes substitution of goods and services, thanks to a great variety of alternatives, and causes quality change. Moreover, for some type of industries it enables self-service to replace market services while for others it produces a surplus due to the intermediations service that price measurement must identify and consider.

It is recommendable to have specific price measurement for online transactions, since prices changes may differ between online transactions and traditional ones. One implication of this suggestion is the need for appropriate weights for the two kind of transactions.

Briefly, different price measurement for services should exist according to:

- The way in which services are intermediated (by platforms or not). An example is the case of non-digital services intermediated by digital platforms (peer-to-peer);
- The existence of an intermediation service surplus. This feature is shared by non-digital services intermediated by digital platforms (peer-to-peer and B2All), online product sales, ICT service sector and content and media digitally delivered cases;
- The way in which services are ordered (online or not). This feature shared by non-digital services intermediated by digital platforms (B2All) and online product sales;
- The complexity of the way services are sold (i.e. bundling, contract, etc.). An example is the case of ICT service sector.

In any case, the complexities of the online price models must be well analyzed and considered especially in cases where the presence of quality adjustment and/or dynamic pricing is common. In particular, recommendations need to be suggested for the measuring of prices in a dynamic context where benefits of price discrimination and the concerns over its potential exploitative, distortionary, exclusionary effects, as well as the likelihood of collusion in a given market, live together.

Finally, it is crucial to be aware of the importance of developing proper price measurements for the transactions of the digital economy, since the rapid appearance of new goods and services and technological change require timely inclusion and quality adjustment for an adequate distinction of price and volume components, avoiding the overestimation of prices and underestimation of volume.

Status of VG's work

Last two columns on Table 3 summarize the current status of VG's work regarding the cases that need to be addressed for digital economy measurement within the scope of VG.

While a number of industries identified as part of the digital economy have been reviewed in previous meetings, the focus has not necessarily been on a change from traditional transactions to digitally enabled or completed transactions. The Voorburg Group and the Bureau may wish to revisit industries as is being done in 2018 for cloud computing on future agendas.

In the next section we contextualize VG's work on this matter and propose criteria for its prioritization in the future.

4. Context and prioritization criteria for future work.

The consistent measurement of services within a rapidly changing digital economy is an important challenge for the Voorburg Group. The Group's mandate and strategic plan was reviewed and modified in 2017 to better recognize that: attention to best practices is not a static activity; the Group needs to develop and manage our knowledge base; and the Group contributes value by not just sharing lessons learned through hard-won experience in NSOs but also by recognizing that we have a duty to tackle the harder issues as well. The first objective of the 2017-2021 strategic plan is that "Voorburg Group will update its best practices to account for the rapidly changing economy and its impact on our statistical measurement practices."

Digital transactions occur across the economy and are not unique to the services sector. Indeed there are a number of international working groups trying to define and measure many aspects of digital transformation. The work of the Voorburg Group is not meant to replicate their work or to contradict their findings. Instead, the Group hopes to find practical methods to implement the measurement of services following the same concepts and objectives of those looking at the bigger picture of the digital economy. Where we find problems in the practical measurement of specific concepts or identify the need for changes to the way we classify industries or products, the Group will provide advice.

One important international initiative for the Voorburg Group to follow is the work of the OECD horizontal 'Going Digital project'. Led by the Committee on Digital Economy Policy (CDEP) in the Science, Technology and Innovation branch, the project is designed to incorporate inputs from over a dozen committees across the OECD. A summary of the project was included in the 2017 Voorburg Group meeting documents as a room paper to accompany the e-commerce session. As noted in the document:

"The Working Party on Measurement and Analysis of the Digital Economy (WPMADÉ) will serve as a co-lead on measurement given delegates' experience and expertise in developing appropriate indicators as well as concepts and definitions. The Working Party will cooperate with other WPs in the Committee to develop new and improve existing indicators and metrics for security and privacy, global data flows, internet openness, broadband and the Internet of Things (IoT). A summary of this work will be encapsulated in the publication/online portal, 'Measuring the Digital Economy: A New Perspective' (Publication in Q4 – 2018).

"In addition, the Committee on Statistics and Statistical Policy (CSSP), one of the core committees in the Going Digital Project, have established an Advisory Group on Measuring GDP in a Digitalised Economy under the auspices of the Working Party on National Accounts (WPNA) to advance the measurement agenda in relation to macroeconomic statistics. The Advisory Group includes national accountants from national statistical offices, international organisations including Eurostat and the IMF, and members of the WPMADÉ. The work of the Advisory Group will also serve as input into G20 deliberations which the G20 has tasked the OECD and IMF to provide further research on potential mismeasurement of macroeconomic statistics due to digitalisation of the economy. Also, on the measurement front and in the context of digital trade the OECD-WTO inter-agency Task

Force on International Trade Statistics (TFITS) is developing a typology on digital trade that will serve as input into the G20 Trade and Investment Working Group.”²⁰

As mentioned in section 3, considering the measurement challenges posed by the digitalization, the Voorburg Group and the Bureau may wish to revisit some industries identified as part of the digital economy focusing on the impact of change from traditional transactions to digital transactions. We propose some criteria for prioritizing VG’s work on this field.

Proposed Criteria for work by Voorburg Group:

1. Updates of sector papers for industries greatly affected by digital transformation, such as significant changes in industrial organization, transformation of the service products being delivered, new pricing mechanisms or other disruptors that require a change in standard approaches.
2. The concept and observable activities have an internationally recognized definition. It is not the Voorburg Group’s place to determine what and how digital transactions should be defined. However, the Group may be able to identify problematic measurement issues if the concepts are not measurable or easily observable among services producers. Feedback from the measurement experiences of the Group could be used to refine or improve the definitions. This is similar to the Group’s reliance on the framework of the System of National Accounts as a basis of our statistical measurement.
3. The Group should consider the breadth of experience available from the group to be able to provide meaningful guidance on the issue. The Group’s best work and guidance comes when multiple NSOs have practical experience to share.
4. The Group should consider the importance of measuring the phenomenon based on the issue’s relative importance in the overall calculation or deflation of GDP in the services sector. For example, an issue that affects few industries which are relatively small in terms of contribution to GDP would be assigned a lower priority than one that affects many industries or a few large industries.
5. The Group should consider the needs and priorities of international organizations or groups that are looking towards Voorburg Group for practical solutions provided there is sufficient capacity or experience within the Group to tackle these challenges. In recent years, Voorburg Group has sought input from the OECD, IMF, UNSD and Eurostat on input to the Voorburg Group’s Agenda. Digital economy is an area that both the IMF and OECD encouraged the Group to continue its work, specifically in the quality adjustment of services prices related to digitalization.

²⁰ Uhrbach, M (2017).

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