Handbook on Measuring Digital Trade

First Edition

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OECD, WTO and IMF

Foreword

In response to growing demand for coherent and comparable data on digital trade, in 2017 the Inter-Agency Task Force on International Trade Statistics created an Expert Group, drawn from international organisations, national statistics agencies and central banks, to develop a Handbook that provided:

- A conceptual framework to define digital trade, around which national efforts could be targeted; and
- A mechanism to bring together and share existing national and international efforts on measuring digital trade and/or dimensions of it, that could be used to identify and develop best practice.

The present Handbook reflects the outcome to date of the Expert Group's efforts. It shows that in many areas work is still very much in its infancy and in some respects (for example as regards the measurement and valuation of many data forms) can best be described as embryonic.

At the same time, progress continues to be made in frontier issues surrounding the measurement of digital trade. It is hoped, not least by highlighting the importance of such issues, that the current Handbook will help to accelerate and assist in those efforts. Recognising that significant work remains to be done, and at the same time that the structure and impact of the digital economy is evolving rapidly and unpredictably, this Handbook cannot be the final word on the subject, rather it should be viewed from the outset as a living document designed to be updated on a continuous basis (available on the OECD, WTO, IMF and UN websites) as new national and international experiences emerge.

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Acronyms and abbreviations

ATM	Automated Teller Machine
BEPS	Base Erosion and Profit Sharing
BPM6	IMF Balance of Payments and International Investment Position Manual, 6th edition
B2B	Business to business
B2C	Business to consumer
B2G	Business to government
BOP	Balance of Payments
C2C	Consumer to consumer
CBEIS	China Customs' Cross-Border E-commerce Information System
CPC	Central Product Classification
DIP	Digital Intermediation Platform
EBOPS	Extended Balance of Payments Services Classification
EC	European Commission
EDI	Electronic Data Interchange
GATT	General Agreement on Tariffs and Trade
GATS	General Agreement on Trade in Services
GDP	Gross Domestic Product
GNI	Gross National Income
G2B	Government to business
ICT	Information and Communications Technology
IMF	International Monetary Fund
IMF BOPCOM	IMF Committee on Balance of Payments Statistics
IPC	International Postal Corporation
ITS	International Trade in Services
ITSS	International Trade in Services Statistics
ITU	International Telecommunications Union
MCC	Merchant Category Code
MNE	Multinational Enterprise
MOSS	Mini One Stop Shop
MS	Member State
MSITS	Manual on Statistics of International Trade in Services 2010
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne
NFC	Near field communication
NNI	Net National Income
OECD	Organisation for Economic Cooperation and Development
OECD CTP	OECD Centre for Tax Policy and Administration
OECD WPTGS	OECD Working Party on International Trade in Goods and Services Statistics

SBS	Structural Business Survey
SKU	Stock Keeping Unit
SME	Small- and medium-sized enterprises
SNA	System of National Accounts
SPE	Special Purpose Entity
VAT	Value Added Tax
UN	United Nations
UNCTAD	UN Conference on Trade and Development
UNESCWA	UN Economic and Social Commission for Western Asia
UNSD	UN Statistics Division
UPU	Universal Postal Union
US BEA	United States Bureau of Economic Analysis
WCO	World Customs Organization
WTO	World Trade Organization

Executive Summary

Defining Digital Trade

Digitalisation is now everywhere but, to date, it remains largely invisible in our official statistics of trade and indeed, more broadly, GDP. This, in part, reflects an actual absence from the accounts, for example concerning the scale of *de minimis* trade transactions, which digitalisation is likely to have significantly increased in recent years, and where there are concerns with the ability of current estimation approaches to capture this increase. But it also reflects a simple lack of visibility of digitally related transactions in the accounts; they are there, we just can't see them.

This lack of visibility is largely a function, or perhaps legacy, of the fact that the core economic production accounts remain largely constructed around firms and products, with the classification of the former being driven by the classification of the latter.

Within this space it is hard to identify digitalisation in its broadest sense. Certainly the current system provides a means to classify industries (firms) around some notion of digitalisation, whether that be through sectors that have, typically, high digital intensities, produce digital (or digitised) products etc. or through notions of the products themselves, i.e. digitised, digital enablers etc. However, useful though these measures can be, they only provide a partial view of digitalisation; which has led many to conclude that the potential scale of mismeasurement is larger than it may actually be.

Complicating matters is the absence of a single definitive view on what is actually meant by the multitude of terms that are commonly used in this statistical space: digital economy, digital trade, the digital transformation, sharing economy, gig economy etc. whose interpretation typically differs depending on the application or the user.

That is not to say that no efforts have been made to tackle these problems and two in particular are of relevance here.

The first concerns a number of international efforts (which Chapter 3 of this Handbook provides more detail on) to identify and **measure e-commerce** transactions; which most users generally recognise as a core component of what needs to be measured to better understand the size of the digital economy, even though definitional differences exist across the various efforts.

The second (see Chapter 4) reflects efforts to consider another important characteristic of the digital economy, that is, the ability to receive a whole range of services electronically.

From a statistical perspective, these two notions require a fundamental rethink in the way that we construct our core economic accounts if we are to develop measures of the size of the digital economy, or indeed, digital trade, which is the focus of this Handbook.

Unlike traditional concepts that focus on ***who*** is doing the production and ***what*** is being produced, the two notions are more aligned around a concept of ***how*** digitalisation is transforming the way that the ***what*** is being purchased and delivered.

There is of course also interest in understanding ***how*** digitalisation is transforming the way that ***what*** is being produced, which is of interest in better understanding the overall impact of digitalisation in the economy and where significant efforts are being made. But this is of less relevance in the context of understanding digital trade, which focuses on the types of products being traded (goods vs services) and the mechanisms used to trade. In this respect the ***how*** matters significantly for trade policy making, both in terms of its impact on modes of supply (delivery) but also in its ability to facilitate trade (purchasing mechanisms).

As a consequence, and to capitalise on existing efforts in these areas, this Handbook defines digital trade as

> *all trade that is digitally ordered and/or digitally delivered.*

The Handbook further defines **digitally ordered trade** (which is equivalent to the OECD definition of e-commerce) as:

> *The international sale or purchase of a good or service, conducted over computer networks by methods specifically designed for the purpose of receiving or placing orders.*

In turn **digitally delivered trade** is defined as:

> *International transactions that are delivered remotely in an electronic format, using computer networks specifically designed for the purpose.*

For both **digitally ordered** and **digitally delivered**, transactions cover orders/deliveries made over computer networks (the web/internet, including via mobile devices, extranet or via electronic data interchange) but should exclude any services, not provided or ordered over computer networks, including via phone, fax or manually typed email.

As the Handbook illustrates, it is important to recognise that the two concepts 'ordering' and 'delivering' are not mutually exclusive. **Many digitally delivered services are also digitally ordered but many are not**, which is an important consideration in thinking through the approaches countries should adopt to estimating overall digital trade.

Estimating Digital Trade

In large part by design, the definition of digital trade, has been developed with a view of current (and potentially feasible) data sources. It would have been a very simple exercise for example to define digital trade as above and then include a recommendation for countries to develop new surveys for all economic agents (firms, governments and households) to measure it. But this would also have been entirely unrealistic.

The aim from the outset has been for the Handbook to provide practical guidance to countries by outlining the potential to use existing data sources or widely used surveys already being implemented, explored and/or exploited in other countries.

Digitally ordered trade

In the area of digital ordering, it does this through its key recommendation that countries capitalise on existing (or develop new) e-commerce, or equivalent, surveys and data sources. Many countries already run surveys to estimate e-commerce (sales) for the whole economy, and many are now beginning to explore the potential of enhancing these so that they include an international dimension: i.e. through simple questions asking respondents to provide a view of the share of sales abroad that are digitally ordered.

It remains to be seen how successful these efforts are, but certainly this appears to be the most promising avenue to explore digitally ordered trade. There are however some complications that need to be addressed in adopting this route.

1. Chief, in this respect, is the difficulty that respondents will have in identifying whether a purchase (as opposed to a sale) was from a non-resident unit, in order to estimate the share of imports that are digitally ordered. Especially when transactions pass through websites, or **digital intermediation platforms**, DIPs, where the only information that may be available to the respondent is the domain name, it will not always be clear whether the purchase was an import or not. Country-code top-level domain names (e.g. .fr, .uk, .cn etc.) are not necessarily a marker, as national experiences in this Handbook well demonstrate.
2. Digital transformation involves significantly higher participation by households, as direct buyers (and, so, impact on imports) but also as sellers, and, so, considerable care is needed in the use of firm-only based estimates of digitally-ordered. Household surveys for identifying digital imports provide an obvious data source for imports, albeit not without challenges, and also potentially exports, but additional sources, in particular from DIPs, should be explored.
3. The difficulties in identifying whether the seller is resident or non-resident to estimate household imports of digitally ordered goods and services are compounded compared to those for firms. Most digitally ordered purchases by households will be through DIPs and company websites (whereas many digitally ordered transactions by firms will be via electronic data interchange mechanisms).
4. A particular complication for digital trade concerns imports of digital intermediation services by sellers using non-resident DIPs (where implicit charges, the implicit fees incurred by the buyer and seller are imputed to the buyer). An additional complication arises for sales by residents to non-residents using resident platforms, where the intermediation fee should be recorded as a domestic transaction (intermediate consumption by the exporter) with the value of exports, including the value of the intermediation fee. Surveys requesting information on foreign sales should be carefully designed to ensure that these transactions are not omitted.

As noted above, a particular challenge for estimating digital trade, concerns the overlap between digitally ordered and digitally delivered. Current methods, as shown below, are likely to record digitally delivered trade using broad macro-based approaches (thus including the overlap).

Mitigating the measurement challenges caused by the overlap is the fact that, the Handbook takes the view that **only services can be digitally delivered** (and not goods)[1].

As such, **ensuring that measures of digitally ordered trade differentiate (at least) between goods and services**, especially if services are spilt into those that can in theory be (potentially) delivered digitally and those that cannot, provides a simple mechanism to estimate the size of any overlap (which relates explicitly to digitally-delivered digitally-ordered services).

The Handbook explicitly recognises that there will be challenges to developing comprehensive, robust and exhaustive estimates of digital trade. As such, in the absence of detailed survey based approaches, it also advocates the use of simpler methods; which can be based on expert judgement, anecdotal evidence, or observations based on the experience (and results) of comparable countries.

In this sense, **one such simple approach to estimating digitally ordered trade is to apply shares (based on these 'judgements') to existing measures of international trade, and to apply specific shares for different products**, ideally by category of importer/exporter (firms, governments, households, NPISHs). In the absence of any other information, this is better than nothing.

Such shares could be based on small (but representative) samples of importers and exporters, mirror statistics, other countries' experiences, or even through the application of estimates based on observations at the whole economy level (i.e. by product but not broken down between foreign and domestic). Of course some discretion will be needed in how these estimates are applied. For example, the share of household

expenditures on, say, computers, that is digitally ordered, at the total economy level, is likely to be an underestimate of the equivalent share on cross-border imports of computers (but probably an overestimate of digitally ordered purchases of computers the household may have made whilst abroad. Similarly, the share of digitally ordered household expenditures on say food products (via a supermarket website) is likely to be higher than corresponding shares of consumption abroad.

Other data sources can also play an important role. Many countries for example are now exploring the potential of credit card data to provide information on digital-ordering, and while these mainly relate to households (and there remain some challenges in reliably identifying whether the transaction was indeed truly international, as opposed to being cleared in a foreign registered merchant house), they also provide an important source that can be used to derive shares. Credit card data (when processed in such a way that it aligns with thresholds used in *de minimis* trade regulations) can also provide a useful source to assess current approaches used to estimate *de minimis* trade (and indeed as the basis for adjustments), especially when coupled with information from other sources (for example from courier companies or with other administrative and Big data sources).

Digitally delivered trade

By definition (see also above) this Handbook takes the view that only services can be digitally delivered. In doing so, the Handbook takes as a starting point the scope of services (see below) covered in the closely related notion of trade in ICT-enabled services:

- Insurance and pension services (EBOPS 6);
- Financial services (7);
- Charges for the use of intellectual property n.i.e. (8);
- Telecommunications, computer, and information services (9);
- Research and development services (10.1);
- Professional and management consulting services (10.2);
- Architectural, engineering, scientific and other technical services (10.3.1);
- Other business services n.i.e. (10.3.5);
- Audio-visual and related services (11.1);
- Health services (11.2.1);
- Education services (11.2.2) and
- Heritage and recreational services (11.2.3).

In addition, the Handbook recommends that estimates of imports and exports of *Digital Intermediation Services*, which are covered in various parts of EBOPS e.g. *transport*, *travel*, *trade*, and *financial services*, are also included).

Finally the Handbook recognises that many services can be digitally delivered using Mode 2 forms of supply, and, so, in deriving estimates of digitally delivered trade, it is important that countries make estimates for these too. Detailed product breakdowns available in international passenger surveys (or equivalents) should be used in conjunction with any judgement-based calculations, as the shares of digitally delivered will differ significantly depending on the actual product purchased. For example, the item *travel* in EBOPS includes expenditures on goods, which cannot be delivered digitally, and also includes many types of services, some of which can be delivered digitally (e.g. telecommunication services received from local operators after acquiring a local SIM card) but many of which cannot (e.g. transportation).

The experience of many countries suggests that adaptions to existing International Trade in Services (ITS) surveys, through the addition of questions that explicitly ask respondents to provide an estimate of digitally delivered trade, are feasible and generate good results, even if the additional questions target only a

smaller sample of firms. The results from these surveys also highlight that in practice, certain products are almost exclusively digitally delivered (for example, telecommunications services) and that many other products are mainly (above 80%) digitally delivered. As such, in the absence of actual estimates, the use of anecdotal information or expert-judgement, to arrive at shares of exports by product that are digitally delivered is a credible alternative.

It is important to recognise that ITSS surveys typically exclude Mode 2 trade and, so, in arriving at estimates of digitally delivered trade for the whole economy, explicit estimates, in particular using international passenger or tourism surveys, are also needed.

A number of countries are exploring the possibility to develop estimates of digitally delivered trade by capitalising on efforts to develop trade statistics by Modes of Supply. These efforts build on the fact that, by definition, all digitally delivered **cross-border** services transactions are Mode 1. As such questions in ITSS asking for the share of cross-border exports or imports that were digitally delivered also provide a (lower-bound)[2] view of Mode 1 service delivery (for those same products). Likewise, surveys of Mode 1 service delivery provide an upper-bound estimate (but reasonable approximation) of cross-border digitally delivered trade.

Because of concerns around the taxation of digitally delivered services, especially those delivered to households, new sources of data on this front are becoming available, as countries seek to plug loop-holes in the tax-base. Countries are strongly encouraged to explore the scope of using related administrative tax data as they become available.

Digital Intermediation Platforms (DIPs)

An important characteristic of digitalisation is the increasing role of firms such as Airbnb, Alibaba, Amazon, Booking.com, eBay, Uber, and Tencent that facilitate transactions in goods and services. These digital Intermediation platforms (DIPs) nearly always have an electronic ordering component and, typically, the goods and services advertised can only be paid for electronically[3].

Although practically all digitally intermediated transactions are included under digitally ordered (and, in some cases, digitally delivered), they are the subject of a separate Chapter in this Handbook for three reasons. The first reflects the specific interest in the role of digital intermediary platforms (DIPs), and, in particular, their potentially disruptive impact on the economy. The second reflects the possibility that a targeted focus on DIPs, including through dedicated survey vehicles, may provide an effective approach to deliver earlier results on both digitally ordered and digitally delivered trade. The third reflects the specific conceptual and statistical challenges that transactions in DIPs present, especially when they are not resident in the country where the intermediation services are consumed.

DIPs that charge users (buyers and/or sellers) a fee (implicit or otherwise) are defined as

> *online interfaces that facilitate, for a fee, the direct interaction between multiple buyers and multiple sellers, without the platform taking economic ownership of the goods or services that are being sold (intermediated).*

In turn, because digital Intermediation platforms may also provide other services, fee-based digitally intermediated platform services are defined as

> *online fee-based intermediation services enabling transactions between multiple buyers and multiple sellers, without the intermediation platform taking economic ownership of the goods or rendering-services that are being sold (intermediated).*

It is important to note that fee-based digitally intermediated platform services, differ from similar services provided by electronic retailers or e-tailers, who may also sell a wide variety of different products and operate exclusively online, but who own all the products being sold, and so provide margin-based distribution services, as opposed to intermediation services.

Current national efforts to measure the activities of DIPs are limited, reflecting in large part the difficulties in identifying them in current statistical business registers, which in turn partly reflects a lack of clear guidance in how they should be classified in ISIC. Discussions are on-going in this area. For now the provisional guidance is that DIPs should be classified to the activity they intermediate (if they intermediate services) and to ISIC 47.91 if they intermediate sales and purchases of goods.

A significant statistical challenge concerning the measurement of DIPs transactions however concerns transactions with non-resident DIPs, especially by households (which may lead to underestimates of trade – especially *de minimis* trade). **The inclusion of questions on DIPs (and in particular well-known and large DIPs, whether resident or non-resident) in household surveys should definitely be explored, especially for surveys of expenditures abroad**.

Non-monetary international transactions

Perhaps the biggest statistical challenge within the area of digitalisation concerns non-monetary transactions[4], in particular with regards to 'data'. This includes non-monetary intra-firm transactions, especially transactions related to the 'free' transfer of services related to knowledge-based capital, including data, often for reasons of fiscal optimisation.

Work is on-going within the international statistics community to provide greater guidance (in particular concerning economic vs legal ownership of assets) on when imputations for these flows should be included in the system of economic accounts, and how they should be valued. Future versions of this Handbook will reflect the conclusions of his work as they emerge.

Notwithstanding those deliberations, there is also growing interest in imputing some value to these related flows, even if they are viewed ultimately as transactions outside of the conventional production (goods and services) accounts. Efforts on this front (notably on the valuation of data) will also be included in future versions of this Handbook. For now the Handbook, provides a placeholder, recognising the importance of the need for information in this area through explicit references in its framework (Figure 2.1) and Reporting Template (Table 2.1).

Moving Forward

As the Handbook demonstrates, the development of statistics on digital trade remains, largely, in its infancy, which is why the Handbook should be seen as a living document that will be updated as new national and international efforts emerge. It is hoped, and indeed intended, that the Handbook itself will help to assist and motivate in further uptake of initiatives.

Perhaps the most important instrument in this respect reflects the reporting template (Table 2.1), a synthesis of which is reproduced in Figure 1 below, with annotations providing information on the various sources that can currently be used to populate statistics on digital trade.

Central to its development is the fact that in most countries estimates of digitally delivered trade appear most feasible at this stage, since the evidence suggests that most products that can be digitally delivered are indeed digitally delivered. This consideration has played a large part in the design of the template, meaning that estimates of digitally ordered trade focus primarily on goods that are not digitally delivered, while digitally delivered services that are also digitally ordered are recorded as an 'of which' component of digitally delivered.

Figure 1. Template for reporting Digital Trade (simplified)

	Exports			Imports		
	By Institutional sector			By Institutional sector		
	Corporations By industry	**Governments**	**Households / NPISHs**	**Corporations** By industry	**Governments**	**Households / NPISHs**
i Digitally ordered						
ii Goods	ES	AR	HS/CC	ES/ITSS	AR	HS/CC
iii Services*, not digitally delivered	ES/ITSS					
iv Digitally delivered services*						
v Digitally ordered*	ES/ITSS/ITRS	AR	HS/CC	ES/ITSS/ITRS/VAT	AR	HS/CC/MOSS
vi Not digitally ordered*						
vii Total Digital Trade						
viii Transactions via DIP's						
ix Digitally ordered						
x Goods	ES + DIP		HS/CC + DIP	ES/ITSS + DIP		HS/CC + DIP
xi Services*						
xii Digitally delivered*	ES/ITSS/ITRS + DIP		HS/CC + DIP	ES/ITSS/ITRS/VAT + DIP		HS/CC/MOSS + DIP
xiii Not digitally delivered*						

* Services should be displayed by EBOPS category, see Chapter 4

ES = Enterprise surveys
HS = Household survey
CC = Credit card data
ITSS = International Trade in Services Statistics Survey
DIP = Data collected directly from Digital Intermediation Platforms (especial surveys, webscrapping, etc.)
ITRS = International Transaction Reporting System
MOSS = Mini One Stop Shop
AR = Administrative records
VAT = administrative records from value added tax collection (especific for digital activities)

National compilers are strongly encouraged to work towards populating these tables, and to provide information on their experiences (completed templates and data sources) to SDD.Servstat@oecd.org.

Notes

[1] This is considered without any prejudice to ongoing WTO negotiations and current debate on specific topics, like 3D printing.

[2] Lower bound as not all Mode 1 services are digitally delivered, for example those delivered by fax, phone.

[3] It is worth noting however that digital payment is not a condition for digital trade. Orders can be made on-line, but, for example, picked up and paid for physically.

[4] Non-monetary in this sense, and as defined in the rest of the Handbook, concerns exchanges that are currently outside of the goods and services account because they were not paid for.

1. Introduction

What is the digital transformation and why do we care about digital trade? What are the policy spaces that are affected by it and how? What is the evidence, and existing initiatives, that can be drawn on to shape a definition of digital trade: one that meets the broad range of policy demands but that is also feasible, and implementable at a global level.

1.1. Introduction

The Internet and digitalisation are fundamentally changing the way people, businesses and governments interact. This has led to a new phase of globalisation underpinned, in particular, by the movement of data across national borders that has begun to transform international trade in goods and services.

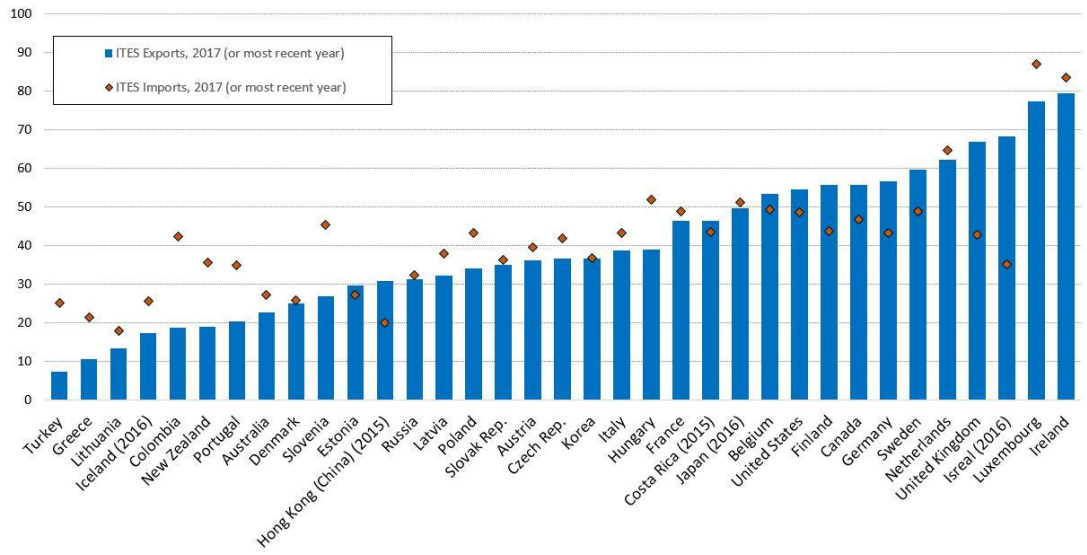
Digitalisation enables a scale of trade in services that would have been unimaginable in an analogue world. It has allowed for significant access to new markets, particularly by SMEs, and for new products, such as cloud services, whilst also having a significant disruptive and transformative impact on many industries.

However, despite the clear and growing impact of digitalisation, existing measurement approaches, on which this Handbook builds, have typically only been able to shed light on some, albeit important, aspects of it, and, in particular, its contribution to trade.

Many of the existing initiatives have focussed on specific aspects of what could be considered as being in scope of digital trade or on measures that provide insights on it, with varying degrees of complexity. For example, many efforts have looked at measures of trade in ICT goods (as enablers of digitalisation), reflecting, in large part, the availability of data in this area.

Other efforts, (see for example Figure 1.1), have looked at measures of potentially ICT-enabled services (i.e. those that could be provided in digitised form, as a proxy for actual ICT-enabled services), such as the effort developed under the UNCTAD led Task Group[1] on measuring Trade in ICT Services and ICT-enabled Services (TGServ) and that of the US Bureau of Economic Analysis[2].

Figure 1.1. *Potentially* ICT-Enabled Services (ITES), % of total trade in services



Source: OECD Trade in Services EBOPS 2010 – International Trade in Services by Partner Economy database and IMF Balance of Payments (BOP) statistics.
Note: Potentially ICT-enabled services refers to services categories that can predominantly be delivered digitally (see also Chapter 4).

Significant efforts made by, for example, the OECD[3], WTO[4], and WCO[5] (for goods) have also been made in the area of electronic ordering (e-commerce).

Of particular relevance here, and symptomatic of the new challenges and difficulties presented by digitalisation, is that efforts on e-commerce reflect a departure from conventional measurement approaches that typically look at groupings of products and/or industries[6]. That is not to say that these

characteristics (product and industry) are not, in and of themselves, useful nor necessary but they struggle, on their own, to provide a holistic notion of digital trade; i.e. one that reveals the contribution of digitalisation to trade[7].

This Handbook builds on this considerable body of work and defines

> *digital trade as all trade that is digitally ordered and/or digitally delivered[8].*

By design, to capitalise on existing measurement efforts and surveys (and so minimising the demands for new surveys and measurement practices), the definition builds on existing definitions of e-commerce and ICT-enabled services. In particular, the definition of *digitally ordered* transactions used in the definition of digital trade follows the existing OECD definition for e-commerce, whilst the definition of *digitally delivered*, is closely related to UNCTAD's definition of ICT-enabled services, albeit with some differences in the coverage of products and the delivery mechanisms (e.g. excluding the provision of services via the telephone).

In addition to covering the conventional notions of digital trade, this Handbook considers international activity enabled by digitalisation that extends to non-monetary transactions, notably those related to data, where measurement and valuation challenges are particularly complex and where on-going efforts are largely in their infancy[9]. There have been concerns that current statistics underestimate the size of trade supported by non-monetary transactions and there is growing policy demand for indicators of these activities.

Whilst it is clear that there is a large degree of ambition in the Handbook, notably in motivating efforts in areas such as non-monetary flows, it is important to note that the ambition is also restrained.

The definition adopted in this Handbook does not, nor does it attempt to, measure, in its broadest sense, the **overall** contribution of digitalisation to trade (see also Section 1.3). For example, many firms increasingly use digital tools in one form or another to engage in trade, including the use of data to improve the production of goods that are subsequently sold through conventional, non-digital, channels. The definition adopted in this Handbook will not be able, nor is it designed, to capture these transactions (especially if the digitised components that are contributing to trade are not themselves traded).

However, in 2017 the OECD created an *Advisory Group on Measuring GDP in a Digitalised Economy*[10] that is developing a satellite account (see Annex A) that has been developed in parallel with this Handbook, and which will be able to shed light on these broader issues.

In addition, the OECD's *Going Digital* project[11] includes a significant measurement component. "*Measuring the Digital Transformation: A Roadmap for the Future*[12]" provides guidance and recommendations on a number of broader indicators, such as high-speed internet access, number of smart phones per capita, the use of digital tools by SMEs etc., and also includes recommendations in a number of areas covered in this Handbook (see Annexes A and C).

In this sense, the Handbook adopts a definition of digital trade that can more accurately reflect the share of current international trade in goods and services that uses ICT networks for being realised on the market.

It is difficult to overstate the 'working' status of this Handbook. As noted above there are a number of areas where measurement work is still in its infancy. While the Handbook is designed to provide an overall conceptual framework around which countries can target efforts to achieve internationally comparable measures and capitalise on emerging best practices, it is also designed to provide a vehicle that drives momentum and kick-starts measurement in areas where significant gaps exist, such as on data. It is therefore **a living document;** one that will be continuously updated as measurement practices mature.

The Handbook is designed to be as exhaustive as possible in its coverage of digitalisation issues of relevance for trade statistics but with discussions still evolving in a number of areas, this is not yet the case.

Four major areas where research is on-going but whose (current) exclusion in the main body of the Handbook have no impact on the conceptual framework covered nor on the definition of digital trade concern:

1. the need for improved guidance on the rules governing economic ownership of intellectual property assets;
2. improved compilation guidance on the measurement of cloud services (where there are challenges in identifying the source of imported services);
3. improved guidance and complementary estimates that provide insights on Mode 3 transactions and other modes of supply (especially Mode 1); and
4. the treatment of cryptocurrencies and crypto-assets (see Annex 4.D, which currently recommends that these are not included in estimates of digital trade).

Regarding the first, the OECD created an informal reflection group to investigate the impact of globalisation on the national accounts and made a series of recommendations, including on the need for improved guidance on the rules for economic ownership for intellectual property assets[13] (see Annex B).

Regarding cloud services, although payments will, at least in theory, be recorded in international trade transactions, free use of cloud services will not be. Although this is similar to many other 'free' services, such as e-mail, the nature of cloud-based services means that it is not always evident from which country the services were provided, even if the country that receives the payment is known (See Annex C).

Digitalisation has further blurred the lines between traditional trade in services (Modes of Supply 1, 2 and 4) and a broader notion of trade that includes delivery via foreign presence (Mode 3). In a digital world, firms can readily supply services via affiliates abroad rather than through traditional trade mechanisms. Sometimes these will be supported by intra-firm services provided by the parent or other affiliates, which should be recorded as traditional trade, but often compensation for the provision of these services is recorded only as primary income receipts of the parent. Guidance on all of these areas will be covered in an update to this Handbook during the course of the next few years.

Finally, guidance is currently being developed around the treatment of crypto-assets, where a consensus, albeit provisional, has emerged around the idea that many are financial assets, and so out of scope of this Handbook. But at the same time, a view has also emerged (which forms the basis of current BOPCOM guidelines and similar recommendations from the National Accounts Advisory Expert Group) that certain types of cryptocurrencies result from a process of production, and so related international transactions should be recorded in the goods and services account. However, recording the flows in this way (and in particular that many cryptocurrencies are the result of production, remains contentious and, at the time of writing, a matter of intense debate. Given the provisional nature of current guidelines, this Handbook excludes transactions of cryptocurrencies and crypto-assets from the scope of digital trade (see Annex 4.D).

1.2. Policy drivers

An important motivator for the development of this Handbook is the growing need for better evidence to assist analysts, businesses and policy makers in developing policies and strategies that can capitalise on, or manage the risks of, digital trade. Indeed, under the recent Chinese, German and Argentine Presidencies, both the G20 Trade and Investment Working Group, and Digital Economy Task Force have placed significant emphasis on measurement.

The 2017 Digital Economy Ministerial Declaration, under the German Presidency, for example stated that:

> *To fully harness the potential of digitalisation for jobs and growth, it is critical that the digital economy is comprehensively included in our national statistics and when feasible, separately identified. There is also a need to continually review our statistical frameworks. This evidence will help us assess the impact that our digital strategies are having on the development of the digital economy. We therefore welcome the work of international organisations and National Statistical Offices to improve measurement of the digital economy.*

This culminated in the development of a Toolkit for Measuring the Digital Economy (see Annex D) under the Argentine Presidency, and which asked for countries to:

> *Work towards improving the measurement of the digital economy in existing macroeconomic frameworks, e.g. by developing satellite national accounts.*

In addition, there have been significant and high-profile policy-driven national initiatives that have looked at both broad and specific aspects of the impact of digitalisation on macroeconomic statistics. For example, the 2016 Bean Review[14] conducted to *assess the UK's future economic statistics needs in particular relating to the challenges of measuring the modern economy,* and the US Department of Commerce's 2016 initiative[15] on *Measuring the Value of Cross-Border Data Flows* (Annex E).

Meeting the needs of policy makers is, of course, central to the design of new statistics and statistical standards and this Handbook is designed to respond, as far as possible, to many of these needs, summarily described below[16].

Market access

Trade market access refers to the rules and regulations – as established through WTO multilateral agreements such as the GATT (for goods) and GATS (for services), or via bilateral or regional trade agreements – that determine if, and under what conditions, products can be sold in foreign markets through trade. These rules may involve tariffs or quotas, but also behind-the-border measures. The multilateral trade rules have been developed to be technologically neutral, meaning that they apply regardless of the technology used to deliver goods or services. In addition, a moratorium on applying duties on electronic transmissions has been agreed since 1998 and regularly extended.

Digitalisation has increasingly been a focus of attention in this area as it further blurs the lines between goods and services, where different rules apply (such as 'software on a disk' versus software delivered electronically) and moreover it creates ambiguities around the nature of the product being supplied. For example, in a recent case heard by the European Court of Justice (December 2017), the Court ruled that Uber was in the business of providing transport services (which are excluded from EU rules permitting freedom to provide services) and not (as argued by Uber) in the business of providing computer services (which are governed by the directive on services in the EU internal market). Although statistical standards do not have to follow these rulings, it is important that they are designed, wherever possible, in such a way that they are able to inform them (see also Chapter 5).

E-commerce was introduced as early as 1998 into the agenda of global trade policy making through the work programme on e-commerce launched by the WTO (WTO, 1998[1]). While progress has been slow, a group of 81 members further agreed to "initiate exploratory work together toward future WTO negotiations on trade-related aspects of electronic commerce" under the Joint Statement Initiative (WTO, 2017[2])[17].

Trade facilitation

The ease of ordering online, including from abroad, has led to an increase in the number of small packages crossing borders. The treatment of small parcels, often by postal systems, is different from the treatment of other goods (e.g. through shipping containers and warehouses), sometimes creating a consumer preference for foreign e-commerce retailers, sometimes for traditional domestic retailers. Very low *de minimis* provisions (the threshold below which no customs duties are collected) can lead to longer customs

clearance times and therefore to potential distortions in market preferences by consumers towards domestic rather than foreign retailers[18]. In this context, and, indeed, as a result of the increased volume of small packages, *de minimis* provisions are currently being reviewed in countries, which will also impact on estimation methods currently used by statistical offices to estimate *de minimis* trade[19].

At the same time, the digitisation of information and the growing ease of data exchange paves the way for faster customs clearance procedures and improved risk management, facilitating international trade. Indeed, the World Customs Organization 'Framework of Standards' prescribes the establishment of a legal and regulatory framework for requiring advance electronic exchange of data between relevant parties involved in the E-Commerce supply chain, and Customs administrations and other relevant government agencies to enhance facilitation and control measures, taking into account applicable laws, inter alia, those related to competition (anti-trust), and data security, privacy, protection, ownership.

The WCO also promotes enhanced exchange of information between customs authorities for exactly these purposes, particularly for smaller-value packages ordered online, as well as inter-agency cooperation and information sharing within the country and across-borders.

Development impact

Digitalisation (including through local or foreign digital intermediation platforms) provides significant new scope for producers (particularly SMEs) to penetrate foreign markets but many developing economies still lag in terms of intellectual property protection, IT infrastructure and skills, and this digital divide may reduce their ability to fully participate in, and benefit from, digital trade[20].

A challenge here is to ensure that developing economies are not also left behind in their ability to produce evidence for policymaking. To assist in a wider compilation and dissemination of this evidence by developing economies, who may have less sophisticated statistical information systems than in advanced economies, future versions of this Handbook will include additional chapters describing complementary indicators, that can provide important insights on digital trade and that can, in theory, be readily produced within and from existing statistical frameworks and surveys. By design however, in addition to the many recommendations that build on the availability of detailed sources and surveys in many advanced economies, all chapters include recommendations that are less data intensive, including for many, the use of 'expert based' judgement or anecdotal sources.

Competition

With digitalisation, new players have emerged. Digital intermediation platforms have strongly impacted competition and the 'rules of the game' in their target industries. Although the position of the relevant authorities is evolving rapidly, often these disruptive players are able to circumvent regulatory requirements that are applicable to domestic, 'non-digital' competitors: for example, hotels face taxes and regulations that Airbnb, and the suppliers it hosts, often do not; Uber gains part of its competitive advantage (in many countries) by considering its drivers as independent contractors instead of employees; and Amazon is able to book transactions through lower tax jurisdictions.

Since network effects and economies of scale are especially important for many platforms, there are growing risks of market dominance in an increasingly winner-takes-all environment. Despite the considerable challenges, being able to identify these disruptive and transformative firms, and their impact on trade, is a key aspect of this Handbook (Chapter 5).

Data flows: localisation, privacy, and monetisation

Digital trade is growing hand in hand with cross-border data flows, which enable seamless trade and create new opportunities to add value. The growing flows of data have also raised new concerns related to data

privacy and security, and consumer protection, resulting in, for example, local storage requirements or restrictions on cross-border data flows. Such regulations may be trade distorting. Finding the right balance between measures developed in pursuit of legitimate public policy goals and preserving the benefits from an open digital environment remains an important challenge to trade policy makers (Casalini and López González, 2019[3]).

Data flows that are not directly monetised are not generally considered as trade flows in current statistical standards; for example, personal information provided on social networks or data captured by firms within the 'Internet of Things'. However, even though these data are acquired for 'free' they clearly have value to the firms acquiring and using them in production, whether to generate advertising revenues, supply-chain and risk management, production efficiencies, etc. Valuing these data is a formidable challenge. Presently work in this area of measurement is very much in its infancy but the Handbook will be updated regularly as national experiences and guidance develop.

Taxation

Digitalisation has a wide range of implications for taxation, impacting tax policy and tax administration at both the domestic and international level, offering new tools and introducing new challenges. As a result, the tax policy implications of digitalisation have been at the centre of the recent global debate over whether or not the international tax rules continue to be 'fit for purpose' in an increasingly changing environment.

In the context of international trade and taxation, digitalisation has provided larger scope for firms to export services from markets where this is fiscally optimal, exacerbating already existing challenges concerning profit shifting. This is certainly the case for many intellectual property services, such as software and R&D, but it is equally true with respect to a whole range of other knowledge based assets, notably marketing assets.

The ability to shift the location of the underlying knowledge assets to low-tax jurisdictions means that significant flows of potentially taxable income could flow from those countries where the asset was originally located, to countries where taxes are lower; resulting in a loss of revenue in the jurisdiction where the asset was originally located. Similarly, firms have an ability to collect data from residents in other countries to either generate advertising revenue services or to use that data in targeted selling by the firm but none of the profits generated through the use of the underlying data (or marketing) asset will necessarily be taxable in the country where the final sales occurred (or from where the data originated).

As a consequence, a number of countries[21] have explored the possibility of introducing digital services taxes on imported services. More recently, as part of an effort to ensure a multilateral rather than unilateral or plurilateral approach, the OECD published a proposal[22] to advance international negotiations to ensure large and highly profitable multinational enterprises, including digital companies, pay tax wherever they have significant consumer-facing activities and generate their profits.

The ability to identify the scale of actual exports of digitally delivered services and imputed values of non-monetary transactions that support sales to final consumers (including sales of goods and non-digital services via digital intermediation, and similar, platforms) will clearly help to inform this debate.

1.3. Initiatives from which this Handbook has drawn

As noted above, this Handbook has drawn, and continues to, draw on a number of earlier and on-going initiatives tackling measurement issues related to trade and more generally macro-economic statistics. Chief inputs in this respect reflect all those cited above and in particular the OECD, WTO and UNCTAD's efforts on defining e-commerce; UNCTAD's efforts on ICT enabling measures; the *G20 Toolkit on Measuring the Digital Economy*; the US Commerce Department's work on *Cross-border data flows*; and the OECD's broader efforts on measurement included in the *Going Digital* project, and, in particular, from

long-standing efforts highlighted in its *Science and Technology Scoreboard* publications and its *Guide to Measuring the Information Society.*

The Handbook has also drawn inspiration from other related efforts that deserve special mention:

- UNCTAD has developed indicators of E-commerce Readiness[23], focusing on Business to Consumer (B2C) transactions with components reflecting the steps involved in completing an online shopping (B2C) transaction, measures of web presence, possibility to pay online, and delivery reliability.
- The World Economic Forum has developed a Networked Readiness Index[24] to measure the capacity of countries to leverage ICTs for increased competitiveness and well-being. The index is based on information from various international organisations as well as its own Executive Opinion survey to derive an index based on four sub-indices: the enabling environment; a country's readiness in terms of e.g. infrastructure and skills; the usage of ICT by actors; and social impact.
- The International Telecommunication Union (ITU) publishes a Global ICT Development Index[25], which aims to measure the information society by combining 11 indicators on ICT access (an indication of the available ICT infrastructure and individuals' access to basic ICTs), ICT usage (including intensity of use), and ICT skills.
- As a final example, the multi-stakeholder "eTrade for All" initiative, launched in 2016 at the UNCTAD Ministerial Conference in Nairobi, is a consortium of more than 20 international and regional organisations, national entities and development banks that aims to improve the ability of developing and transition countries to engage in and benefit from e-commerce. The Initiative has developed a tool for assessing the e-trade environment at the national level, consisting of a series of 30 e-trade indicators across seven key policy areas (ICT infrastructure and services, payment solutions, access to financing, e-commerce skills development, legal and regulatory frameworks, trade logistics/facilitation, and e-commerce readiness). The e-trade readiness indicators are published online in the World Bank Group data portal TC360[26], as well as in e-trade country profiles on the eTrade for all platform[27].

1.4. Structure of the Handbook

As noted above, much of the work presented in this Handbook reflects work-in-progress as a way of motivating the development of new measures and indeed new approaches to measurement. Many of these efforts are very much at the frontier of statistical measurement and it is hoped they will be added to as experiences mature.

In that sense, Chapter 2 of this *living document* is the prism through which these efforts should be viewed. It provides the unifying conceptual framework for digital trade that national efforts should target, which is crystallised via a simple reporting template setting out the key components of digital trade. Recognising that many of the measures required in the template require advances in measurement techniques, the template includes a number of complementary indicators that provide insights on digital trade, and that, importantly, can already be developed by many countries from available statistics.

Chapters 3 to 5 provide compilation guidance on specific aspects of components of digital trade identified in the conceptual framework, drawing on the responses of 74 countries to an OECD-IMF survey conducted over 2017-2018 (see Annex F). The chapters build on existing practices and pilot-tests in several countries and identify potential new data sources. Further chapters will be added, for example on non-monetary transactions and complementary indicators, as efforts mature.

Chapter 3 focuses on the measurement of digitally ordered trade.

Chapter 4 focuses on the measurement of digitally delivered services and includes commentary on *potentially* digitally delivered services.

Chapter 5 is a dedicated chapter focusing on transactions enabled by digital intermediation platforms, given their significance.

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Notes

[1] With membership from ITU, OECD, UNCTAD, UNESCWA, UNSD, World Bank and WTO. See also, https://unctad.org/en/PublicationsLibrary/tn_unctad_ict4d03_en.pdf

[2] See, for example, (UNCTAD, 2015[4]) and (Borga and Bruner, 2012[5]).

[3] The OECD defines an e-commerce transaction as '*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. OECD Guide to Measuring the Information Society, 2011

[4] The WTO defines e-commerce as *the production, distribution, marketing, sale or delivery of goods and services by electronic means*. WT/L/274, 30 September 1998, Adopted by the General Council on 25 September 1998.

[5] The WCO defines 'Cross-Border E-Commerce' as: All transactions which are effected digitally through a computer network (e.g., the internet), and result in physical goods flows subject to Customs formalities. It has identified the following main characteristics of E-Commerce: Online ordering, sale, communication and, if applicable, payment; Cross-border transactions/shipments; Physical (tangible) goods; and Destined to consumer/buyer (commercial and non-commercial).

[6] In this sense, the evolution of definitions of e-commerce around modes of ordering and delivery, rather than what is being ordered/delivered and who is ordering/delivering, in part, mirrors longer standing difficulties concerning the delineation of goods and services products; which digitalisation has, in turn, exacerbated. Software, for example, can be delivered in hard form (a good) or digitally (a service), and all firms can, at least in theory, sell or order goods and services by digital means.

[7] For more on the importance of these distinctions in trade policy see: (López González and Ferencz. J., 2018[6]).

[8] The conceptual framework is developed in accordance with existing statistical accounting standards, in particular the 6th Balance of Payments Manual (BPM6) and the System of National Accounts (UN, 2010[7]).

[9] See: "Introduction to data and analytics, Taxonomy, data governance issues, and implications for further work", paper circulated for consultation; OECD (2013).

[10] See (Ahmad and Ribarsky, 2018[8]).

[11] http://www.oecd.org/going-digital/

[12] https://www.oecd.org/science/measuring-the-digital-transformation-9789264311992-en.htm

[13] See also the UNECE Guide to Measuring Global Production (UNECE, 2015[10]).

[14]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/507081/2904936_Bean_Review_Web_Accessible.pdf

[15] https://www.ntia.doc.gov/files/ntia/publications/measuring_cross_border_data_flows.pdf

[16] See also (López González and Jouanjean, 2017[9]).

[17] See (López González and Ferencz. J., 2018[6]) and (WTO, 2017[2]).

[18] For example, through higher costs for consumers.

[19] The rise in parcel trade also affects the capacity of Customs authorities and other border agencies to manage and facilitate growing volumes of parcel traffic. As many new buyers and sellers in the parcels market often have limited access or knowledge to export/import processes and regulations, documentation, product descriptions, or declared values are often incomplete or inaccurate. In addition to the increasing number of transactions, therefore, agencies also have to manage any risks associated with: the involvement of new, often unknown actors; the ability to enforce standards; potential under-invoicing and misclassification; or illicit trade, such as in counterfeits.

[20] However, digitalisation presents new opportunities for developing countries to overcome trade cost disadvantages (Andrenelli and López González, 2019[12]).

[21]See: https://taxfoundation.org/digital-taxes-europe-2019/ and https://news.bloombergtax.com/daily-tax-report-international/insight-taxation-of-digital-services-a-comparison-of-the-malaysian-and-singapore-approach. See also (UNCTAD, 2019[11]).

[22] The proposal, which is now open to a public consultation process, would re-allocate some profits and corresponding taxing rights to countries and jurisdictions where MNEs have their markets. It would ensure that MNEs conducting significant business in places where they do not have a physical presence, be taxed in such jurisdictions, through the creation of new rules stating (1) where tax should be paid ("nexus" rules) and (2) on what portion of profits they should be taxed ("profit allocation" rules). See also: https://www.oecd.org/tax/beps/public-consultation-document-secretariat-proposal-unified-approach-pillar-one.pdf

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[26] https://tcdata360.worldbank.org/

[27] https://etradeforall.org/ressources/data-indicators/

2. Conceptual framework for measuring digital trade

Drawing on existing measurement initiatives in the digital space, with a focus on policy needs, the chapter defines digital trade as trade that is digitally ordered and/or digitally delivered, and develops a conceptual framework around the *where* (in the accounts are transactions recorded), the *how* (are digital trade transactions defined), the *what* (types of products are included) and the *who* (are the buyers and sellers).

From the conceptual framework the Chapter develops a reporting template, setting out the key components of digital trade that are required to help inform policy discussions. In addition, recognising that not all countries will be able to advance at the same pace, the template includes a number of 'lower-hanging' addendum items that can complement measures of digital trade and that most countries are currently able to produce.

2.1. Introduction

Key obstacles towards internationally comparable estimates of digital trade have been the absence of an internationally agreed definition and an absence of a conceptual accounting framework.

Many significant initiatives, as described in Chapter 1 and in subsequent chapters, have provided important insights on aspects of digital trade, leading to a plethora of various statistical measures: e-commerce (defined in various ways), ICT-enabled services, digitally enabled services, potentially digitally enabled services, and so on. Together, they help to knit a tapestry of much of what we consider to be digital trade but, outside of an overarching conceptual framework, they can lack coherence.

That is not to say that these initiatives are not important. Far from it, they are all, to varying degrees, central to the development of the framework presented here. Many of these initiatives have motivated the development of new surveys, some of which have now been in existence for many years, which this framework, mindful of practicalities and response burdens, tries to build on.

At the same time, it is also important to emphasise that the proposed definitions and the framework in this Handbook are intended for *statistical* purposes. While every effort is made to align the terminology with that used in other fora, differences may occur regarding the scope and precision[1].

Before presenting the conceptual framework in detail, it is useful to review some of the principal considerations that have shaped it, in addition to those described above, and, consequently, the definition of digital trade used in this Handbook.

Digitisation as opposed to the broader process of 'digitalisation', is commonly understood to reflect the encoding of information or procedures into binary bits that can be read and manipulated by computer. Digitisation can take many forms such as the translation of analogue measurements; encoding business and industrial processes; voice over Internet protocol (VoIP); social networks (as alternatives to face-to-face interactions); etc. Collectively, the changes produced by different forms of digitisation, the resulting applications, systems, platforms, and the effects on economic and social activity constitute "digital transformation" – or digitalisation[2].

But while there is an understanding that digitisation is a process that involves the encoding of information into binary bits, its use as the basis for a definition for digital trade is restrictive and, in any case, difficult to operationalise in a practical and meaningful way for measurement purposes.

Digitisation is key to the digital transformation (digitalisation) but valuing its direct contribution to that transformation is only part of what is required, when we think about digital trade. For example, the cost of digitally transferring data from a customer to a producer via a peer-to-peer ride-sharing platform has fallen dramatically in the last decade, so an approach that looked at the costs of digitisation would significantly underestimate the value of digitalisation[3].

But while a focus on digitalisation is clearly preferable to a focus on digitisation, from a definitional perspective it remains nontrivial. Should, for example, digitalisation reflect the total effects of digitisation on trade? For example, in the case of a ride-sharing platform should it include the total value of activity supported (e.g. including the value of taxi services provided), or should it reflect only the intermediation fees charged for using the platform? The two will give significantly different answers but both are relevant to the debate and both are important for policymaking. The first, to some extent, looks at the overall impact, that can, albeit very crudely, be described as a consumption perspective, whereas the latter, and again crudely, is closer to a producer's perspective (e.g. output of 'digitised' industries). This multi-dimensionality is at the heart of the difficulty in defining a concept for digital trade.

An example can help to reinforce the point. While there may be broad unanimity that a digital book is a digital product, what is not clear is whether its whole value (which includes the author's contribution) should be included in a measure of digital trade or only that part of the value that reflects its conversion into bits

and bytes and any charges/costs related to digital transactions, which excludes the author's contribution. Does it matter if the author originally typed the book on a computer, directly, into digital form?[4]

A simple approach, which is of particular relevance for trade statistics that remain, by and large, driven by considerations around the type of products that are traded, would be to identify categories of products that could be defined as digital, (however these were defined, for example, digitally delivered services)[5].

However, such an approach is likely to omit large parts of what most users would want to see captured in a measure of digital trade. One of the most significant impacts of digitalisation has been its ability to shrink the space between final consumers and producers, and indeed between producers and producers, providing previously unimaginable access to new markets. However, even though goods increasingly embody digital characteristics, most of these transactions involve *non-digital* goods or services. They would therefore very likely fall outside the scope of a purely product-based definition of digital trade, unless the idea of a digital product was also based on how the product was ordered, for example non-digital goods ordered over the internet would be in scope but the same good purchased physically would not be[6].

That being said, a definition that focused purely on whether products were *ordered* via digital channels, (for example following the OECD's definition of e-commerce), would also be deficient, as it would exclude many transactions in *digitised*, or *digitally delivered*[7], services that are not digitally ordered (see also below).

Many services, such as online banking services and mobile communication services are provided digitally to households but often the provision of these services is preceded by an initial 'physical' ordering (e.g. physical signing of a contract) in a branch or shop. These transactions are excluded from the OECD definition of e-commerce, even if, throughout the lifetime of the contract, the only interaction the client has with the service provider is via digital means.

Similarly, business-to-business transactions, such as software support and online automated call centres, ordered via conventional (physical) channels, would also be out of scope; and it is not improbable that the larger the size of the contract the greater the likelihood that the order was made 'physically'.

A defining characteristic of those *digital services* that may not be digitally ordered is that they are, to all extents and purposes, *digitally delivered*. But, a definition that focused only on digitally delivered products would exclude any goods that were digitally ordered, so, like digital ordering, digital delivery also misses large parts of what would be commonly considered to be within the scope of digital trade.

However, an approach that marries these two modes (ordering and/or delivery) can overcome these deficiencies whilst also proving feasible as national and international efforts on measuring e-commerce and on digitally-enabled services demonstrate[8] (Andrenelli and López González, 2019[1])

From a practical and conceptual perspective therefore, these two not-mutually-exclusive criteria form the underlying, and unifying, principle for the statistical definition of digital trade. That is to say, the statistical definition of digital trade is based on the *nature of the transaction*, and *not* on the nature of the product that is traded, and so, this Handbook defines

> *digital trade as trade that is digitally ordered and/or digitally delivered.*

Both of these overlapping components are described, (and defined), in more detail in Section 2.2 below. One important overlap concerns transactions facilitated by digital intermediation platforms (described in more detail below), both because of their important role in digital trade as well as the fact that they raise specific compilation challenges, as Chapter 5 demonstrates.

As such, even if in principle all transactions through digital intermediation platforms are either digitally ordered and/or digitally delivered, they feature as a distinct component in the conceptual framework described below.

One of the key concerns driving the need for better evidence on digital trade has been the perception that large parts of trade are not being recorded because of digitalisation.

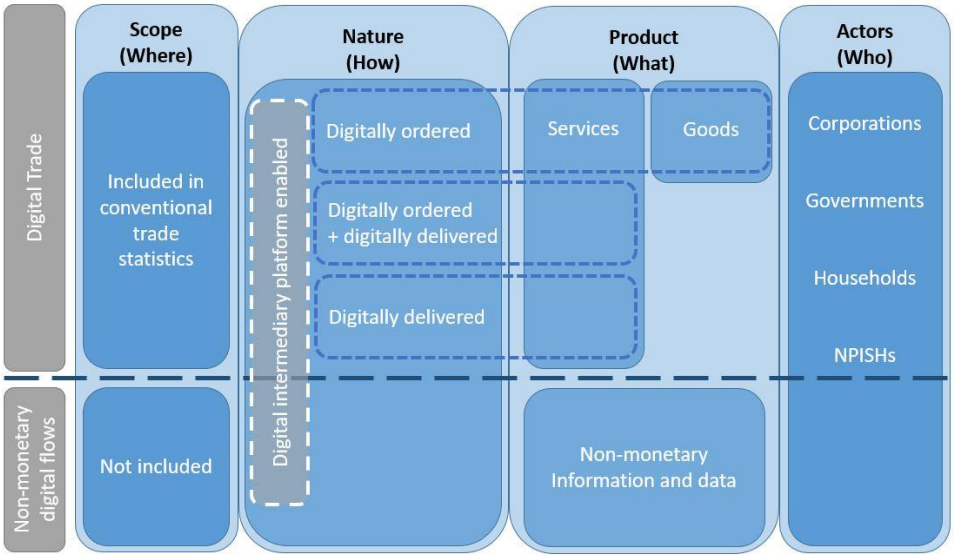
These concerns are both:

- Practical, for example, in relation to the measurement of *de minimis* transactions, where there are concerns that approaches to estimate small parcel trade below customs thresholds may not have kept up with the pace of ordering through digital channels; and
- Conceptual, notably with respect to the measurement of transactions related to intellectual property flows where digitisation has transformed the ability of firms to shift intellectual property from a high to a low tax jurisdiction and, in turn, the location of production and exports[9] as well as the measurement of data flows that may support other transactions but whose direct exchange does not involve a monetary transaction[10]. Many of these (typically) invisible flows are outside of the conceptual production boundary (Ahmad and Schreyer, 2016[2]) and so outside of conventional measures of trade, but that is not to say they are not important (described in more detail below). As such, the conceptual framework and reporting template described in this Handbook includes these flows as complementary items.

2.2. The conceptual framework for digital trade

As noted above, the nature of the transaction – digitally ordered and/or digitally delivered – is the overarching defining characteristic of digital trade. However, for trade policy purposes, any conceptual framework also needs to have a product dimension. Equally, because of the considerable interest in understanding who is engaged in digital trade, information on the actors involved is also needed. Figure 2.1 below provides a simple depiction of the framework proposed in this Handbook (discussed in more detail in the following sections).

Figure 2.1. The conceptual framework for digital trade



Note: Digital Intermediation Platforms (DIPs) are also an important component of Actors. Their current explicit inclusion in the nature of transactions (which may change depending on how measurement efforts evolve) reflects the scope for measuring modes of digital delivery and/or ordering through targeted surveys of DIPs. For a more detailed description of non-monetary information and data, and more generally measurement challenges related to information and data (paid, which are included in the scope of digital trade, or non-monetary, which, currently, are not) see below. Deliberations continue on the precise terminology concerning non-monetary flows. Future versions of this Handbook may introduce different terminology.

The scope of the framework (Where)

The framework is primarily designed to provide a view of international trade in produced goods and services that have been digitally ordered and/or digitally delivered; which this Handbook refers to as *digital trade*.

However, as described above, it also attempts to respond to growing demand for information on non-monetary transactions not included in measures of conventional goods and services trade (referred to in the framework as transactions in *non-monetary [11] information and data*). Because no monetary transaction is made when the data are acquired by a firm (for example a social media platform) a simplifying assumption is made that these elements are not digitally ordered and only materialise in the framework when they are delivered digitally.

It is important to note that monetary transactions for data are included in the definition of digital trade. In addition, monetary transactions supported by data, often in relation to advertising services, will of course be included in digital trade if the services supported by the data (e.g. advertising) are digitally ordered and/or digitally delivered.

The nature of the transaction (How)

Digitally ordered transactions

An important guiding principle in the development of this Handbook is that it should be practical and feasible. As such, by design, it builds upon existing and related areas of work, especially where measurement instruments exist.

Significant efforts have been made for a number of years now in the measurement of e-commerce[12]. This Handbook capitalises on those efforts and uses the OECD definition of e-commerce[13] to define '*digitally ordered* 'as:

> *The international sale or purchase of a good or service, conducted over computer networks by methods specifically designed for the purpose of receiving or placing orders. (OECD, 2011[3])*

Some additional clarifications are provided in the OECD definition. Specifically, these state that *the payment and ultimate delivery of the goods or services do not also have to be conducted online. Transactions can involve participants from all institutional sectors, and cover orders made over the web[14], extranet or via electronic data interchange (EDI, see* Box 2.1*). Excluded are orders made by phone, fax or manually typed email.*

In developing its definition of e-commerce, the OECD emphasised its need to be *coherent, simple* and *pragmatic*, and explicitly acknowledged its focus on those electronic transactions that were *known, definable* and *important* at the time (OECD, 2011[3]). At the same time, in its deliberations, the OECD acknowledged that as new technologies evolved, new forms of e-commerce would need to be considered.

In the intervening period, many new mechanisms (particularly related to applications) have emerged. Discussions with statistical compilers held in the course of developing this Handbook concluded that additional guidance was needed for a consistent interpretation of digitally ordered trade transactions and to clarify areas where ambiguities had appeared.

Box 2.1. Electronic Data Interchange (EDI)

Electronic Data Interchange is the computer-to-computer transmission of (business) data – such as shipping orders, purchase orders, invoices, and requests for quotations – in a standard format using agreed standards. The messages are composed and processed without human intervention, which increases the speed of order processing, and reduces errors. It is used in a wide variety of industries including food, retail, logistics, and manufacturing, to efficiently manage international supply chains (e.g. Just-in-time inventory management).

Responses to the second round of the OECD-IMF Stocktaking Survey[15], with more than 70 countries replying, concluded that[16]:

- Digitally ordered trade in goods and services should cover 'in-app' online purchases (100% agreed);
- Digitally ordered trade in goods and services should include transactions via online bidding platforms (95% agreed);
- When a trade transaction is concluded via offline ordering processes, but subsequent follow-up orders are made via digital ordering systems, only the follow-up orders should be considered as e-commerce (80% agreed); and
- Digitally ordered trade in goods and services should *not* cover offline transactions formalised using digital signatures (86% agreed).

Digitally delivered transactions

The second dimension of the nature of digital trade transactions is referred to as digitally delivered. The concept of digitally delivered transactions is based on the work of the UNCTAD led Task Group on Measuring Trade in ICT Services and ICT-enabled Services (TGServ)[17].

TGServ defined ICT-enabled services as follows:

> *All cross-border transactions that are delivered remotely over ICT networks – i.e. over voice or data networks, including the Internet, in an electronically downloadable format.*

Implicit in the above definition is the inclusion of services that are delivered via networks that are excluded from the scope of digital ordering, in particular, phone, e-mail and fax. To align the concept of 'networks' used in definitions of digital ordering and digital delivery, a more restrictive set of delivery modes, namely '*computer networks*' rather than '*ICT networks*' is used to arrive at the definition of *digitally-delivered services*[18], which this Handbook defines as:

> *All international transactions that are delivered remotely in an electronic format, using computer networks specifically designed for the purpose.*

As is the case for digital ordering, digitally delivered services can involve participants from all institutional sectors, and cover deliveries made over the web/internet (including via mobile devices), extranet or via electronic data interchange but should exclude any services provided by phone, fax or manually typed email.

Digital intermediation platform enabled transactions

An important characteristic of digitalisation is the increasing role of firms such as Airbnb, Alibaba, Amazon, Booking.com, eBay, Uber, and Tencent that facilitate transactions in goods and services. These digital intermediation platforms nearly always have an electronic ordering component and, typically, the goods

and services advertised can only be paid for electronically. Even if in some cases it is possible to make orders using analogue methods, the platform itself is typically[19] the only mechanism through which consumers can see the advertised products.

Although all digitally intermediated transactions are included under digitally ordered (and often digitally delivered), they are separately identified in the framework for three reasons. The first reflects the specific interest in the role of digital intermediation platforms (DIPs), and, in particular, their potentially disruptive impact on the economy. The second reflects the possibility that a targeted focus on DIPs, including through dedicated survey vehicles, may provide an effective approach to deliver earlier results on both digitally ordered and digitally delivered trade. The third reflects the specific conceptual and statistical challenges that transactions in DIPs present, especially when they are not resident in the country where the intermediation services are consumed (see Chapter 5).

Firms classified as DIPs use many different types of business models to sell or deliver goods or services. The World Customs Organisation (WCO) as well as the OECD Centre for Tax Policy and Administration (CTP)[20] (OECD, 2018[4]) have developed typologies of new, online business models. While the terminology differs (for example, the OECD (Hagiu and Wright, 2015[5]) describes '*multi-sided platforms*' while the WCO uses '*e-platforms/market places*[21]') both identify key criteria to define digital intermediation platforms, including (OECD, 2019[6]):

1. There are multiple buyers and multiple sellers that interact directly;
2. The platform itself does not own the goods nor does it supply the services that are being sold.

Based on these criteria, *fee-based digital intermediation platforms* can be defined as:

> *Online interfaces that facilitate, for a fee, the direct interaction between multiple buyers and multiple sellers, without the platform taking economic ownership of the goods or rendering the services that are being sold (intermediated).*

In turn, because digital intermediation platforms may also provide other services, *fee-based digitally intermediated platform services* are defined in this Handbook as:

> *Online fee-based intermediation services that enable transactions between multiple buyers and multiple sellers, without the intermediation platform taking economic ownership of the goods or rendering services that are being sold (intermediated).*

It is important to note that fee-based digitally intermediated platform services, differ from similar services provided by electronic retailers or e-tailers, who may also sell a wide variety of different products and operate exclusively online, but who own all of the products being sold[22], and so provide margin-based distribution services, as opposed to intermediation services.

In addition, because the platforms provide a means of intermediating productive transactions between households, they may also have implications on the types of surveys used to measure trade flows (see Box 2.2).

As shown in Figure 2.1 however, the scope of digital intermediation platforms includes non-monetary transactions. Many DIPs provide services without charging fees (implicit or explicit) and instead generate revenue through advertising and data services. Most social media platforms, search engines, knowledge sharing platforms, and providers of free phone applications generate revenues in this way; providing, in turn, 'free' services to ultimate end-users. It is important to stress here, as this is often lost in the debate around potential mismeasurement, that the revenues, value-added, employment etc. of these platforms that are generated/sustained through sales of advertising and data services will be recorded in the economic accounts.

Free digital intermediation platforms are defined in this Handbook as:

> *Platforms providing digital services to multiple end-users that are financed through advertising and/or data revenues paid by units seeking to sell goods and services to end-users rather than charging end-users explicit fees for the digital services that they receive.*

The OECD Advisory Group on Measuring GDP in a Digitalised Economy, defines this category of firms as a subset of the category '***Data- and Advertising-Driven Digital Platforms***[23] ***(DADDP)***'.

For convenience, unless otherwise specified, further references in this Handbook to digital intermediation platforms, refer to those platforms charging a fee, whilst references to DIPs not charging a fee, either explicitly mention the lack of a fee, or refer to DADDPs.

Box 2.2. The sharing economy

A subset of digital intermediation platforms that is of particular interest and attention reflects those that facilitate consumer-to-consumer (C2C) transactions, often referred to as the sharing economy.

Growth in these platforms may present particular compilation challenges for measuring international trade, especially if the platforms are hosted abroad, as the producers of the products being intermediated are households, meaning they may be out of scope of most current survey mechanisms for international trade.

ONS UK (2017) 'The feasibility of measuring the sharing economy: November 2017 progress update', https://www.ons.gov.uk/economy/economicoutputandproductivity/output/articles/thefeasibilityofmeasuringthesharingeconomy/november2017progressupdate

Statistics Canada (2017) 'The sharing economy in Canada', Statistics Canada Daily, https://www150.statcan.gc.ca/n1/daily-quotidien/170228/dq170228b-eng.htm

The product (What)

Goods

As shown in Figure 2.1 products are split into the two conventional categories of goods and services. This Handbook currently adopts the convention that **goods cannot be delivered digitally**[24], and, so, the category of goods required for measures of digital trade includes only those goods that have been digitally ordered.

In this respect, it is important to note that the category of goods included here should not be confused with notions of *digital goods*. For example, shoes can be ordered online (a digital transaction) but are difficult to conceive as digital products even if they have been developed with significant input of products that could be considered as digital (e.g. software, computer services, etc.).

The reporting template, described in Section 2.4, does however suggests, as an addendum item, a separate breakdown of goods into Information and Communication Technology (ICT) (OECD, 2015[7]) goods that are digitally ordered and other goods that are digitally ordered, defined as:

> *ICT goods must either be intended to fulfil the function of information processing and communication by electronic means, including transmission and display, or use electronic processing to detect, measure and/or record physical phenomena, or to control a physical process.*

In addition, the reporting template also includes an addendum item showing total trade in ICT goods (digitally ordered or not, see also Annex 2.C).

Services

Services as a group can be broken down into two distinct but overlapping components in the Framework: *Digitally ordered services* and *digitally delivered services*. The overlap reflects digitally ordered-and-delivered services,

Digitally ordered services

Transactions in (any) services that are digitally ordered, following the definition described, should be included as digitally ordered services. This includes two components, *digitally ordered services not digitally delivered* and *digitally ordered-and-delivered services*.

Digitally delivered services

As described above, digitally delivered trade closely follows the definition used for ICT-enabled services developed by the UNCTAD TGServ Task Force. By design, therefore, there are strong similarities between the two concepts: ICT-enabled services and digitally delivered services (see also Chapter 4).

However, there are also some important differences.

ICT-enabled services, in practice, include services delivered by methods that do not necessarily require computer networks, such as human-to-human interactions via the phone.

However the notion of 'digital' that underpins the definition of digital ordering (based on the OECD definition of e-commerce) requires that the transaction is passed through a 'computer network', which excludes these human-to-human interactions and indeed others, such as transactions ordered by e-mail or fax.

To align the notion of 'digital' that underpins both digital ordering and digital delivery therefore, digitally delivered services refers only to those services that are delivered through computer networks.

For many products included in the scope of *ICT-enabled* (see Chapter 4), there is unlikely to be a material difference between the two measures – ICT-enabled and digitally delivered – as the underlying product will only be delivered via a computer network (e.g. cloud services). However, this is not always the case. For example, many dial-up call-centre services, with a human interface at the other-end, will be out of scope for *digitally delivered*. Chapter 4 provides a description and guide on other differences in the product list of the two measures.

One particularly important difference between the two concepts concerns the services provided by DIPs (the intermediation service) which this Handbook (see below) includes in the scope for digitally delivered services.

While there is currently no internationally agreed position on the product to which these transactions should be classified[25] (requiring agreement and consultation with the national accounts and trade statistics community, see also below), the Handbook recommends following the provisional guidance of the UN Expert Group on Industrial Classifications (see Section 2.3).

The TGServ group also included a separate breakdown of ICT services and this Handbook recommends that these estimates, and estimates of ICT-enabled services are produced as complementary items; not least because it is currently feasible to do so in many countries.

Information and data exchanges outside of the goods and services account

The 1993 System of National Accounts (SNA) introduced the notion of databases. The 2008 SNA provided further clarifications that specified that databases should reflect only the value of the underlying database management systems and the costs associated with the digitisation of data. This recommendation reflected the view that the underlying value (information content) associated with the data itself was de facto a non-produced asset (Ahmad and Van de Ven, 2018[8]). Outright purchases of databases, which

include a significant value of the underlying data, are recorded in the accounts as goodwill (see Annex 2.B).

However, recent years have seen an explosion in the generation of data, and the use of these data, in, for example, advertising-based business models. But because data are typically acquired for free, large parts of it (except those exchanges that are supported by an explicit payment, generally bundled in a different product) are de facto invisible in official statistics (see also Annex 2.B).

These acquisitions of free data can support significant monetary transactions that may cross borders, for example through advertising revenues or significant improvements in production efficiencies (for example in supply chain management tracking goods). Social networking sites such as Facebook, or search engines such as Google, offer "free" services to users in exchange for data that can be used by these firms to generate targeted advertising, and hence revenues, (Nakamura, Samuels and Soloveichik, 2016[9]). There is no monetary transaction between Facebook or Google and consumers from whom they collect data, but while international advertising services would be captured in trade statistics, the data flows upon which they depend are not, and neither are the values of the free services (e.g. search engine facilities, social networking, software, cloud services etc.) received by the end-consumer (providers of the data). As noted in Chapter 1, understanding the nature scale (and potential value) of these data is of considerable policy interest, both for trade policy where information on the volume (e.g. bits and bytes of data) would be useful as well as more generally, notably in considerations of well-being and consumer-surpluses.

An additional important flow of data that is often also, typically, missing from the accounts are data exchanged within a firm, where strong arguments could be made that the associated value of these data should be recorded in the system, and treated in the same way as paid data. The challenges here are similar (indeed fundamentally the same) as those relating to unrecorded intra-firm transfers and transfer pricing more generally; which digitalisation has exacerbated. As noted in Chapter 1 further guidance in this area, including in the related area of economic versus legal ownership for intellectual property products, will be developed in future versions of this Handbook. For now therefore, readers should interpret the reference to non-monetary data and information flows as not including intra-firm transfers.

It is important to stress here that paid transactions for data, and indeed more generally, for any product mentioned above, such as software, cloud services, etc. are of course already included in measures of international trade, and so, where appropriate, these transactions should also be included in the relevant component of digital trade (as described in Table 2.1). For now the reporting template includes the non-monetary component of information and data as a separate addendum but it may be useful in future versions of this Handbook, and as estimation methods develop, to include a ‘total’ value (which groups paid and non-monetary transactions together) as a separate addendum, not least if the market for ‘data’ develops and if operators currently providing data related services (e.g. social networking services) move to paid models.

In a similar manner, and because they are free, the international accounting system does not in general impute transactions related to the use of public goods (such as open-source or free software). The debate around measurement of these ‘assets’ generally revolves around the potential implications for measures of material well-being and productivity but there are also concerns around competition policies, if the freely available software is designed to gain market share with a view to the introduction of subsequent ‘priced’ models.

Research is ongoing within the statistics community to better estimate the values of these flows[26], and indeed to consider whether they should be included within the production boundary for GDP and by extension, trade.

Imputations for data and open source software have been recommended in the supply-use tables for the digital economy, being developed by the OECD Advisory Group on Measuring GDP in a Digitalised Economy (see also Annex A). At the same time significant advances on the broader measurement front,

including on data, and on open source software, have been made as part of the OECD's *Going Digital Initiative*[27], and, in particular, the measurement strand of that effort (OECD, 2019[10]).

Although measurement efforts are evolving rapidly, they remain very much in their infancy and, so, it is premature to provide guidance on these items in this version of the Handbook. However, it is expected that this guidance (including a more detailed typology of specific types and transactions in data, at least along the lines described above) will be available in the near future; at which time, this Handbook (and in particular the reporting template) will be updated.

Actors (Who)

Technological change has provided individual consumers (households) with increased possibilities to purchase goods and services from foreign suppliers, whilst also increasing their interaction as 'producers' when supplying services (for example, accommodation services) via DIPs. Similarly, the possibility to sell online has lowered, and has the potential to lower further, barriers to export, allowing especially smaller firms to market their products abroad[28]. These aspects of digital transformation increase the need for trade statistics by type of user and producer, but they also complicate the way that trade is measured in practice. For example, when households interact with each other via foreign DIPs, conventional business surveys may not be able to capture the foreign dimension, increasing the relevance of household surveys.

The conceptual framework recognises these developments through its breakdown of actors by (SNA) institutional sectors: households, corporations (including both financial and nonfinancial), governments, and non-profit institutions serving households (NPISHs).

Work on linking trade and business registers provides an important vehicle for identifying who the exporting and importing firms are (including by industry, size class and, more recently, ownership patterns – e.g. foreign vs domestic ownership), and these efforts should be accelerated and capitalised on in developing statistics on digital trade. Within the corporate sector, it may also be useful to explore additional breakdowns of industries and aggregations of firms, such as those developed by the OECD Advisory Group on Measuring GDP in a Digitalised Economy, for example: *ICT industries; Digital intermediation platforms (charging fees); Data and advertising driven platforms; Firms dependent on digital intermediation platforms; E-tailers; Digital firms providing digital financial and insurance services; and Other producers only operating digitally* (see also Annex A).

Identifying transactions involving households (whether as producers or consumers) is more challenging. However, there are a number of efforts ongoing (see the following chapters) that indicate that progress can be made on this front.

Importantly, the institutional sector breakdown provides for an easy concordance with the terminology used in e-commerce surveys, such as the OECD Survey on ICT Usage by Business, which try to identify transactions between: 'Business-to-Business' (B2B) (broadly corporation to corporation), 'Business-to-Consumer' (broadly corporation to households) (B2C) and 'Business-to-Government (corporation to government), see also Annex 2.A.

2.3. Accounting principles

In all cases, the accounting principles for digital trade follow those of BPM6. For transactions that pass through Digital Intermediation Platforms (DIPs), however, some additional guidance concerning the recording of the flows, and in particular whether the accounts should record the flows of money (referred to for convenience as 'gross') or the actual underlying flows related to the intermediation services (referred to for convenience as 'net', see also Chapter 5). The Task Force took the view that the economic substance of the transaction is best followed by recording 'net' flows.

It's important to note that this treatment differs from the recommendations given in BPM6 and the Manual on Statistics of International Trade in Services (2010) for subcontracting, which recommends that the flows are recorded on a gross basis, on the grounds that the arranger (of the subcontracted service) buys and sells the services.

The argument for the net approach used for services provided by DIPs is that subcontracted services involve a higher degree of engagement on the part of the intermediation than digital intermediation platforms, which are typically completely automated. Specifically, the principal firm arranging the subcontracting is engaged in a 'merchanting in services' activity that results in it owning the subcontracted services, before they are sold on to the end consumer[29]. DIPs, on the other hand, never take 'ownership' of the goods or services that they intermediate.

2.4. Recommended reporting mechanisms

Each of the dimensions described above could be developed as separate blocks but the fact that there are overlaps requires some guidance on how they should be aggregated within a standardised reporting mechanism that could form the basis of digital trade accounts. Table 2.1, with breakdowns between imports and exports, actors and types (nature) of transactions, describes that reporting mechanism.

Table 2.1. Reporting template for digital trade

			By Exports/Imports				
				By Institutional sector			
				Corporations			
				Non-financial	Financial		
			Total	By industry	By industry	Governments	Households / NPISHs
				ISIC 01 ISIC XX ISIC 99	ISIC YY ISIC XX ISIC ZZ		
i	Digitally ordered	ii+iii					
ii	Goods						
iii	Services*, not digitally delivered						
iv	Digitally delivered services*	v+vi					
v	Digitally ordered*						
vi	Not digitally ordered*						
vii	**Total Digital Trade**	**i+iv**					
viii	**Transactions via DIP's**						
ix	Digitally ordered	x+xi ≤ i					
x	Goods	≤ ii					
xi	Services*	xii+xiii ≤ iii+v					
xii	Digitally delivered*	≤ v					
xiii	Not digitally delivered*	≤ iii					
	Addendum items						
xiv	Digital services*	iii+iv					
xv	Digitally ordered total	i+v					
xvi	ICT goods total						
xvii	of which: digitally ordered	≤ ii					
xviii	of which: via DIPs	≤ x					
xix	Potentially digitally delivered services*	≥ iv					
xx	Potentially ICT-enabled services*	≥ xix					
xxi	Non-monetary transactions in information/data (imputed)						
xxii	DIPs intermediation fees (imputed)						

Note: * Services should be displayed by EBOPS category, see Chapter 4.

Most of the items in Table 2.1 have been described in detail above and so require no further explanation[30]. *Potentially ICT-enabled services* and *potentially digitally delivered services* have not been described and, so, some additional explanation is given here (and in Chapter 4, which also provides a description of the products included within the scope for digitally delivered services, and, indeed, potentially ICT-enabled services).

Recognising that reporting mechanisms may not currently be able to deliver estimates on ICT-enabled services, TGServ also derived the concept of 'potentially' ICT-enabled as many countries (with well-developed services trade statistics) should be able to provide these estimates without modifications to existing survey approaches. The rationale for the development of this complementary concept also explains the addition of a number of addenda items in the template above that can also currently be delivered using conventional trade statistics (for example, ICT goods).

For the same, practical, reasons, the template also includes an addendum item for 'potentially digitally delivered services', recognising that there are differences in the coverage of products (and definitions of 'networks' that facilitate them) between digitally delivered and ICT-enabled (see Chapter 4).

It is important to note that the ordering of items above attempts to align with the way that countries are likely to develop estimates of digital trade, and indeed current data availability.

Perhaps the most promising of all of the components above, at the time of writing this first version of the handbook, reflects digitally delivered services (which is likely to be proxied for the short to medium term in most countries by potentially digitally delivered, or even potentially ICT-enabled, services).

The approach to estimating either actually or potentially digitally delivered services does not require a view on whether those services were also digitally ordered. Whilst the inclusion of an item on digitally-delivered-and-ordered services is of course desired (and indeed requested in the template), not least for a total view of digitally ordered trade, it is not strictly needed if the ultimate objective is a view of total digital trade.

As such, to arrive at an estimate of total digital trade, in practice, surveys that measure digitally ordered trade need only focus on digitally ordered goods if separate estimates of total digitally delivered services can be obtained via other survey vehicles or other means

It is for this reason that the template (and the ordering of items) is presented as above, i.e. digitally delivered-and-ordered services are a subset of digitally delivered services.

The alternative approach would have been to have a separate category under digitally ordered, referring to digitally ordered digitally delivered services, but this approach would have run counter to the likely approaches that countries will use to measure digitally delivered trade in practice.

That is not to say that all countries will adopt this approach. Some national surveys for example, prioritise information on the value of e-commerce transactions, which is why the digitally ordered total is included as an addenda item. It would be much easier, however, to modify existing questions on international digitally ordered trade, such that they differentiate between goods and services, than to ask separate survey questions on (or develop separate estimates of) digitally delivered trade that was not digitally ordered.

Annex 2.A. Examples of digital trade transactions

Annex Table 2.A.1. Examples of digital trade transactions

What	How			Who	Description	Transaction example
	Digitally ordered	Platform enabled	Digitally Delivered			
Good	Y	N	N	B2B	An enterprise in country A purchases a good directly from a supplier in country B.	A firm purchases a component used in its production via its EDI.
Good	Y	N	N	B2C	A consumer in country A purchases a good (for final consumption) directly from a supplier in country B.	A consumer purchases an article of clothing from a company's website.
Good	Y	Y	N	B2B	An enterprise in country A purchases a good from a supplier in country B via an online platform located in country A, country B or C.	A firm orders office furniture from another firm via eBay.
Good	Y	Y	N	B2B	An enterprise in country A purchases a good from a supplier in country A via an online platform located in country B.	A firm orders a computer from another resident firm but through a non-resident platform. For transactions via a DIP, only intermediation payments from the seller to the platform would be recorded.
Good	Y	Y	N	B2C	A consumer in country A purchases a good (for final consumption) from a supplier in country B via an online platform located in country A, country B or C.	A consumer orders a physical book on Amazon.
Good	Y	Y	N	C2C	A consumer in country A purchases a good (for final consumption) from another consumer in country B via an online platform located in country A, B or C.	A consumer purchases second-hand goods via eBay.
Good	Y	Y	N	C2C	A consumer in country A purchases a good (for final consumption) from another consumer in country A via an online platform located in country B.	A consumer buys a second hand phone from another resident but through a non-resident platform. For transactions via a DIP, only intermediation payments from the seller to the platform would be recorded.
Service	Y	N	N	B2B	An enterprise in country A purchases a service online directly from a supplier in country B, and the service is delivered physically.	A firm purchases a transportation service from another firm via a website.
Service	Y	N	N	B2C	A consumer in country A purchases a service online directly from a supplier in country B, and the service is delivered physically.	A tourist purchases a hotel stay via the hotel's website.
Service	Y	Y	N	B2B	An enterprise in country A purchases a service from a supplier in country B via an online platform located in country A, B or C, and the service is delivered physically.	A firm purchases standardised maintenance or repair services.
Service	Y	Y	N	B2C	A consumer in country A purchases a service from a supplier in country B via an online platform located in country A, B or C, and the service is delivered physically.	A tourist orders a transportation service through Uber.
Service	Y	Y	N	C2C	A consumer in country A purchases a service from another consumer in country B via an online platform located in country A, B or C, and the service is delivered physically.	A tourist purchases accommodation services via Airbnb.
Service	Y	Y	N	C2C	A consumer in country A purchases a service from another consumer in country A via an online platform located in country B.	A consumer orders a transportation service from another resident through Uber. Only the intermediation services should be recorded as international trade.

What	How: Digitally ordered	How: Platform enabled	How: Digitally Delivered	Who	Description	Transaction example
Service	Y	N	Y	B2B	An enterprise in country A purchases a service online directly from a supplier in country B, and the service is delivered digitally.	A firm purchases standardised computer services.
Service	Y	N	Y	B2C	A consumer in country A purchases a service online directly from a supplier in country B, and the service is delivered digitally.	A consumer purchases a life insurance policy.
Service	Y	Y	Y	B2B	An enterprise in country A purchases a service from a supplier in country B via an online platform located in country A, B or C, and the service is delivered digitally.	A firm orders a logo design from a graphical design firm via a platform for graphical designers.
Service	Y	Y	Y	B2C	A consumer in country A purchases a service from a supplier in country B via an online platform located in country A, B or C, and the service is delivered digitally.	A firm subscribes to a music streaming service.
Service	Y	Y	Y	C2C	A consumer in country A purchases a service from a consumer in country B via an online platform located in country A, B or C, and the service is delivered digitally.	A consumer orders a knitting pattern from another consumer via Ravelry.
Service	N	N	Y	B2B	An enterprise in country A places an *offline* order for a service directly from a supplier in country B, and the service is delivered digitally.	A firm purchases bespoke consultancy services, or business process outsourcing (BPO), services.
Service	N	N	Y	B2C	A consumer in country A purchases a service *offline* directly from a supplier in country B, and the service is delivered digitally.	A foreign student purchases educational services with online lectures.

Annex 2.B. Background to data in the 2008 SNA

It is important to note that the decision not to treat data as produced in the 1993 and 2008 SNAs does not mean that data has no value, it clearly does.

Future benefits can very clearly be derived from data, either through the sale of a database (including the value of the data), or in creating additional value added in support of the production of other goods and services, such as advertising.

In the former case, the 2008 SNA captures the value of data as goodwill when a market transaction occurs (which de facto means that data are treated as a non-produced asset), whilst in the latter, although data remains in and of itself invisible, its contribution to production is accurately reflected.

Although the contribution of data to production is always captured, data itself are only valued when market transactions occur (recorded as a transaction in non-produced assets). In this sense, data in the SNA, as, de facto, a non-produced asset (even though it is not explicitly described as such), is similar, at least in an accounting sense, but still different from, other non-produced assets, such as land.

Like data, land is also used in production, and as a non-produced asset it cannot be readily identified as a separate factor of production. However, unlike land, data are increasingly crossing borders, and, in most cases, these exchanges occur without any observable market transaction taking place.

The decision to only recognise data in the accounts when a monetary transaction occurs reflects the fact that the underlying value of data reflects its information or knowledge content. Valuing all data as a produced asset therefore, whether purchased or otherwise, would by inference also require that all knowledge, including human capital, be treated as a produced asset. That is not to say that, conceptually, this shouldn't be done; there has been a long discussion over the years on human capital and indeed on other knowledge-based assets, and whether these should be recognised in some form in the accounts.

But to do so would require approaches to be developed that were internationally comparable, feasible and meaningful. Certainly with respect to human capital, recording the activity as production could run the risk that it would swamp GDP, and indeed measures of trade, rendering them unusable for macroeconomic policy making, It was the realisation that the value of data was intrinsically related to the underlying knowledge it embodied that led to it being recorded as de facto non-produced (i.e. goodwill) when a market transaction occurred. To do otherwise would open the door to the inclusion of all kinds of information or knowledge.

Annex 2.C. HS 2017 classification of ICT goods

The latest classification of ICT goods (UNCTAD, 2018[11]), following the WCO HS 2017, includes the following products.

Annex Table 2.C.1. List of ICT goods based on HS 2017

A-Computers and peripheral equipment
844331 Printing, copying, and facsimile machines; machines which perform two or more of the functions of printing, copying or facsimile transmission, capable of connecting to an automatic data processing machine or to a network
844332 Printing, copying, and facsimile machines; single-function printing, copying or facsimile machines, capable of connecting to an automatic data processing machine or to a network
847050 Cash registers
847130 Automatic data processing machines; portable, weighing not more than 10kg, consisting of at least a central processing unit, a keyboard and a display
847141 Automatic data processing machines; comprising in the same housing at least a central processing unit and an input and output unit, whether or not combined, n.e.c. in item no. 8471.30
847149 Automatic data processing machines; presented in the form of systems, n.e.c. in item no. 8471.30 or 8471.41
847150 Units of automatic data processing machines; processing units other than those of item no. 8471.41 or 8471.49, whether or not containing in the same housing one or two of the following types of unit: storage units, input units or output units
847160 Units of automatic data processing machines; input or output units, whether or not containing storage units in the same housing
847170 Units of automatic data processing machines; storage units
847180 Units of automatic data processing machines; n.e.c. in item no. 8471.50, 8471.60 or 8471.70
847190 Magnetic or optical readers, machines for transcribing data onto data media in coded form and machines for processing such data, not elsewhere specified or included
847290 Office machines; not elsewhere classified
847330 Machinery; parts and accessories (other than covers, carrying cases and the like) of the machines of heading no. 8471
847340 Machinery; parts and accessories (other than covers, carrying cases and the like) of the machines of heading no. 8472
847350 Machines; parts and accessories (other than covers, carrying cases and the like) equally suitable for use with machines of two or more of the headings 8470 to 8472
852842 Monitors; cathode-ray tube, capable of directly connecting to and designed for use with an automatic data processing machine of heading 84.71
852852 Monitors; other than cathode-ray tube; capable of directly connecting to and designed for use with an automatic data processing machine of heading 84.71
B-Communication equipment
851711 Line telephone sets with cordless handsets
851712 Telephones for cellular networks or for other wireless networks
851718 Telephone sets n.e.c. in item no. 8517.1
851761 Base stations
851762 Communication apparatus (excluding telephone sets or base stations); machines for the reception, conversion and transmission or regeneration of voice, images or other data, including switching and routing apparatus
851769 Communication apparatus (excluding telephone sets or base stations); machines for the transmission or reception of voice, images or other data (including wired/wireless networks), n.e.c. in item no. 8517.6
851770 Telephone sets and other apparatus for the transmission or reception of voice, images or other data, via a wired or wireless network; parts
852550 Transmission apparatus for radio-broadcasting or television, whether or not incorporating sound recording or reproducing apparatus, not incorporating reception apparatus
852560 Transmission apparatus for radio-broadcasting or television, whether or not incorporating sound recording or reproducing apparatus, incorporating reception apparatus
853110 Signalling apparatus; electric, sound or visual, burglar or fire alarms and similar, other than those of heading no. 8512 or 8530
C-Consumer electronic equipment

851810 Microphones and stands therefore
851821 Loudspeakers; single, mounted in their enclosures
851822 Loudspeakers; multiple, mounted in the same enclosure
851829 Loudspeakers; not mounted in their enclosures
851830 Headphones and earphones, whether or not combined with a microphone, and sets consisting of a microphone and one or more loudspeakers
851840 Amplifiers; audio-frequency electric
851850 Amplifier sets; electric sound
851890 Microphones, headphones, earphones, amplifier equipment; parts of the equipment of heading no. 8518
851920 Sound recording or reproducing apparatus; operated by coins, banknotes, bank cards, tokens or by other means of payment
851930 Sound recording or reproducing apparatus; turntables (record-decks)
851950 Sound recording or reproducing apparatus; telephone answering machines
851981 Sound recording or reproducing apparatus; using magnetic, optical or semiconductor media, n.e.c. in item no 8519.20, 8519.30 or 8519.50
851989 Sound recording or reproducing apparatus; n.e.c. in heading no 8519
852110 Video recording or reproducing apparatus; magnetic tape-type
852190 Video recording or reproducing apparatus; other than magnetic tape-type
852210 Sound recording or reproducing apparatus; parts and accessories thereof, pickup cartridges
852290 Sound or video recording or reproducing apparatus; parts and accessories thereof, other than pick-up cartridges
852580 Television cameras, digital cameras and video camera recorders
852712 Radio broadcast receivers capable of operating without an external power source; pocket-size radio cassette-players
852713 Radio broadcast receivers capable of operating without an external power source; apparatus (other than pocket-size radio cassette-players), combined with sound recording or reproducing apparatus
852719 Radio broadcast receivers capable of operating without an external power source; n.e.c. in item no. 8527.1
852721 Radio-broadcast receivers not capable of operating without an external source of power, of a kind used in motor vehicles; combined with sound recording or reproducing apparatus
852729 Radio-broadcast receivers not capable of operating without an external source of power, of a kind used in motor vehicles; not combined with sound recording or reproducing apparatus
852791 Radio-broadcast receivers n.e.c. in heading no. 8527; combined with sound recording or reproducing apparatus
852792 Radio-broadcast receivers n.e.c. in heading no. 8527; not combined with sound recording or reproducing apparatus but combined with a clock
852799 Radio-broadcast receivers n.e.c. in heading no. 8527; not combined with sound recording or reproducing apparatus and not combined with a clock
852849 Monitors; cathode-ray tube, n.e.c. in subheading 8528.42, whether or not colour
852859 Monitors other than cathode-ray tube; n.e.c. in subheading 8528.52, whether or not colour
852862 Projectors; capable of directly connecting to and designed for use with an automatic data processing machine of heading 84.71
852869 Projectors; n.e.c. in subheading 8528.62, whether or not colour
852871 Reception apparatus for television, whether or not incorporating radiobroadcast receivers or sound or video recording or reproducing apparatus; not designed to incorporate a video display or screen
852872 Reception apparatus for television, whether or not incorporating radiobroadcast receivers or sound or video recording or reproducing apparatus; incorporating a colour video display or screen
852873 Reception apparatus for television, whether or not incorporating radiobroadcast receivers or sound or video recording or reproducing apparatus; incorporating a monochrome video display or screen
950450 Games; video game consoles and machines, other than those of subheading 9504.30

D- Electronic components

852321 Magnetic media; cards incorporating a magnetic stripe, whether or not recorded, excluding products of Chapter 37
852352 Semiconductor media; smart cards, whether or not recorded, excluding products of Chapter 37
853400 Circuits; printed
854011 Tubes; cathode-ray television picture tubes, including video monitor cathode-ray tubes, colour
854012 Tubes; cathode-ray television picture tubes, including video monitor cathode-ray tubes, monochrome
854020 Tubes; television camera tubes, image converters and intensifiers, other photocathode tubes
854040 Tubes; data/graphic display tubes, monochrome; data/graphic display tubes, colour, with a phosphor dot screen pitch smaller than 0.4mm
854060 Tubes; cathode ray, n.e.c. in heading no. 8540
854071 Tubes; microwave, magnetrons, excluding grid-controlled tubes
854079 Tubes; microwave (for example klystrons, travelling wave tubes, carlinotrons), excluding magnetrons and grid-controlled tubes
854081 Valves and tubes; receiver or amplifier
854089 Valves and tubes; n.e.c. in heading no. 8540
854091 Tubes; parts of cathode-ray tubes

854099 Valves and tubes; parts of the valves and tubes of heading no. 8540, excluding parts of cathode-ray tubes
854110 Electrical apparatus; diodes, other than photosensitive or light-emitting diodes (LED)
854121 Electrical apparatus; transistors, (other than photosensitive), with a dissipation rate of less than 1W
854129 Electrical apparatus; transistors, (other than photosensitive), with a dissipation rate of 1W or more
854130 Electrical apparatus; thyristors, diacs and triacs, other than photosensitive devices
854140 Electrical apparatus; photosensitive, including photovoltaic cells, whether or not assembled in modules or made up into panels, light-emitting diodes (LED)
854150 Electrical apparatus; photosensitive semiconductor devices n.e.c. in heading no. 8541, including photovoltaic cells, whether or not assembled in modules or made up into panels
854160 Crystals; mounted piezo-electric
854190 Electrical apparatus; parts for diodes, transistors and similar semiconductor devices and photosensitive semiconductor devices
854231 Electronic integrated circuits; processors and controllers, whether or not combined with memories, converters, logic circuits, amplifiers, clock and timing circuits, or other circuits
854232 Electronic integrated circuits; memories
854233 Electronic integrated circuits; amplifiers
854239 Electronic integrated circuits; n.e.c. in heading no. 8542
854290 Parts of electronic integrated circuits
E- Miscellaneous
852351 Semiconductor media; solid-state non-volatile storage devices, whether or not recorded, excluding products of Chapter 37
852359 Semiconductor media; other than smart cards, whether or not recorded, excluding products of Chapter 37
852380 Media n.e.c. in heading 8523, whether or not recorded, excluding products of Chapter 37
852910 Reception and transmission apparatus; aerials and aerial reflectors of all kinds and parts suitable for use therewith
852990 Reception and transmission apparatus; for use with the apparatus of heading no. 8525 to 8528, excluding aerials and aerial reflectors
901320 Lasers; other than laser diodes

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1.1. Notes

[1] For example, the definition of e-commerce used in WTO trade negotiations ("production, distribution, marketing, sale or delivery of goods and services by electronic means") is broader than the statistical definition of digital trade in this Handbook (particularly its reference to production).

[2] "Digitisation is the conversion of analogue data and processes into a machine-readable format. Digitalisation is the use of digital technologies and data as well as interconnection that results in new or changes to existing activities. Digital transformation refers to the economic and societal effects of digitisation and digitalisation." See https://www.oecd-ilibrary.org/docserver/9789264312012-en.pdf?expires=1575895664&id=id&accname=ocid84004878&checksum=A947701CFE037D87D49887BF6EFEA525

[3] Indeed, it is important to put these issues into perspective. Many similar challenges and questions can be raised in the 'analogue' domain. For example, a book cannot be valued only by the costs associated with typing it.

[4] Another example considers customs valuations issues which have been discussed in the WTO, in the context of the Moratorium on applying customs duties on electronic transmissions. In these debates, the question is whether the duties apply to the value of the product or the carrier medium. For the list of countries applying (or not) this decision see: https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=232176,232112,228318,134782,127543,119288,85381,68907,99826,76906&CurrentCatalogueIdIndex=1&FullTextHash=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True

[5] One might also consider looking at trade conducted via a category of digital industries, but this would also present significant boundary issues. For example, would a shoe manufacturer selling all of its products online be in or out of scope? Even if this could be meaningfully resolved, how would the same manufacturer selling half of its products via conventional trade and half online be considered?

[6] That is not to say that delineations based on products are not worthwhile, indeed this Handbook demonstrates they are, but they cannot be the basis on which digital trade as a concept is defined.

[7] Indeed, with a definition that focused only on digital ordering it would be harder to make the conceptual leap to justify imputing values for non-monetary digitally delivered services as complementary statistics to those on 'digitally ordered' , e.g. concerning data or intra-firm deliveries of other digitised information (including knowledge), as there is no 'sale' or 'purchase'.

[8] It's important to note in this context that the efforts in this Handbook are not exclusively driven around the notion of 'gaps' in current statistics, important though these are. The primary aim in this respect is to make digital trade more visible in current economic statistics, hence the focus on goods (where transactions are generally well covered in international trade statistics), as well as services.

[9] Guidance in this area will be provided in future updates of this Handbook. Equally, parent companies are now able to organise the flow of many digitised services (including data) between affiliates that may have no monetary transaction, which further blurs the lines between trade in services and property income

[10] For example, data can be collected by a social network platform from users without a monetary exchange between the user and the platform but the data itself forms a revenue stream (via sales of targeted advertising) for the platform.

[11] The references to 'monetary/non-monetary' as opposed to other variants such as paid/unpaid in this Handbook is deliberate, even if cumbersome. As noted elsewhere in this Handbook, there are on-going discussions within the international statistics community as to whether certain non-monetary transactions in data should be included within the production boundary and goods and services accounts on the grounds that they reflect an underlying 'paid' that is via 'barter' transaction.

[12] The WTO definition on e-commerce includes both ordering and delivering modes.

[13] It is important to note that the definition measures the total value of the product being traded, whether that product has digital characteristics or not.

[14] The text reflects the exact supporting text quoted in the OECD definition. For the purposes of this manual, references to the 'web' should be interpreted as the 'internet', including access via mobile devices.

[15] See Annex F.

[16] Some areas of ambiguity remain and are subject to further research. For example, whether purchases of goods or services via online chat functions, such as WeChat should be considered e-commerce. On the one hand, WeChat and related systems are typically not specifically designed for placing orders (as per the e-commerce definition), but instead receive manually composed messages similar to emails. On the other hand, rapid technological change has meant that orders can now be handled automatically and, so, arguably, related transactions could be classified as e-commerce.

[17] With membership from ITU, OECD, UNCTAD, UNESCWA, UNSD, World Bank and WTO. See also, https://unctad.org/en/PublicationsLibrary/tn_unctad_ict4d03_en.pdf

[18] Note too that the definition of digitally delivered refers to international transactions rather than cross-border, to include Modes 2 and 4, and also excludes the reference to 'downloadable' so as to avoid inadvertently removing many streamed digitally services from the scope of digitally delivered.

[19] Some platforms are now beginning to experiment with physical stores.

[20] UNCTAD (2018) is looking at classifications based on the overall business model (profit vs non-profit) and type of product involved (goods, payment services, social media, labour).

[21] WCO, 2018, http://www.wcoomd.org/en/topics/facilitation/instrument-and-tools/frameworks-of-standards/ecommerce.aspx

[22] Note that these two business models may co-exist within the same enterprise group, for example Amazon Ecommerce (an e-tailer) as opposed to Amazon Marketplace (a digital intermediary platform), part of the same firm, which is why an important distinction is made between definitions of the platforms themselves (the firms) and the services they provide (the 'nature').

[23] Also included in this category are websites and platforms that receive revenue for directing visitors to a third-party website. Although the platform receives a fee, the process in itself does not explicitly facilitate a transaction between two independent sets of users (it just makes one more likely). Therefore, it does not meet the definition of a digital intermediary platform charging a fee.

[24] However, we are conscious of the on-going discussions concerning the classification of transactions related to 3-D printing and cryptocurrencies.

[25] Whether the intermediation service payments and the platform should be classified to the same industry whose products are being intermediated is the subject of debate within the UN Expert Group on Industrial Classifications, which recognised that additional guidance is needed for platforms, not least because the practice varies across countries and industries. However, in provisional guidance (from its September 2017 meeting) concerning the treatment of platforms, there was support for the idea that the platforms should be classified to ISIC sector 79.90 “Other reservation services and related activities’, recognising the parallels with other non-digital matching services such as high-street travel agencies.

[26] (Li, 2018[14]), (OECD, 2013[12])and (OECD, 2013[12]).

[27] http://www.oecd.org/going-digital/

[28] It also lowers barriers to importing and access to productivity enhancing digital inputs that can increase export competitiveness.

[29] See also (UNECE, 2011[13]), chapter 6.

[30] See also Annex 2.A. for particular transactions.

3. Digitally ordered trade

Following the longstanding OECD definition of e-commerce, the Handbook defines digitally ordered trade as the *international sale or purchase of a good or service, conducted over computer networks by methods specifically designed for the purpose of receiving or placing orders*. The Chapter describes how existing (enterprise and household) surveys targeting e-commerce provide the ideal tool for measurement. It highlights the significant measurement challenges that respondents (especially households) have in identifying international transactions, particularly when they pass through digital intermediation platforms. Examples of how additional sources of data can help estimate components of digitally ordered trade are also provided, as well as guidance on improving estimates of *de minimis* transactions.

3.1. Introduction

Digitally ordered trade as defined in this Handbook follows the OECD's definition of e-commerce, and is defined as:

> *"The international sale or purchase of a good or service, conducted over computer networks by methods specifically designed for the purpose of receiving or placing orders".*

Some additional clarifications are provided in this definition. Specifically, these state that the

> *payment and ultimate delivery of the goods or services do not also have to be conducted online. Transactions can involve participants from all institutional sectors, and cover orders made over the web[1], extranet or via EDI. Excluded are orders made by phone, fax or manually typed email.*

Although there have been considerable efforts over the last decade, as noted in Chapters 1 and 2, to measure the scale and value of e-commerce transactions (and so, by definition, the scale and value of digitally ordered transactions), it is only in recent years that these have been expanded to begin to provide insights on (international) digitally ordered trade.

In that respect, this Chapter, perhaps more than any other, best illustrates the 'living' nature of this Handbook, reflecting as it does the current state of research at the frontier of measurement efforts.

Most existing efforts provide a measure of the size of e-commerce (the term e-commerce is used interchangeably with digitally ordered transactions throughout the handbook) at the whole economy level, typically attacking the issue from two not-mutually-exclusive fronts, i.e. separately targeting (surveying) firms and households, and it is through these existing mechanisms, via additional questions, that efforts to estimate international digitally ordered trade are being pursued.

However, as this Chapter demonstrates, estimating the international dimension is fraught with difficulties, as respondents may struggle to determine whether they engaged in an international transaction, especially if the transaction was intermediated by a local affiliate of a multinational firm (see also Chapter 5). Additional complications arise if the transaction was facilitated by a foreign digital platform intermediating between two resident actors.

Developing stronger guidance in these areas is of high priority. This Handbook attempts to do that, but it cannot be overstressed that the current Chapter only reflects a step in that direction, with the expectation that significant additional guidance will be added as national and international efforts mature.

One important take-away from the Chapter is the need to be as innovative as possible in seeking solutions. As noted above, traditionally, statistical efforts have gravitated around conventional measurement vehicles, such as surveys of businesses and households. Important though these are, and are likely to remain, other complementary or more targeted approaches that focus on key actors, should be explored.

The Chapter attempts to describe existing and potential developments around the types of data sources or methods that are being, or can be, exploited. One particular source that is not covered in this Chapter but is instead covered in Chapter 4 is the use of tax data (given that, at present, adaptations to tax regimes and tax law are driven in large part by attempts to better tax digitally-delivered services).

3.2. Enterprise surveys

Business surveys such as the European Community Survey on ICT Usage and E-commerce, the OECD Model Survey on ICT Usage by Businesses, and Canada's Survey of Digital Technology and Internet Use have been important mechanisms to compile statistics on e-commerce in many developed economies over the last decade or so.

However, at least until recently, these have focused almost exclusively on measuring the scale (and often size) of e-commerce transactions in the economy as a whole and not the international dimension.

Typically, existing statistics drawn from enterprise-based surveys provide a view of the overall share of turnover (sales) derived from digitally ordered transactions. For example, the European Community Survey on ICT Usage and E-commerce shows that in 2018, 17% of all turnover (sales) of enterprises with 10 or more employees reflected digital ordering, varying significantly by country and industry.

In recent years, recognising the need for an international trade dimension[2], these existing surveys have begun to be expanded to include additional questions on trade. Since 2017, for example, the European Community Survey on ICT Usage and E-commerce in enterprises has included questions (albeit optional) on the geographical breakdown of turnover derived from orders received via a website or apps (i.e. sales only)[3], with results already available for 2017 and updates expected towards the end of 2019 (see Box 3.1). Statistics Canada's Survey of Digital Technology and Internet Use is already able to do so, providing data on the proportion of overseas Internet sales of all Canadian enterprises, broken down by B2B and B2C sales and by sales to the United States and to the rest of the world.

Unfortunately, whilst these expansions will be able[4] (in time) to provide insights on the **overall** share of digitally ordered **exports**, they do not pertain to purchases[5] by firms using digital ordering, and so for now at least, they will not be able to deliver information on digitally ordered imports.

Notwithstanding the absence of information on imports, it is also important to recognise some of the challenges inherent in the information that can be derived relating to exports, and where further evolutions in enterprise-based surveys should be explored.

Box 3.1. Questions on geographical breakdown of turnover from received orders placed via a website or apps in the European Community Survey on ICT Usage and E-commerce in Enterprises 2019

Question F2. Please state the value of the turnover resulting from orders received that were placed via a website or apps (in monetary terms, excluding VAT), in 2018: _____ (National currency)

If you can't provide this value, **please indicate an estimate of the percentage of the total turnover resulting from orders received that were placed via a website or apps, in 2018:** _____ %

Question F7. What was the percentage breakdown of the turnover from orders received that were placed via a website or apps in 2018 by customers located in the following geographic areas?: (optional).

(estimates in percentage of the monetary values, excluding VAT). If you cannot provide the exact percentages an approximation will suffice.

(a)	Own country	___ %
(b)	Other EU countries	___ %
(c)	Rest of the world	___ %
	Total	100 %

Source: Eurostat Community Survey on ICT Usage and E-commerce in Enterprises, 2019: https://circabc.europa.eu/sd/a/d9b1ab6e-a38f-485b-aeb5-8f7e2ce8d153/ICT-Entr%202019%20-%20Model%20Questionnaire%20V%202.0%20-%20after%20WG.pdf

Enterprise-based estimates of exports of digitally ordered goods and digitally-ordered services

To mitigate potential double-counting, and because other approaches (see Chapter 4) may prove better, or at least complementary, vehicles to measuring parts of digitally ordered services (namely, digitally delivered services that have been digitally ordered), **it is important that estimates of digitally ordered trade derived from enterprise surveys are able to differentiate between goods and services.**

Although most current surveys on digital ordering do not provide a breakdown by the type of product traded, they do provide breakdowns by the industry (at the 2-digit NACE level in the European Survey). Assuming that most of the production (and so exports) of these firms will be in those products that form the main output of their industry would allow countries to link the estimates of digitally ordered exports obtained from these surveys to a view of the product exported (by country and region). This, in turn, provides a vehicle to estimate digitally ordered transactions, as described in Figure 2.1 and Table 2.1.

Indeed, for those countries that are able to link their trade and business registers, this approach can be further refined to do away with assumptions about the goods that are exported; as trade registers will be able to provide this information (notwithstanding difficulties relating to *de minimis* trade, see below).

Recommendation 3.1

Existing or new e-commerce/ICT-use surveys or equivalents should ask respondents to break down sales of products that were digitally ordered and exported between goods and services. Ideally, this information could also be provided by detailed product, but an acceptable alternative is to have breakdowns by the following 4 product categories: Digitally ordered ICT goods, Other digitally ordered goods, Digitally ordered services in products that are (or alternatively in the absence of data, potentially can be) Digitally delivered, and Other digitally ordered services.

If it is not possible to include new or additional questions, an alternative approach is to estimate the share of products that are exported via digital ordering through linking the results of total exports of digitally ordered products with underlying business statistics and trade registers. In so doing the ratios observed at the firm level can be applied equally to all products exported by the firm, providing an estimate of digitally ordered exports by product and partner. Estimates of potentially digitally delivered services can then be derived using the concordance relationships described in Chapter 4.

It is important to note, in this respect, a specific aspect of the design of current surveys and their alignment with underlying concepts included in trade registers. Many firms may sell goods via digital ordering to domestic intermediaries that subsequently take ownership of the goods and export them. In this respect the surveys will correctly reflect the fact that the transaction between a producing enterprise and the domestic intermediary was not a 'trade' transaction, whilst the subsequent export of the intermediary (if also digitally ordered) would be included in digital trade; both flows being completely consistent with what would be recorded in linking trade and business registers.

Where difficulties may arise, however, concerns sales by the firm that were intermediated by digital platforms that did not take ownership of the product being intermediated and exported (see Section 5.4). This matters because the firm conducting the intermediation service (the DIP, whether resident or non-resident) may also record in its response to the survey its share of turnover (which may also include – but shouldn't – the value of the product that it intermediated) that was digitally ordered. ***There is a risk therefore of double counting unless explicit corrections are made to adjust for transactions***

facilitated by DIPs, or separate questions stipulating that only values related to intermediation fees should be included in their sales.

As noted earlier (although they remain difficult to identify in national registers, see Chapter 5), following the provisional guidelines of the UN group on Classifications, DIPs engaged in transactions in goods would be classified to ISIC 4791 – *Retail sale via mail order houses or via Internet* – whilst DIPs engaged in intermediating services would be classified to the main service category they intermediate.

Recommendation 3.2

For Digital Intermediary Platforms (not taking ownership of the products they intermediate), estimates of turnover (sales) that are digitally ordered should reflect only revenues related to the intermediation services they provide and not include the value of the products intermediated. When explicitly charged, intermediation services should be recorded as being paid by one or both of the resident producer and consumer depending on who paid the explicit fees. When not explicitly charged, intermediation services should be recorded as being paid by the producer of the product being intermediated (and not the consumer).

Whilst information on businesses purchases of goods and services is currently lacking in most surveys that capture digital ordering, many (including the European Survey) do include a breakdown of whether the products provided by the firms were sold to consumers (households) or other business (including government), albeit not broken down by whether the consumer was resident or not.

However, household-based surveys (as shown below), can provide a means to derive estimates of digitally ordered imports. As such, separately identifying digitally ordered exports between those sold to businesses and those sold to households in enterprise-based surveys, could provide the basis for mirror statistics to complement (and validate) a partner country's own estimates of imports by households (based on household surveys).

Recommendation 3.3

To provide scope for information on imports of digitally ordered services by businesses, countries should develop export data by partner country that can form the basis of import statistics for other countries.

Recommendation 3.4

Because of the scope to develop separate estimates of imports by households using dedicated household surveys, questions on digitally ordered exports (broken down by importing partner country and region) should differentiate between type of consumer (household and business/government). In the short term, countries should derive splits of export data between households and businesses using information available for the whole economy.

Enterprise-based estimates of imports of digitally-ordered goods and digitally-ordered services

As noted above, very limited information is collected from within current enterprise-based surveys on purchases (imports) via digital ordering. One obvious recommendation in this sense would be to include questions on imports similar to those used for exports, as shown in Box 3.1.

It is important to recognise that such an approach (including information on the value of imports that are digitally ordered) will add to response burdens and, moreover, given the challenges, it is not clear at this stage that the addition of such questions will be able to generate meaningful results. A key challenge in this respect reflects the fact that the enterprise (like households) may not always know whether the purchase was made via a domestic or a foreign intermediary. Many firms, for example, provide local domain websites for transactions even if they have no physical presence in the country, meaning that purchasing firms may record a transaction as domestic even if the entire transaction was conducted abroad. Equally, firms may incorrectly ascribe a transaction as being entirely foreign if most of the value was domestic, for example resident to resident transactions intermediated by foreign DIPs.

Whilst these are considerable challenges, that is not to say that information providing a view of overall purchases by electronic means (particularly via EDI) would not be meaningful, as it would, at the very least, be able to provide a starting point. Moreover, it is important to put the scale of these qualifications into perspective, as a significant share of digitally ordered transactions are made with EDI mechanisms.

Recommendation 3.5

Enterprise-based surveys should include questions on the share of purchases made by digital ordering, with a separate estimate for transactions via EDI. Estimates should be broken down into whether those transactions were for imported (ideally by partner and product and **at least** between goods and services) or domestically produced products.

One area where it may be currently feasible to gain additional insights on imports of digital trade, concerns imports of intermediation services provided by DIPs. Because this Handbook recommends that any implied intermediation fees are paid directly by the producer (and not the final consumer), a measure of the value of these intermediation services can be derived from estimates of sales intermediated by DIPs. The European Survey already includes a similar question that could be used as the basis to estimate the value of these imports[6], by applying an average intermediation fee to the overall turnover intermediated via these channels.

Recommendation 3.6

Questions in enterprise-based surveys that separately identify sales of producers via digital intermediary platforms can be used to estimate the value of the underlying intermediation service fee that was imported by the producer, if the questions also differentiate between sales via non-resident and resident DIPs. Average intermediation fees can be determined using rates (percentages or fixed costs divided by average value of products intermediated) charged by DIPs in the domestic economy, with the value of imported intermediation services determined as the rate multiplied by the value of the product being exported.

Mainstreaming enterprise-based surveys of digitally-ordered goods and digitally-ordered services

Most of the current attempts to estimate digitally ordered transactions reflect complements (often ad-hoc) to traditional e-commerce surveys. Given the emphasis placed on better understanding the digital economy more generally, and digital trade in particular, statistics offices should explore whether additional questions could be mainstreamed in their conventional business surveys used to derive structural business statistics; particularly as most current e-commerce surveys typically target only larger firms (for example, the European Survey is only voluntary for firms with fewer than 10 employees).

These additional questions could take as their starting point the existing question in current e-commerce surveys, coupled with the recommendations above.

Recommendation 3.7

Efforts should be made to explore the feasibility of including questions in standard business surveys that ask firms to provide the following information relating to digital ordering: Share of total sales via own-website; Share of total sales via the internet or apps (other than own-website); Share of total sales via EDI; Share of total exports via own-website; Share of total exports via the internet or apps (other than own-website); Share of total exports via EDI; Share of total purchases via the internet or apps; Share of total purchases via EDI; and Share of total imports via EDI.

3.3. Household surveys

One approach increasingly used to gain insights on digitally ordered transactions is through household surveys.[7] However, these efforts remain very much in their infancy, providing very little information on the size of digital trade. For example, the Canadian Internet Use Survey does collect information on the share of overall expenditure that was digitally ordered but it does not collect an estimate of how much of that expenditure was on imports. The 2018 European Survey on ICT Usage in Households and by Individuals, on the other hand, does provide an estimate of the percentage of households that digitally ordered goods and/or services from abroad, but it does not provide a value of that trade.

This Handbook could make recommendations similar to those included for business surveys, i.e. to include a series of additional questions that are able to provide a view of the value of international digitally ordered transactions. However, such a recommendation would ignore the evidence suggesting that this is not (at least currently) likely to deliver meaningful results.

While the evidence suggests that meaningful results on digital ordering's share of overall household expenditure can be achieved, the Canadian experience also revealed that most households were not able to accurately determine if a transaction was international. This is, in no small way, complicated by the fact that while many platforms or online sellers appear to have a domestic presence (i.e. have a ".ca" website, show prices in Canadian dollars, French/English text, etc.), the transactions are in fact routed and processed by non-resident businesses, with the resident domain site merely serving to advertise products.

This appears to be an intractable problem, as it seems very unlikely that households will ever be in a position to determine whether they are ordering through a real resident platform or not.

That being said, one area where household surveys may prove useful concerns expenditures on digitally delivered products (see Section 4.5).

Another potential area where household surveys could be exploited concerns expenditures abroad and tourist expenditures in the compiling economy. Specific questions could be added to either conventional household expenditure surveys or international travel surveys to identify the share of expenditures on accommodation and (separately) travel services purchased abroad that were digitally ordered, which may help to identify and quantify potential underestimates in these areas (see also Box 3.2). Similarly, conventional household income surveys could be used to ask households if they provided (and the value of) short-term accommodation services via digital intermediation platforms. Whilst such questions would not be able to differentiate (at least initially) between accommodation services provided to residents and those provided to non-residents, it would provide an order of magnitude (and upper-bound estimate, notwithstanding potential deliberate under-recording[8]).

Recommendation 3.8

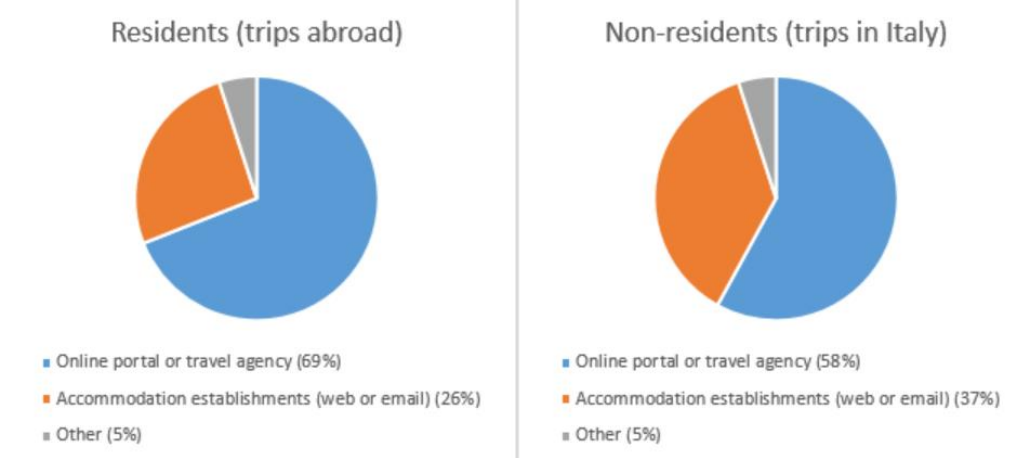
Household and/or international travel surveys should include questions asking respondents to identify the shares of residents' expenditures on accommodation and (separately) other travel services related to their foreign travel that were digitally ordered. Non-resident visitors could also be asked, in international travel surveys, for similar (digitally ordered) purchases from residents. In addition, to assist in providing an upper bound for exports of accommodation services provided by resident households, conventional household income surveys should also ask questions on short-term accommodation services they supplied that were ordered through digital intermediation platforms.

Box 3.2. Compiling digitally ordered travel transactions in Italy

The Bank of Italy (BoI) has been running an extensive (face-to-face) border survey since 1996 providing information on various features of Italy's inbound and outbound international tourism, such as number and characteristics of visitors and visits, number of night stays, mode of payments used, etc. Recently, additional questions have been added to gather information on the use of online tools to book or buy travel services. Travellers are asked about a) online purchases of "all inclusive" travel packages and b) online booking of accommodation. The survey shows that, in 2016, expenditures on "all inclusive" trips purchased or booked online accounted for 14% and 18%, respectively, of outbound and inbound travellers' total expenditure on the product. For accommodation services, the equivalent figures amounted to 42% and 65% respectively.

A specific question addresses the channel used to book the accommodation online (see below).

Figure 3.1. Channels used to book accommodation online - Italy's border survey - 2016



Source: Bank of Italy

3.4. Credit card data

A promising area being explored by many countries, especially with respect to B2C international transactions, concerns the use of credit card data, see Box 3.3, Box 3.4 and also Annex 3.A.

Typically, these approaches are able to differentiate between two main modes of transaction – those where the card was present and those where the card was not present – providing meaningful proxies[9] for transactions that were not digitally ordered and those that were.

However, whilst these approaches are able to provide a relatively simple means to arrive at overall household expenditure that was digitally ordered, they can only provide a partial view of the product that was digitally ordered, as they depend greatly on the code of the merchant (Merchant Category Code); which will only closely align with the product ordered for specialised merchants and platforms.

For estimates of digital trade, additional complications arise. The merchant's clearinghouse (where the transaction is processed) may, for example, be located abroad but the transaction may ultimately reflect a resident to resident transaction; for example, when the merchant is also a DIP facilitating a transaction in

goods and/or services between residents, in which case only the fee for services provided by the DIP should be treated as international trade. Moreover, even if the ultimate transaction is between a resident and a non-resident, the clearinghouse may not be in the same country from where the goods and services are provided, meaning that bilateral estimates of digital trade may be distorted. Further, it is possible that the merchant clearinghouse has a local presence, but the actual producer is located abroad.

Box 3.3. Using credit card data to measure cross-border online purchases in Israel

Benefitting from the legal framework in place allowing access to credit card information, and a memorandum drawn up with three major companies, the Israeli Central Bureau of Statistics (CBS) has started to develop more robust estimates of digitally ordered purchases from abroad by consumers.

The credit card companies have since provided monthly or quarterly data covering the period from 2012 onwards, and currently report approximately two weeks after the end of the quarter.

Data are separately available showing expenditures by Israeli tourists abroad (providing a measure of tourism expenditures) and expenditures by Israeli residents cleared through foreign websites, providing insights on digitally ordered trade (see main body of Chapter 3 for some of the challenges involved).

Data are broken down by duty rates for imported goods set by the customs authorities, in order to distinguish goods that were cleared by customs (i.e. transactions > USD 500), and therefore already included in import statistics.

The data are classified according to the international classification of Merchant Category Codes (MCC) – a classification of businesses made by credit card companies – and relate to households only (business credit cards were excluded), and only those transactions where cards were not present (as these primarily refer to online purchases, although they may include purchases made by telephone or fax).

Source: Israel Central Bureau of Statistics

Notwithstanding the challenges involved (see Box 3.4), credit card data does appear to provide scope for meaningful estimates of household imports of digitally ordered trade, including for breakdowns of some categories of expenditure, such as accommodation services and travel.

Recommendation 3.9

Credit card data provides considerable potential to estimate the total value of digitally ordered expenditures by households. Whilst there are many challenges involved in identifying that part that is international trade and the type of product covered by the transaction, countries are encouraged to explore their potential, not least as they can be a cost-effective way of gathering data.

Box 3.4. Compiling travel transactions in the USA using credit card data

In the mid-2000s, BEA explored the use of credit card data to estimate trade in travel services as it offered several advantages over self-reported expenditure data, including that it did not rely on travellers' recall or expectations and they provided complete geographic coverage. BEA collected card data for transactions related to trade in travel via a quarterly survey of bank and payment card processors for 2008-2017.

BEA's original survey captured all cross-border purchases and cash withdrawals made with a card for both spending in the United States using cards issued by foreign banks and spending in other countries using cards issued by U.S. banks. The survey collected a breakdown of total transactions for six broad categories of travel-related purchases as well as detail on total transactions by country. BEA's initial concerns with the survey data were that it appeared to include e-commerce transactions and that classifications by spending category varied across reporters, while transactions unrelated to travel spending were also being reported.

BEA attempted to address these concerns with a redesign of the survey in 2012. One of the most important changes included the separation of reported transactions by whether the card was or was not present at the time of the transaction. The vast majority of retail goods and services purchased without a card present were expected to represent e-commerce, and not in-person point-of-sale transactions thought to be typical of travel expenditures. E-commerce transactions could therefore be omitted from BEA's calculation of travel expenditures. The instructions were also modified to specify how each transaction's merchant category code (MCC) should be classified into the spending categories and to omit certain MCCs that did not correspond to the types of purchases made by travellers. In addition, transactions were collected by both spending category and country, which allowed for more detailed comparisons with alternative data sources.

The improvements to the survey were only partly successful because not all reporters could fully comply with the new instructions. In addition, survey reporters could only identify transactions by country based on the location of the bank that issued the card rather than by the country of residence of the traveller using the card. This identification not only affected the ability to correctly attribute transactions by country of the purchaser, but also whether transactions should be classified as resident/non-resident. Further, data from card transactions did not correspond with data from alternative sources on traveller counts and spending. When combined with traveller counts, the implied spending per person was significantly higher than self-reported spending from a survey of air travellers, even though it did not include purchases made without a card or international purchases channelled through entities in the country of residence of the purchaser (e.g. a U.S. resident booking a foreign hotel via a U.S. website). Furthermore, the country-level estimates of implied per person spending revealed unrealistic levels of spending and unexpected differences in spending across countries that are geographically close to one another and have similar traveller demographics.

Another concern with the card transactions data was that certain relevant card transactions would be missed by the survey due to the structure of the card-processing and card-issuing industries. For example, reciprocal agreements may allow a foreign card processor to process a relevant transaction, and relevant card payments on closed-loop or digital wallet payment systems may not be captured by the survey. Also, the categorisation by MCC may not correspond to the goods or services purchased because merchants may have one or a few MCCs per retail outlet, which does not allow for a high level of disaggregation by product type. In BEA's analysis, the level and seasonal pattern of spending for categories thought to be well identified by MCC, such as lodging, were quite different from self-reported spending in the traveller survey.

Since not all spending is done with cards and some transactions related to travel may be booked via intermediaries resident in the same country as the traveller, BEA planned to account for transactions made by methods other than cross-border credit card transactions using data collected on a one-time companion sample survey of international travellers. The companion survey provided information on the portion of total spending attributable to cross-border card transactions, but there were concerns over the quality of the data collected and its associated cost, so it was not repeated. BEA ultimately decided that the credit card data it collected was not a reliable basis to estimate trade in travel and discontinued the survey of card processors.

Source: US BEA.

3.5. Using data from other payment processing firms

Other, similar, approaches to using credit card data are being adopted in some countries, drawing on information from specialised online payment companies. Although similar challenges to those for credit card data arise, the experience of the Bank of Russia shows that meaningful results can be derived (Box 3.5).

Recommendation 3.10

Information from other specialised payment companies provides considerable scope to estimate the total value of digitally ordered expenditures by households. Whilst there are some challenges involved in identifying that part that is international trade, countries are encouraged to explore their potential, not least as they can be a cost-effective way of gathering data.

Box 3.5. Using online payment companies to measure digitally ordered trade transactions: the Russian experience

Digitally ordered trade transactions are nearly always settled via specialised online payment companies. In Russia, both international companies such as PayPal, and national IT companies such as QIWI or Yandex operate in this market. Russian law requires such companies to have licenses to work as credit institutions and to notify the Bank of Russia when they begin transferring electronic funds.

The online payment companies are required to report detailed information to the Bank of Russia on a regular basis, including on e.g. direction of payment, the counterparty country and the currency of transactions. Due to the large number of small transactions (the average transfer amount is $20), the individual transactions are not categorised by type of goods and services. However, considering the growing importance of digital ordering, a quarterly survey of specialised online payment companies was developed in order to obtain disaggregate information on transactions by major product categories. To reduce the burden on respondents, a list of the types of goods and services that account for the largest shares in international transactions was developed with input from the operators of payment systems, and only the three largest operators, which account for more than 80% of total international transactions, are surveyed. Categories identified in the approach include the purchase of goods; the purchase of services in the field of culture and recreation (computer games); computer services (content, hosting, domain registration); communication services (cellular communication and internet, SIM cards for tourists, information services); participation in online casinos; transactions on the Forex market; and transfers between individuals.

The first survey was conducted in 2014. The results showed that imports of goods from online stores, participation in online casinos, and computer games made up the largest shares of online cross-border transactions conducted by individuals. The practice has been considered successful and is currently used in the calculation of imports and exports of goods and services, personal remittances and other balance of payments items.

Source: Central Bank of Russia.

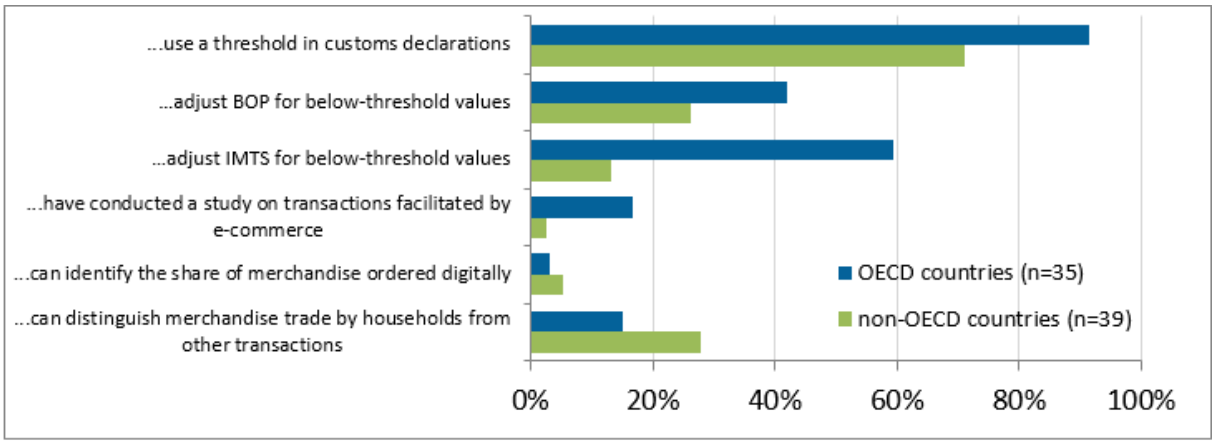
3.6. *De minimis* trade

One area where there has been considerable concern that digitalisation may have led to mismeasurement – that is *underestimation*[10] – relates to the estimation of *de minimis* trade, i.e. transactions below the minimum value (weight or size) on which duties are collected, which are therefore outside of the scope of conventional merchandise trade statistics. For example, the 2017 International Post Corporation E-commerce Shopper Survey found that 84% of international goods purchased online weighed 2kg or less and almost two-thirds of them (66%) cost less than 50 euros. Moreover, while the number of international online transactions is increasing, their average value is decreasing, including from some smaller businesses using 'just in time' inventory management systems, as well as through EDI.

In addition, the OECD-IMF Stocktaking Survey showed that the *de minimis* thresholds currently in use vary widely across countries. For example, among OECD countries, the threshold ranges from GBP 15 in the United Kingdom to USD 2,500[11] in the United States. Some countries also apply a volume threshold and thresholds can vary for each tax or duty applied. Among non-OECD surveyed countries, customs thresholds ranged from a minimum of about USD 25 (Belarus, Philippines, and Mauritius) to USD 2,000 (or less than 50kg) for imports and USD 5,000 for exports in Colombia. Seven countries also indicated

having different thresholds for postal shipments or by type of transport, such as Russia, which applies different thresholds varying by mode of transport on duty-free imports by individuals.

Figure 3.2. Percentage of respondents to the OECD-IMF Stocktaking questionnaire that…



Note: It is likely that the lower number of non-OECD respondents making an adjustment to balance of payments figures compared to International Merchandise Trade Statistics is influenced by the organisations (central banks) answering the questionnaire.
Source: (OECD, 2016[1]) and IMF calculations.

Around half of OECD countries, as well as several non-OECD countries, produce estimates of *de minimis* trade for balance of payments purposes, using various sources, including: the national postal service, administrative reports from Customs, credit card information or estimation models (See Box 3.6 and Box 3.7).

In most cases, *de minimis* trade amounts to around 1-3% of total trade but can reach as high as 15% in Azerbaijan (for Q1 2017). Countries that do not produce *de minimis* estimates often cite limitations in source data or consider these flows as insignificant.

While there is likely to be a strong correlation between the growth in *de minimis* transactions and growth in digital ordering, it is important to note that not all *de minimis* trade will be digitally ordered, and so some care is needed in interpreting the data.

Box 3.6. Low-value estimations in the United States

Since the 1960s, the United States has promoted the reduction of trade flow processing costs by exempting low-valued transactions for both imports and exports from the burden of additional procedures and paperwork. The U.S. Census Bureau provides estimates for low-valued trade statistics below a threshold of USD 2,500.

Data for exports is based on the sum of two sources of information, gathered from small package courier company trade transactions and country-specific low-value trade estimates. Courier data is used to develop a "courier factor" based on the proportion of the low value trade to the total high value trade over several months. This factor is the same for all countries, and is multiplied with the courier data to produce courier low- value estimates. Non-courier data is estimated by using a country-specific factor multiplied by each country's trade from the prior (or current, if available) month to produce low value estimates. This is done for exports to all countries except Canada, which is separately generated under the U.S.-Canada Data Exchange. These two data components are summed, by country, to produce monthly low value estimates.

In contrast, imports data is typically based on available low value import data rather than estimates, with two main methodological features. The first is a summarisation or "roll up" of excess electronically-filed data (comprising the majority of data) that is typically omitted from the original statistics, which increases the value of trade for certain commodities where lower valued trade is prevalent. The second is a revised low value estimation process with four components: 1) a low value total for electronically filed import data, 2) an estimate of low valued data filed via paper, 3) an estimate of courier low value data, and 4) a low value total for Foreign Trade Zone data filed either via paper or electronically. These four components are summed, by country, to produce monthly low value estimates.

Source: US BEA.

Box 3.7. *De minimis* estimations in Russia

Russia has a relatively high *de minimis* threshold (1000 EUR per person per month). Most goods are delivered through postal and courier services and are not included in customs statistics, so in 2011 The Bank of Russia started to measure the value of these flows, using data on the volume of incoming mail received from the Russian Postal Service. A model was constructed distinguishing between three types of postal items (letters, parcels and express items) and partner country. Letter post (small packages of up to 2 kg) accounted for the largest share of postal shipments. This was due to the high demand in Russian households for cheap purchases from Chinese online shops (Alibaba, for example).

Subsequently, the average cost of each of these categories was determined using a household survey conducted by the Postal Service and estimates provided by experts. The total value was then estimated by multiplying the number of incoming mail items by the average value of one shipment in the appropriate category. Imports were adjusted to reflect FOB prices, and goods purchased by households for further resale.

While this approach resulted in reasonable initial estimates, it proved difficult to determine the average costs of one shipment, and especially because the survey did not cover information from private courier companies such as DHL and FedEx, the approach was abandoned in 2013 in favour of calculations using credit card information.

Source: Central Bank of Russia.

A key take-away from national experiences is that estimates based on information from postal delivery providers can provide relatively robust estimates of overall *de minimis* trade but only (as the case of Russia shows) if the estimation process covers at least the majority of postal and courier service providers, covering all transport modes.

Of course such approaches are not able to identify the scale of digitally ordered transactions that fall under *de minimis* trade thresholds but (as the examples for Russia and Israel show), credit card data can provide a useful approach for estimating digitally ordered trade below *de minimis* thresholds if credit card companies are asked to compile data showing the value of transactions below and above those thresholds, albeit with additional adjustments (assumptions) to avoid attributing expenditures to digital trade (or to the wrong partner country as digital trade) when transactions pass through DIPs in particular.

Recommendation 3.11

Countries should give greater priority to estimate *de minimis* transactions using a variety of sources. Information provided by postal and courier agencies can provide meaningful estimates as long as coverage of providers is high and all modes of transport are representatively covered. These efforts should be coupled with information from credit card companies (and other actors providing payment services) on transactions below *de minimis* thresholds (where these are valued in monetary terms) to gain insights on digitally ordered *de minimis* trade in goods but care (adjustments) is (are) needed to avoid incorrectly attributing all transactions that pass through DIPs located abroad as digital trade.

Box 3.8. International efforts on digitally ordered *de minimis* trade

The Universal Postal Union (UPU), WTO, UNCTAD and OECD are currently investigating the possibility of using postal data from the UPU to measure digitally ordered merchandise trade broken down by B2B and B2C transactions. UPU postal data include information on e-commerce shipments, such as product options, track and trace and return options, and information on electronic customs declarations between postal operators. An update of this work will be provided in future versions of this Handbook.

3.7. Digitally ordered merchandise trade directly from customs statistics

More systematic efforts that may deliver significant results on digitally ordered goods trade in the short to medium term, including on *de minimis* trade, are in development.

A key pillar of these efforts reflects work led by the WCO, in collaboration with large e-commerce enterprises[12], to better identify and monitor digitally ordered trade in customs records via improved electronic identification of origin/destination and content of packages, for example via the S10 bar code for postal items, or special (simplified) declaration forms for e-commerce

The WCO's work is governed by its "Framework of Standards" on cross-border e-commerce (See Box 3.9), which offers, among other things, structural guidance on measuring e-commerce (digitally-ordered) transactions, and aims to establish global standards in the e-commerce supply chain, including a harmonised approach to risk assessment, clearance/release, revenue collection, and border cooperation, from both trade facilitation and customs control perspectives.

China Customs, which unlike many other customs authorities is also responsible for the publication of official international merchandise trade statistics, is also making significant advances in this area (see box 3.10), supported by government policy aiming to create an environment conducive to e-commerce development. The government is strengthening five areas of e-commerce policy, including: 1) Customs clearance; 2) inspection and quarantine; 3) tax policy; 4) payment and settlement; and 5) financial support. Comprehensive test areas for cross-border e-commerce have been set up to conduct pilot regulatory systems and policies, beginning in Hang Zhou.[13]

The most important data elements compiled from these sources include individual stock-keeping unit (SKUs) names and item numbers for the product, origin and destination, with breakdowns of the transaction price into its associated freight or other logistics costs and insurance fees, as well as firm-level information on the transacting enterprise, the e-commerce platform used, and the logistics or freight company transporting the product. In addition, Chinese Customs also requests detailed contact information on the payer or consignee and specific product details such as its name, commodity classification code, dimensions and weight.

Box 3.9. WCO Framework of standards on cross-border e-commerce

The WCO's Framework on Standards is based on eight guiding principles for cross-border ecommerce outlined in the Luxor Resolution, (adopted at the 2017 WCO Policy Commission meeting) and includes a Standard (Standard 14: Mechanism of Measurement) based on one specific principle (V) on measurement and analysis:

i. Establish a set of common terminologies and reliable mechanisms to accurately measure and analyse cross-border e-Commerce in close cooperation with international organisations such as the WTO, UNSD, OECD, UNCTAD, UPU, ICAO, WEF, World Bank Group, as well as with national statistical organizations and e-Commerce stakeholders;

ii. Use Data Analytics (including "big data" modules) and the existing capabilities of international organisations, e-vendors/e-platforms, and other stakeholders, with a view to generating trends and analysis for evidence-based decision making to support the implementation of the Guiding Principles and the efficient and sustainable growth of cross-border e-Commerce;

iii. Establish mechanisms, including supporting legal framework, to capture data at item level to facilitate the development of E-Commerce trade statistics, while implementing simplified clearance processes, for example the consolidated simplified summary declaration.

Standard 14: Mechanism of Measurement stipulates that: "Customs administrations should work with relevant government agencies in close cooperation with E-Commerce stakeholders to accurately capture, measure, analyse and publish cross-border E-Commerce statistics in accordance with international statistical standards and national policy, for informed decision making."
The WCO E-Commerce Package provides Technical Specifications for this Standard.

Sources: (1) WCO (2018 and 2019): http://www.wcoomd.org/en/topics/facilitation/instrument-and-tools/frameworks-of-standards/ecommerce.aspx
(2) WCO (2017): http://www.wcoomd.org/-/media/wco/public/global/pdf/about-us/legal-instruments/resolutions/policy-commission-resolution-on-cross_border-ecommerce_en.pdf?la=en

Several countries, including China (see box 3.10), Japan and Canada (see below) have already started to implement these systems:

Japan

Japan has a regulatory framework on the clearance system for low-value goods, which includes a simplified tariff, manifest-based clearance, *de minimis* regime, and inspection, at express service providers' premises when needed. Their initiatives include the exchange of advance electronic information for postal items and the promotion of paperless environment.

Canada

Canada has initiated a postal modernisation initiative (PMI) which includes advance electronic data on small parcels and related systems such as a postal operations support tool (POST) and international conveyor systems (ICS). The Courier Low-Value Shipment Programme is also designed to expedite the processing of imported non-prohibited, regulated or controlled goods worth less than CAD2500.

Box 3.10. Measuring cross-border merchandise e-commerce using customs data in China

In recent years, e-commerce has flourished in China, and China has become the world's largest e-commerce market where all forms of e-commerce (including for example B2B, B2C, C2C,) have developed rapidly. This growth has brought challenges for accurately measuring cross-border e-commerce involving goods, related to high-frequency and low-value transactions. As the institution responsible for producing official Chinese merchandise trade statistics, China Customs has developed new approaches to ensure the statistical coverage of these transactions, covering both B2C and B2B.

For the B2C cross-border e-commerce transactions, China Customs has established a specialised clearance system named Cross-border E-commerce Information System (CBEIS). Specific customs regime codes (9610, 1210 and 1239) help identify goods that are cleared via CBEIS. Customs allow the release of B2C cross-border e-commerce goods via a simple declaration which combines and cross-validates the original orders, logistics and payment data, while e-commerce platforms declares summarized data to Customs afterwards for statistics and other purposes.

Since e-commerce platforms typically have high quality data management systems to oversee the entire chain of transactions, logistics and payments, information is easy to collect and report. China Customs uses the information on orders provided by e-commerce platforms both within and outside China to develop statistical estimates on the overall scale of cross-border e-commerce. By also incorporating administrative records of cross-border logistics and cross-border payments, using big data methodologies, China Customs can compare and cross-validate the data to improve the accuracy of measurement. This approach delivers complete, accurate and timely statistical information.

For B2C goods cleared as mail parcels and courier deliveries rather than through CBEIS, China Customs and the postal agency have carried out a pilot survey, using sampling methods to determine the proportion of e-commerce postal parcels, to estimate the scale of cross-border e-commerce merchandise trade via postal channels.

For the B2B transactions, China Customs currently encourages importers and exporters to declare whether the goods are ordered via e-commerce. This information will be used for a future statistical survey to further estimate and validate these data.

Source: China Customs.

3.8. Data linking and private data sources

Another avenue to explore in developing statistics on international digitally ordered transactions involves microdata linking, for example by integrating merchandise trade statistics with e-commerce enterprise surveys, albeit coupled with stylised assumptions relating to foreign/domestic e-commerce splits, or proportionality assumptions when applying the share of foreign sales that occurs via e-commerce equally to all products and trading partners. Further refinements could also be made in combination with Broad Economic Categories (BEC) classifications to provide estimates of the share of international sales that can be classified as B2B and as B2C.

The OECD-IMF Stocktaking survey indicated that several countries have started concrete projects along these lines. For example, Germany is developing Trade by Enterprise Characteristics (TEC) data for NACE Rev.2 47.91 (retail sales via mail order), and others (Luxembourg, the Netherlands, and Slovenia) are exploring the ability to capitalise on ICT surveys. Each of these initiatives (and others) will be added to this section of the Handbook as they reach maturity.

New insights on international digitally ordered trade can also be derived from linking administrative data with private data sources (see Box 3.11)

Box 3.11. Measuring cross-border e-commerce from webshops in the Netherlands

To measure expenditure by Dutch consumers at non-Dutch webshops located in the EU, Statistics Netherlands (CBS) used the Dutch VAT returns filed by foreign EU companies, which are mandatory across Europe for all traders exporting more than a certain threshold (EUR 35,000 or EUR 100,000 per year, depending on the member state) to another member state. To identify webshops among these VAT returns, the information was first combined with data from Bureau Van Dijk's ORBIS database, to select those enterprises engaged in retail as their primary or secondary activity (and therefore to trade in goods only). In the absence of common identifiers, matching of records was done using company names. This process required significant editing to avoid false negatives due to e.g. differences in punctuation marks (dots, commas, dashes) or abbreviations (e.g. LTD versus LIMITED). In this process, CBS worked together with the University of Amsterdam and Leiden University to implement big data analytical techniques achieve faster and more accurate linking.

Subsequently, this overview of companies was paired with internet data collected through web scraping to identify the websites of the shops through which products can be ordered online. Webpages were identified on the basis of the company name, with sites checked (automatically) for the display of a shopping cart. This identification of webshop features was checked manually for the largest foreign companies in terms of turnover size in the Netherlands. Through these manual checks, a rough estimate was made of the measurement errors in the algorithm, which was approximately 5 percent of turnover. With the help of manual check results, the next version of the algorithms can be 'trained' using machine learning in order to further reduce measurement errors.

The results indicate that Dutch consumers spent over 1 billion euros (excluding VAT) on products sold by foreign EU webshops in 2016, an increase of 25% relative to 2015, and a value six times higher than previously recorded with demand-side surveys among consumers. More than half of all online purchases were made at webshops located in Germany, followed by the United Kingdom, Belgium and Italy. Clothing and shoes were the main items that were purchased.

Source: Statistics Netherlands/University of Amsterdam/University of Leiden.
See https://www.cbs.nl/en-gb/our-services/innovation/project/over-1-billion-euros-spent-in-foreign-eu-webshops, https://www.cbs.nl/en-gb/news/2018/30/spending-in-european-webshops-up-by-15-percent.
For the academic paper describing the approach in detail: (Meertens et al., 2019[21])

3.9. Conclusions

As highlighted in the opening remarks to this chapter, whilst there have been significant efforts over the last decade to measure digitally ordered transactions (e-commerce), in many countries, work to explore the trade dimension is only just beginning.

In virtually all cases, current efforts still need to overcome significant challenges. A key challenge affecting many of the current approaches, and particularly household-based surveys, concerns the difficulty involved in determining from where goods and services were provided, (i.e. imports of digitally ordered services).

The Canadian experience using household surveys well illustrates the difficulties involved here. The existence of a website with a domain name particular to a country is not a sufficient indication that the business operating the site is present and operates within the country and can be interpreted as the

location associated with a digital order. This can affect measures of bilateral trade with a particular partner country and estimates of trade itself. The same caveats in this respect also apply for other data sources, for example credit card data, where the merchant processing transactions may not be the location from where the goods and services were despatched.

That being said, measures of digitally ordered exports are less affected by these locational issues, because the starting point for measures of trade in this instance are enterprises with an economic presence in the compiling country. As a result, the use of enterprise surveys, and indeed **the mainstreaming of additional questions pertaining to trade and digital ordering on general structural business surveys are strongly encouraged**.

That is not to say, however, that the current approaches to better measure digitally ordered imports are not worth pursuing. **In those countries that currently have no information on digitally ordered trade, statistics should be developed and disseminated despite the current caveats.** Certainly it will be difficult for statistical agencies to comply with such a recommendation concerning the estimation of *de minimis* imports for all countries, especially for those who currently make no estimates.

Annex 3.A. Extract from OECD "Measuring the Digital Transformation": Measuring e-commerce

Why do we need indicators on e-commerce?

E-commerce has been high on the agenda of policy makers since the mid-1990s. In 1998, the OECD Ministerial Conference on Electronic Commerce in Ottawa recognised e-commerce as a global driver of growth and economic development (OECD, 1998[3]). In 2016, the OECD Ministerial Declaration on the Digital Economy called for policies to "stimulate and help reduce impediments to e-commerce within and across borders for the benefits of consumers and business" (OECD, 2016[4]).

The e-commerce landscape has become increasingly dynamic in recent years. New players have emerged at the same time that established actors have taken on new roles; some barriers to e-commerce, such as Internet access have been greatly reduced, while new barriers, such as concerns about security and privacy, have become more prominent. Above all, new opportunities have arisen to unlock the potential of e-commerce to boost growth and consumers' welfare (OECD, 2019[5]). As technological change and new business models are changing the e-commerce landscape, policy faces challenges in a range of areas, including consumer protection, tax, competition and environmental policy. Sound statistics on e-commerce are necessary to design, monitor and implement these policies. However, statistical information on consumer and operator behaviour and on the effects of online platforms is still scarce.

What are the challenges?

The OECD first developed a statistical definition of e-commerce in 2001. Based on this definition, data on e-sales and e-purchases by individuals and businesses are collected yearly in OECD and selected Partner countries, through two dedicated surveys on ICT usage. Both the e-commerce definition and model surveys are regularly updated to adjust to new technological developments and new usages.

Measurement of e-commerce through the ICT usage surveys presents methodological challenges that can affect the comparability of estimates. These include the adoption of different practices for data collection and estimations, the treatment of outliers, the extent of e-commerce carried out by multinationals, and the imputation of values from ranges recorded in surveys. Other issues include differences in sectoral coverage of surveys and limited measures concerning the actors involved (B2B, B2C, etc.). Convergence of technologies brings additional challenges for the treatment (and surveying) of emerging transactions, notably over mobile phones, via SMS or using devices that enable near field communication (NFC).

While ICT use surveys have been successful in measuring the diffusion of e-commerce among individuals and firms, collecting information on the value of e-commerce transactions and on the flows of cross-border e-commerce has proven more difficult. Individuals find it hard to recollect the value of their online expenditures and do not always know when they buy an item from a domestic or a foreign supplier; and the accounting systems of many businesses do not make it possible to split online and offline transactions nor to identify the location of their **customers and suppliers**. In addition, because Business to Consumer transactions include purchases of digital products, which are increasingly downloaded or streamed over the Internet, it is difficult for the consumer to identify the country of origin.

Beyond survey data, several other sources have been used to approximate shipments in e-commerce, including across borders. These include the aggregation of data from company reports, payment data,

parcel shipments or Internet traffic among others (UNCTAD, 2016[6]). However, each of these sources usually only provides a partial and potentially biased perspective on e-commerce transactions.

For example, the aggregation of company reports typically covers only a limited number of large firms, sometimes restricted to pure online retailers. Payment data is typically limited to a specific method of payment or might contain certain transactions that are not related to e-commerce (e.g. payments via Near Field Communication - NFC). Additionally, the geography of cross-border payments does not always reflect the geography of cross-border e-commerce, as the payment processing might have been outsourced to a third country. Parcel shipments only relate to physical products and mostly do not provide detailed information on the value of shipments. More importantly, not all parcel shipments are due to e-commerce transactions. Similarly, internet traffic, sometimes used as a proxy for cross-border transactions, is influenced by non-commercial transactions and rarely reflects the value of shipments.

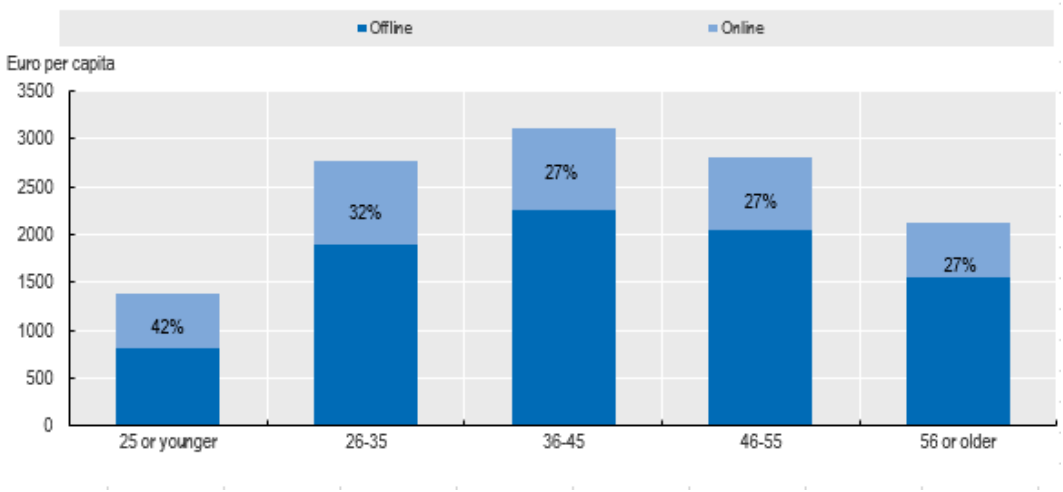
Options for international action

International initiatives to improve measurement of e-commerce are being deployed along three main axes. The first is to improve the quality of the data collected through the ICT surveys. For example, a consortium of seven European countries, Denmark, Austria, Lithuania, the Netherlands, Poland, Slovenia, led by Finland (EUROSTAT et al., 2017[7]) has tested existing questions in view of potential simplification as well as new questions to capture new developments in e-commerce. The testing addressed issues related to the distinction between Web sales and EDI-type sales; demand-driven orders, e.g. an order sent automatically by the IT system of an enterprise; bookings and reservations, i.e.: the booking is placed online but the actual service is not ordered online; window shopping, e. g. customers visiting a website but placing their order by phone; the breakdown of web sales turnover from an enterprise's own website or apps vs. via an e-commerce marketplace website or app.; standing orders, e.g.: magazine subscriptions, cloud services, streaming services, etc.; as well as the treatment of e-commerce transactions among firms belonging to the same group. The findings of this work are being reflected in the European ICT usage surveys and could be considered for inclusion by other countries.

The second axis for international action is the inclusion of e-commerce questions in surveys that may be better suited to this purpose. In general, measuring the value of e-commerce requires detailed information that cannot be collected through ICT surveys. The framework of the Structural Business Surveys appears more appropriate for firms to report on the value of their e-sales and e-purchase (EUROSTAT et al., 2017[7]). Similarly, it may be easier for individuals to record the value of their e-purchases as part of Household Expenditure Surveys, which typically include a diary of daily expenses. As both Structural Business Surveys and Household Expenditure Surveys are sources underlying the System of National Accounts and are harmonised among countries, international organisations can play an important role in developing these surveys to collect better information on e-commerce.

Annex Figure 3.A.1. Off-line and online payments by age in Spain, 2016

Euro per capita



Source: (OECD, 2019[8])

Finally, private big data sources, e.g. from banks, credit cards companies, etc. may help to improve measurement of e-commerce in areas where surveys tend to be less effective. For instance, businesses, and especially individuals, buying online typically ignore the location of the seller, an issue complicated further by online platforms. In those circumstances, private source data may become a useful complement to official, survey-based statistics. It is important, however, that the official statistics provide the overall background, particularly in terms of statistical representativeness, consistency, etc. that private source data, by their very nature, cannot not always achieve.

A collaboration between the OECD and the Spanish Bank BBVA provides a recent example of this approach. As shown in the figure, analysis of credit card transactions of BBVA customers in Spain provided novel insights into the consumption patterns of consumers online and the determinants of domestic and cross-border expenditure flows (OECD, 2019[9]).

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Notes

[1]The text around this additional clarification cites verbatim that used in the OECD definition for e-commerce. In this Handbook, references to 'web' are synonymous with the more contemporary notion of 'the internet', including access via mobile devices and apps.

[2] Motivated in large part by the recommendations described in UNCTAD's report: In Search of Cross-border E-commerce Trade Data, 2016.

[3] The 2021 questionnaire is currently being developed and in February 2020 a decision will be taken on whether the currently optional question should be made mandatory. The 2019 survey included (on optional basis) a similar question on a percentage breakdown of the value of web sales by destination. Apart from the question on the geographical breakdown of the turnover originating from web sales, the survey has included, on biennial basis, questions on geographical origin of received orders, placed either via a website/app or via EDI-type message, since the beginning of the survey.

[4] A second survey used by Statistic Canada, Retail Trade and Annual Non-store Retail Surveys, reports retail e-commerce trade limited to the retail sector and can't provide estimates of expenditures spent by foreign consumers in Canadian online shops.

[5] The 2018 European Survey did include some questions on total purchases, but these were significantly less ambitious than those relating to sales; restricting themselves to optional responses on whether any purchases were made using digital ordering techniques, and, if so, whether these constituted more than 1% of total purchases.

[6] Question F5: What was the percentage breakdown of the turnover from orders received via a website or apps in 2018 for the following: (b) via an e-commerce marketplace website or apps used by several enterprises for trading products? (e.g. Booking, eBay, Amazon, Amazon Business, Alibaba, Rakuten, etc.)

[7] See for example the European *Survey on ICT Usage in Households and by Individuals* and Statistics Canada's *Internet Use Survey*.

[8] Reinforcing the importance that household surveys make regarding confidentiality of respondents data and its use for statistical purposes only.

[9] "Proxies" as transactions can be made with the card not being present but are not digitally ordered, for example ordering via the telephone.

[10] It's important to note that the measurement issue affects exports less than imports, as exports under a *de minimis* regime will be recorded as output of the exporting firms and, so, any systematic underestimation will reveal themselves as supply-demand imbalances when compiling the national accounts.

[11] Note in this section that the estimates for '*de minimis*' referred to above may reflect the thresholds actually used by statistics agencies to estimate small-parcel trade and not the de jure thresholds set by Customs authorities. For example in the United States, the *de minimis* threshold is actually USD 800, one third the threshold used by the US Census Bureau to estimate small parcel trade. Also, see GEA for updated de Minimis on customs and VAT: https://global-express.org/assets/files/Customs%20Committee/de-minimis/GEA%20overview%20on%20de%20minimis_9%20March%202018.pdf

[12] Who, in turn, may benefit from more efficient customs procedures.

[13] See (Hongfei, 2017[10]) and http://www.gov.cn/zhengce/content/2015-03/12/content_9522.htm; http://www.chinadaily.com.cn/business/2016hangzhoug20/2016-09/02/content_26675070.htm.

4. Digitally delivered trade

The Chapter defines digitally delivered trade as *international transactions that are delivered remotely in an electronic format, using computer networks specifically designed for the purpose*. The definition capitalises, and builds on, UNCTAD's existing work on related concept of ICT-enabled services but stresses important differences in scope, with digital trade restricted to transactions over computer networks but covering Mode 2 transactions and intermediation services provided by digital intermediation platforms. The Chapter describes a number of data sources that can be used to measure digitally delivered trade and also the potential of surveys measuring trade by mode of supply.

4.1. Introduction

Digitally delivered trade as defined in this Handbook refers to all

> *international transactions that are delivered remotely in an electronic format, using computer networks specifically designed for the purpose.*

As is the case for digital ordering, *digitally delivered services can involve participants from all institutional sectors, and cover deliveries made over the web/internet (including via mobile devices), extranet or via electronic data interchange but should exclude any services provided by phone, fax or manually typed email*.

By design, the underlying concept of digitally delivered trade is similar to the concept of *ICT-enabled services* (i.e. 'services products delivered remotely over ICT networks')[1], developed by the UNCTAD-led Task Group on Measuring Trade in ICT Services and ICT-enabled Services (TGServ) of the Partnership on Measuring ICT for Development as well as the TFITS (UNCTAD, 2015[1]).

There are, however, some important differences between the two concepts, as this Chapter demonstrates. The first concerns the range of products included within the two concepts (digitally delivered trade and ICT-enabled services) and the second reflects the difference between the mechanisms that can be used for 'delivery'.

The focus on 'digital' in this Handbook explicitly excludes delivery mechanisms such as the phone, fax, or manually typed e-mails, and instead (consistent with the mechanisms used for digital ordering) only includes deliveries that pass through 'computer networks'. ICT-enabled services on the other hand, in theory at least, include services delivered by methods that do not necessarily require computer networks, such as human-to-human interactions via the phone.

For many products included in the scope of *ICT-enabled* (as show below), there is unlikely to be a material difference between the two measures – ICT-enabled and digitally delivered – as the underlying product will only be delivered via a computer network (e.g. cloud services). However, this is not always the case. For example, many dial-up call-centre services, with a human interface at the other-end, will be out of scope for *digitally delivered*.

One area where there is complete consistency between the two concepts concerns the broad scope of products. By definition, the concept of ICT-enabled services only includes services. Whilst there are ongoing discussions concerning the possibility of classifying 3-D printing transactions, and indeed cryptocurrencies (see Annex 4.D), in the goods account, in the absence of any definitive position, **this Handbook takes the convention that only services can be delivered digitally**[2].

In practice, a significant share of digitally delivered transactions is likely to be digitally ordered, especially fully digital and downloadable products (including those that are streamed), such as software, music, e-books, and data and database services.

However, it is also likely that many digitally delivered services transactions are not digitally ordered, for example, roaming mobile communications charges incurred whilst abroad, where the service provider for the 'roaming resident' pays fees to the service provider abroad. Many – and possibly most large-scale transactions in services between firms, and especially intra-firm services – may also be digitally delivered but not digitally ordered.

In addition (although not part of the definition of digital trade itself), nearly all cases of non-monetary transactions (e.g. provision of e-mail, social media, cloud services, etc.) between households and producers will not, by definition, be digitally ordered, because there is no sale or purchase for an explicit fee including those pertaining to non-monetary transactions. It's important to note that most of these transactions, like most other digital trade transactions described in this Handbook, are already likely to be recorded in official statistics, but many may not be[3].

The fact that part of digitally delivered services can be, or are, also digitally ordered creates an overlap between the two components of digital trade. Current, and indeed emerging, measurement approaches gravitate around compiling estimates of total digitally ordered trade and separately digitally delivered trade. However, obviously, adding the two together would over-estimate digital trade as digitally delivered digitally ordered services would be double counted.

It is precisely to avoid double counting that the reporting template described in Chapter 2 explicitly includes a separate item for digitally delivered digitally ordered services.

Like Chapter 3, the discussion of compiling statistics in this Chapter is organised around the principle of the primary data source used. Not surprisingly, given the overlap, many similar challenges to those concerning digitally ordered transactions arise in considerations of digitally delivered services. For example, households, and indeed firms, often struggle to identify whether a service was imported, especially when a transaction passes through a local domain site. In addition, a number of countries are using or exploring, credit card data to identify household transactions.

In the interests of parsimony, therefore, and to avoid repetition with other chapters, this Chapter does not cover those sources that uniquely, or primarily, provide a view of digitally ordered digitally delivered services: Household surveys, see Section 3.3; Credit card data, see Section 3.4; and Other payment processing firms, see Section 3.5.

As such, the main focus in this Chapter is on delivering **total** estimates of digitally delivered services trade at the total economy level and also by institutional sector (businesses, governments and households).

The chapter begins with reviewing traditional International Trade in Services (ITS) surveys (Section 4.2), followed by ITRS data sources (Section 4.3), administrative tax data sources (Section 4.4), and household surveys (Section 4.5). Section 4.6 provide examples of data sources used to measure digital financial services.

4.2. Compiling digitally delivered transactions using ITS surveys

International Trade in Services (ITS) surveys provide perhaps the best existing survey vehicle to develop estimates of digitally delivered trade in services, although it is important to note that they will struggle to capture household-to-household transactions and, in particular, household-to-household transactions facilitated by digital intermediation platforms (see also Chapter 5).

Notwithstanding the challenges (see Recommendation 4.1) related to unincorporated enterprises (in the households sector), in the simplest case, ITS surveys could be enhanced with a supplemental question[4] that asks respondents to estimate the share of exported and imported[5] services (by product) that were delivered digitally.

Recommendation 4.1

Although trade by unincorporated enterprises represents a small share of overall trade in services, existing ITS surveys should review coverage and related grossing and stratification methods, in particular for digitally delivered services.

For obvious reasons, supplemental questions need only be asked for those products that **can be** delivered digitally, and, so, would not need to be added for many services transactions, such as transportation, water, gas, and electricity distribution.

Comparing products in ICT-enabled services and digitally delivered services

A starting point to consider the scope of products that could be digitally delivered is the work of the UNCTAD-led TGServ Task Group[6] who developed a list of *potentially* ICT enabled services, using the EBOPS 2010 classification (Table 4.1) and CPC Ver. 2.1 (Annex 4.A).

Table 4.1. Potentially ICT-enabled services

Title	SDMX DSD[7]	EBOPS 2010
Insurance and pension services	SF	6
Financial services	SG	7
Charges for the use of intellectual property n.i.e.	SH	8
Telecommunications, computer, and information services	SI	9
Research and development services	SJ1	10.1
Professional and management consulting services	SJ2	10.2
Architectural, engineering, scientific and other technical services	SJ31	10.3.1
Other business services n.i.e.	SJ35	10.3.5
Audio-visual and related services	SK1	11.1
Health services	SK21	11.2.1
Education services	SK22	11.2.2
Heritage and recreational services	SK23	11.2.3

Note: Items included under SDMX DSD (Statistical Data and Metadata eXchange Data Structure Definitions) refer to the codes used for EBOPS items (see also https://sdmx.org/?page_id=1747).

Not surprisingly, most of the services included in Table 4.1 can be seen to fall neatly into a similar category of *potentially* digitally delivered services. However, the arguments for the inclusion of some products require closer scrutiny.

Certainly, with regard to many of the services, it is clear that they can only (or at least in practice) be digitally delivered, for example, cloud services or on-line education and health services, where the absence of transmission (and delivery) via computer networks would virtually invalidate (large parts of) current international deliveries.

However, this is not, at least conceptually, the case for all of the services listed in Table 4.1, including, for example, international insurance services. While it is clear that digitalisation has provided significant scope for consumers to access insurance services, it is harder to argue that the underlying service is, in and of itself, digitally delivered. Although a strong case can be made that the transaction is nearly always supported by a digital ordering process, the underlying service that is being provided (essentially risk-management) is basically (but not entirely) unaffected by (and indeed not determined by) its ability or otherwise to be 'digitised'.

Indeed the flow of services accruing to consumers (at least those not making a claim) at any given point in time, in return for their payment of insurance premia would remain unaffected (in particular for life-insurance services) even if the underlying computer networks used to deliver information on their payments came crashing down .

In this sense it is clear that core insurance services are not in their purest sense 'digitally delivered'. That is not to say that none of the services received by consumers under the heading of 'insurance services' can be digitised. Consumers may, for example, be able to make claims via digital channels (computer networks), and these associated services are certainly in scope for digitally delivered services.

Similar arguments could be made with regards to many (probably the bulk of) international financial services[8], including: liquidity provision and transformation, risk management, underwriting, safekeeping,

record keeping and payment services. Like insurance services, some aspects of financial services can be (and are) digitised (for example on-line ability to access accounts, transfer money/pay bills etc., see also Section 4.6.) but the size of these are likely to be swamped by financial services that cannot be digitised (e.g. liquidity transformation); even if digitalisation has greatly improved the efficiency of these services.

That all being said it is clear that there is significant policy interest in including the total value of these services (and not just the 'pure' component that is digitally delivered) within a concept of digitally delivered[9], not least with respect to tax and trade policies (but also to maintain, and capitalise on, a close alignment with existing efforts on ICT-enabled services[10]), and, so, **this Handbook includes them as being in scope for digitally delivered trade and should reflect the full value of the digitally delivered service**[11].

One particular product[12] that is not included in the range of products included in *potentially* ICT-enabled services but that should be included within the scope for digitally delivered services pertains to intermediation services provided by DIPs, (recorded as exports by the platforms and imports by the producers using the platforms to export, including via Mode 2).

These services are (at least in theory) included in various parts of EBOPS: as trade related services[13] (10.3.4) and also partly under transport services[14] and financial services; the first two of which, as can be seen in Table 4.1, are excluded from the scope of ICT-enabled services.

Another service excluded from the UNCTAD definition of ICT-enabled trade (which primarily focuses on cross-border trade, i.e. Mode 1 delivery) concerns travel services, delivered by Mode 2, such as telecommunications services received abroad, explicit intermediation fees paid by residents abroad etc., which are included in the scope of international digitally delivered services.

Recommendation 4.2

The broad range of products included in digitally delivered trade follows that used in deriving potentially ICT-enabled services (see Table 4.1), with two exceptions. Digitally delivered trade should include estimates for intermediation services provided by DIPs and also any digitally delivered trade that is included in the EBOPS item for 'travel' (Mode 2 transactions).

In order to foster international comparability, and the possibility that countries may estimate digitally delivered services by applying specific (expert-judgement) shares to individual products (see Recommendation 4.6), or because countries may only include estimates for some EBOPS categories, estimates of digitally delivered trade should be made available at the product level shown in Table 4.1(including DIPs).

Ideally exports and imports of DIPs services should be shown as separate addenda items in current International Trade in Services (by EBOPS) statistics, as well as within specific product categories, depending on the nature of what is being intermediated, including 'transport' (EBOPS 3), 'financial services' (EBOPS 7), and trade-related services.

Further investigations are needed to determine where DIPs are recorded in practice, in particular for platforms organising accommodation services (see also Chapter 5).

Within the framework of the national accounts the current guidance is for DIPs intermediating goods to be classified as a sub-sector of the distribution sector and for DIPs intermediating services to be classified to the industry whose services they intermediate. In turn, and, by extension, intermediation services of DIPs should also be classified to the service being intermediated (and to distribution services in the case of goods).

To assist in the alignment of estimates of digitally delivered services provided by DIPs in the EBOPS system and the equivalent estimates required in national accounts supply and use tables, underlying information on DIPs intermediation services collected in ITS surveys should be made available to national accountants.

Recommendation 4.3

Compilers of international trade in services statistics by EBOPS category should insure that complementary information on DIPs is provided to national accountants compiling supply-use tables. This information should aggregate data based on the industry classifications of resident exporting DIPs and on the basis of products being intermediated for imports.

Recommendation 4.4

To assist in the development of exhaustive statistics for digitally delivered services additional questions are needed in ITS surveys on:

(a) Exports of DIPs intermediation services, broken down by type of service being intermediated; and

(b) Imports of intermediation services provided by DIPs, whereby respondents should be asked to provide an estimate of the commission they pay (which should be determined as the difference between the price paid by the final consumer and the basic price charged by the producer (respondent), after accounting for taxes and subsidies on products, see also Chapter 5).

There are currently very few examples of approaches based on ITS surveys to estimate digitally delivered trade (and indeed the closely related ICT-enabled services) but efforts are being accelerated, as shown below.

UNCTAD's model enterprise survey on ICT-enabled services

As part of its work to develop estimates of **actual**, as opposed to *potentially*, ICT-enabled services[15], UNCTAD developed a model enterprise survey (as well as training material) that focused on the export side (as it is easier to identify and survey the narrower population of services exporting firms than that of importing firms). The survey was piloted in 2017 in Costa Rica (see Box 4.1), India and Thailand[16].

The results demonstrated that, in practice, most *potentially* ICT-enabled services were actually ICT-enabled, or, equivalently, assuming that the majority of these services are delivered over 'computer networks' (and not for example by phone, fax or manual e-mails), most potentially digitally delivered services were **actually** digitally delivered.

In Costa Rica for example, the results[17] revealed that 97% of the exports of services that could be ICT-enabled were actually delivered over ICT networks (with a predominance of large foreign-owned enterprises, providing management, administration and back-office services). These services accounted for 38% of total services exports.

Similarly, for India, the results[18] showed that 81% of potentially ICT-enabled services were actually delivered over ICT networks. ICT-enabled services accounted for 57% of total services exports. Computer services were the biggest contributor, accounting for almost two-thirds of India's ICT-enabled services

exports. For services exporting SMEs, delivery over ICT networks constituted the predominant mode of supply (more than 99%).

Box 4.1. Measuring ICT-enabled services in Costa Rica

Costa Rica was among the first countries to leverage the assistance offered by UNCTAD to set up a data collection and compile statistics on services that were actually delivered remotely over ICT networks (i.e. ICT-enabled).

Using the classification system developed by UNCTAD (Table 4.1 and Annex 4.A), Costa Rica implemented a survey among 285 enterprises that were identified as potential exporters of ICT-enabled services in 2017. 185 responses were received, of which 117 responded that they exported services that were ICT-enabled.

The results were grossed up to the entire population of firms exporting these services (digitally or not), a total of 1196 firms, using selected economic variables of the Central Bank of Costa Rica (BCCR) and other administrative records, including enterprise size, different trading regimes (special regime or free trade zone and final regime), and industry.

The results show that 82% of firms sold cross-border ICT-enabled services, amounting to 97% of all potentially ICT enabled services, or 18% of total exports and 38% of total services exports. Over three-quarters of firms exporting ICT-enabled services were foreign owned, predominantly American or European.

Source: Central Bank of Costa Rica (BCCR).

Box 4.2. ICT and potentially ICT-enabled services in the United States

The BEA introduced statistics on trade in ICT and potentially ICT-enabled services as a supplement to its main presentation of trade in services statistics in 2016. Trade in ICT and potentially ICT-enabled services statistics are calculated as an aggregation of existing trade in services categories, so their compilation did not require BEA to make modifications to existing data collection instruments or methodologies. The statistics complement BEA's standard presentation of international trade in services statistics by providing insight into the extent to which ICT may be used to facilitate trade in services. BEA has received positive feedback from many data users regarding these statistics, which highlight the potential for digitally delivered trade in services.

Publication of ICT and potentially ICT-enabled services has also introduced challenges. The first concerns potential misinterpretation. Users often ignore the word "potentially" and mistake this for actual digitally enabled trade. BEA has used multiple approaches to address this, starting with adopting the full title, "potentially ICT-enabled services," rather than a shorter term. BEA also released a report describing how the statistics are compiled, and presents the trade in potentially ICT-enabled services total alongside its individual components to provide users better insight into what these statistics include.

The second major challenge is that because trade in ICT and potentially ICT-enabled services statistics are aggregations of published, and in some cases unpublished, statistics, their separate publication requires additional resources for disclosure analysis. To address this challenge the BEA prioritized the publication of statistics on standard categories of trade in services over the statistics on trade in ICT or potentially ICT-enabled services, which resulted in suppressions in some trade in ICT or potentially ICT-enabled services components.

Source: US BEA. For more information, see (Grimm, 2016[2]) and (Nicholson, 2016[3]).

ITS surveys linked to modes of supply

In practice[19], all digitally delivered **cross-border** services transactions are likely to be Mode 1 as defined in statistical terms, so supplementary questions in ITS surveys asking for the share of **cross-border** exports or imports that were digitally delivered also provide a (lower-bound) view of Mode 1 service delivery (for those same products). Likewise surveys of Mode 1 service delivery provide a view of **cross-border** digitally delivered trade (but not digitally delivered trade by Modes 2 or 4). Estimates of Mode 1 trade can be interpreted as an upper-bound estimate of Mode 1 digitally-delivered trade, **as Mode 1 service delivery is in principle broader than digitally delivered**, because it includes services delivered via post, phone and manually typed e-mails.

In large part in reflection of the broad equivalence (for those products that can be delivered digitally), the Office for National Statistics (ONS) of the United Kingdom and the United States Bureau of Economic Analysis (BEA) have begun to develop methods that provide estimates of digitally delivered trade based on the same survey responses that are used to capture estimates by modes of supply (Mann and Cheung, 2019[4]).

The starting point for the approach is similar but not exactly the same as that adopted in the UNCTAD model survey. Whereas the UNCTAD model-based survey directly targets *ICT-enabled services*, the target concept used by the ONS and BEA is *remotely delivered services*. This latter concept, targeting modes of supply, includes delivery of services by post as well as ICT-enabled services. However, in both countries the share of delivery of remotely delivered services using non-ICT means is considered to be marginal

and, so, *remotely delivered* provides a meaningful estimate of **cross-border** ICT-enabled and so, in turn a reasonable approximation of **cross-border** digitally delivered. Moreover, questions may not need to be asked for those products that are likely entirely delivered digitally such as certain charges for the use of intellectual property.

The approach adopted by the BEA (Box 4.3) predates that of the ONS (Box 4.4) who were able to capitalise on lessons learnt in the United States experience.

Box 4.3. Digitally delivered transactions using ITS surveys in the United States

BEA has recently taken steps to compile digitally delivered transactions using the ITS survey as an offshoot of an effort to measure services supplied by the four GATS modes of supply. BEA has expanded its Benchmark Survey of Transactions in Selected Services and Intellectual Property with Foreign Persons for 2017 to collect data on the share of trade in certain services delivered through Mode 1. Although Mode 1 is broader than digitally delivered services in that it includes supply by post, the value of services delivered by these means is considered negligible.

BEA considered and tested several versions of a question set before arriving at a final design. A first version collected information on Modes 1, 2, and 4, but feedback from respondents indicated that this approach would be excessively burdensome and impractical because most accounting systems do not track services by mode of supply.

A second version asked respondents to provide the predominant mode through which services are supplied. Feedback indicated that this would not be overly burdensome. However, BEA concluded that the information would be of limited use because BEA expected that companies would report that Mode 1 was predominant for most service types. Relying only on the knowledge that Mode 1 is the predominant mode and given that what was not supplied through Mode 1 could be supplied by Mode 2, Mode 4, or both, BEA would be left with a wide range of possible values for the percentage of that service that was supplied through Mode 1 (between 33 and 100 percent).

BEA settled on an approach that respondents indicated would not be too burdensome, yet might provide reliable measures. Under this approach, respondents simply report the share of certain services delivered by Mode 1 within percentage ranges. Mode 4 can then be measured as the residual of total trade for a given service type less Mode 1. Services delivered through Modes 2 and 3 would be measured using independent data sources available to BEA, most notably statistics for travel services statistics for Mode 2 and FATS collected by BEA for Mode 3. The approach incorporates an additional simplification that advises respondents that they can provide information from general knowledge of their company's operations rather than from their accounting systems. In contrast with the UK's approach described in Box 4.3 below, BEA asked for Mode 1 information only for those service types which it conjectured would not be supplied exclusively through Mode 1. This approach has the advantage of reducing reporting burden.

Table 4.2. Format of BEA's ITSS Questions to Collect Sales and Purchases of Services Remotely Performed

Transaction type (1)	Did you report exports/imports of this service? (Check yes or no)		For each "Yes" response, check the appropriate percentage range. (Check one)						This information provided is based on (Check one)	
	Yes	No	Less than 25%	25-49%	50-74%	75-89%	90-99%	100%	Accounting records	Recall/general knowledge of operations
…	…	…	…	…	…	…	…	…	…	…

Note: 1. This question applies to the following 13 transaction types, which are expected to have Mode 1 transactions, which may be digitally delivered: accounting, auditing, and bookkeeping services; advertising services; other computer services; education services; architectural services; engineering services; surveying, cartography, certification, and technical inspection services; legal services; market research services; public opinion and polling services; other management, consulting, and public relations services; provision of customized and non-customized research and development services; other research and development services.

The table below contrasts the share of certain services delivered by Mode 1 based on the results of the survey with the corresponding shares derived via the simplified allocation method outlined in chapter V of the MSITS and the associated MSITS 2010 Compilers Guide, (which involves allocating the services to modes based on assumptions of how services are most likely supplied).

Table 4.3. Mode 1 comparison between BEA's simplified approach and the US estimates from the International Trade in Services survey, percentage

	Exports		Imports	
	Simplified approach	Survey based	Simplified approach	Survey based
Accounting	75	51	75	66
Advertising, market research, public opinion	75	78	75	70
Computer	50	80	50	56
Architectural and engineering	50	61	50	53
Education	75	37	75	32
Legal	75	80	75	91
Management consulting	67	77	67	68
Research and development	75	59	75	81

Source: United States Bureau of Economic Analysis.
Note: For more information see (Mann and Cheung, 2019[4]).

Box 4.4. Digitally delivered transactions using ITS surveys in the United Kingdom

The approach adopted by the ONS was very similar to that adopted by the BEA except that it included a response category 'unknown' in addition to the 6 percentage ranges adopted by the BEA.

In the initial phase of the ONS' work, a sample of 100 businesses were selected to test the new survey questions in September 2018. The results indicated little change in the response rate among the pilot sample and most businesses were able to respond with the information needed. As a result, new questions were added to the 2018 annual ITS survey of 5,000 businesses known to engage in international trade in services.

An additional variation of the ONS approach (compared with the BEA approach) was the integration of data from the proportional allocation method developed by Eurostat (Annex 4.B). In addition, the ONS questionnaire did not restrict responses for Mode 1 trade to those products that could be remotely delivered, as described in Annex 4.A.

Of particular interest in this respect is the fact that respondents identified Mode 1 delivery in a number of products that are not recognised as Mode 1 in MSITS 2010 and in addition are not typically considered as being remotely delivered (and not considered in the UNCTAD or Eurostat templates, Annex 4.B and Annex 4.C, see also Table below). This suggests care is needed in designing the surveys and questions to respondents such that they align with the recommendations set out in MSITS 2010, see also below.

Table 4.4. Mode 1 comparison between Eurostat's simplified approach and the ONS estimates from the international trade in services survey, percentage

	Exports		Imports	
Service type	Eurostat	ITS survey	Eurostat	ITS survey
Manufacturing	0	49	0	37
Maintenance and repair	0	49	0	37
Transportation	65	65	80	80
Travel	0	0	0	0
Construction	0	47	0	23
Insurance and pension	100	84	100	71
Financial	100	89	100	79
Intellectual property	100	83	100	87
Telecommunications, computer and information services	87	85	89	85
Other business services	75	65	75	65
Personal, cultural and recreational	75	43	75	29
Government	75	75	75	75

Source: ONS.
https://www.ons.gov.uk/businessindustryandtrade/internationaltrade/articles/modesofsupplyukexperimentalestimates/2018

Perhaps the three most important lessons from the efforts of the United States and the United Kingdom were that:

- respondents had great difficulty in estimating actual estimates of trade by mode of supply;

- crude approaches that ask respondents to identify their main mode of supply should be avoided;
- some services (see Box 4.3) not covered in UNCTAD's list of potentially ICT-enabled services are digitally deliverable.

Instead, the approach (used by both the BEA and ONS) was to ask respondents (for those products that could be digitally delivered, or provided by Mode 1) to estimate the share of trade that was actually delivered via Mode 1 within certain ranges (see Box 4.2).

Estimates of the share of trade using other modes (for all products) was derived using information from other sources (e.g. international travel surveys) and through expert judgement, (e.g. using proportional allocation methods, such as those developed by Eurostat, see Annex 4.B).

Coverage of services categories in scope for digitally delivered services

The work of the ONS which resulted in a range of Mode 1 delivery of services beyond those products covered in UNCTAD's list of potentially digitally delivered services (Annex 4.A), points to care in constructing surveys around Mode 1 and concepts of 'remote delivery' and their interchangeability with 'digital delivery'. The ONS survey resulted in Mode 1 shares being allocated to manufacturing, maintenance and repair, and construction services (see Box 4.4) that are outside the range of products included within the scope of Mode 1 supply in MSITS 2010.

The question, therefore, is whether these products should also be considered as being in scope for measures of digitally delivered services.

It's important to note in this context that the driver for the ONS work was to estimate services trade by mode of supply (in particular Mode 1), using the concept of 'remotely delivered', which is broader than digitally delivered (as it includes delivery by post, for example).

Notwithstanding the fact that the allocation of these shares to Mode 1 is not in line with international standards, another question is whether these products should also be considered as being in scope for measures of digitally delivered services. It's important to note in this context that the ONS used the concept of 'remotely delivered', which is broader than digitally delivered (as it includes delivery by post, for example).

Notwithstanding these differences, there are also other differences that emerge that suggest care in translating 'remotely delivered' directly into 'digitally delivered'. In the ONS survey some construction services contracted out to a third party, were considered as being remotely delivered. This may have reflected specific aspects of construction services, for example, ancillary services such as technical specifications, monitoring, management, etc. that could be delivered remotely[20], and so in turn digitally delivered but equally it may have reflected the view of a principal party responding to the survey that its outsourcing of a contract to a third party was 'remotely delivered'; which should not be viewed as being equivalent to digitally delivered, as the digitisation of a contract underpinning a service should not be interpreted as meaning that the actual service itself – i.e. a construction of a building – has been digitised. It clearly has not and **neither should the transaction be viewed as Mode 1**.

Of course, a similar argument (i.e. that not all services contracted out and included as Mode 1 should be viewed as digitally delivered) could be made for other services that are contracted out, for example, where a principal located abroad contracts out (i.e. imports) computer services (e.g. troubleshooting) to a local computer services provider in the host economy, and re-exports those services back to the host economy. Similar examples could be made for many other services: solicitors, accountants, cleaners etc., but only those services (as distinct from contracts) that can be provided in a digitised form (e.g. a final report, new software code, etc.) should be included in scope for digital delivery.

As such, the Handbook recommends that the range of products that should be considered as being in scope for digitally delivered remains consistent with those identified in Annex 4.A (including with estimates

for DIP services) and in Recommendation 4.2. However, it also recommends further work in areas, such as maintenance and repair, as there is growing scope for many services to be delivered digitally.

Recommendation 4.5

Further investigations are needed to determine the range of digitally delivered services identified in Recommendation 4.2, in particular concerning maintenance and repair services.

Conclusions from adapting ITS surveys

The approaches used by UNCTAD, the BEA and the ONS appear promising, providing robust results that help fill information gaps, both for digitally delivered services and also Modes of Supply (in the case of the BEA/ONS efforts).

Recommendation 4.6

Existing ITS surveys should include questions:

- On the share of services trade (for each product that can be delivered digitally, see Annex 4.A) that is **actually** remotely (or digitally) delivered.
- To identify exports (of intermediation services) by DIPs (commissions/fees) by type of product (good or service) being intermediated.
- To identify imports of DIPs services by type of product being intermediated (recognising that implicit fees should only be accrued to the producer of the good/service being intermediated). A simplifying assumption could be that all intermediation commissions/fees paid (implicitly or otherwise) to non-resident DIPs are in respect of the main activity of the responding firm.

In addition, it would be useful to assess the importance of exports and imports by unincorporated enterprises, which are typically absent from the scope of ITS surveys, and in turn, to generate estimates of these sectors that could supplement ITS survey-based estimates, in particular for travel services digitally delivered.

Recommendation 4.7

Most products included in Table 4.1 and Annex 4.A are delivered internationally by Mode 1 supply. Unless there is evidence to the contrary, it can be assumed that all Mode 1 supply of products included in Box 4.1 and Annex 4.A are also digitally delivered.

Using this assumption, supplementary questions in ITS surveys can instead focus on measuring trade by mode of supply, asking firms for estimates of remotely delivered services (including DIPs services). Supplementary questions can be limited to providing estimates within certain percentage ranges (see Box 4.2) as developed by the BEA and the ONS.

It is important to ensure however that estimates of digitally delivered trade by unincorporated enterprises are either included in survey vehicles or estimated separately, as are estimates of digitally delivered trade via Modes 2 and 4.

Recommendation 4.8

Considering the impact on respondent burdens, countries should consider the possibility of also requesting breakdowns of digitally delivered services by whether they were ordered via a DIP, other digitally ordered, or not digitally ordered. However this should not be viewed as a top priority. It may be possible to develop estimates via ad-hoc surveys.

All existing efforts (UNCTAD/BEA/ONS) highlight that most transactions on the list of *potentially-ICT/actual-ICT/remotely* delivered services (see Annex 4.A) are in fact actually predominantly digitally delivered; upwards of 80% in most cases.

This suggests that total *potentially* digitally delivered services could be used as a meaningful (albeit upper bound) proxy of **actually** digitally delivered services (notwithstanding the results from the ONS work that suggest that the scope of potentially digitally delivered should be expanded nor the need to include intermediation services provided by DIPs).

Although estimates of potentially digitally delivered services can serve as a reasonable (upper-bound) proxy for actual digitally delivered services, (see also Box 4.4), the broad commonality across many of the existing initiatives, including in Eurostat's simplified approach for modes of supply, show **that, in the absence of actual data, estimates of actual digitally delivered services can be derived by applying expert judgement shares** – including based on other (similar) countries' experiences (by specific product) – to national estimates of trade in services.

However, this should only occur in cases where there is a sufficient degree of product detail, at a minimum, at the level of the main EBOPS 2010 categories. Further, the evidence suggests that it is not unreasonable to assume that any Mode 1 estimates for the category of potentially delivered services identified in Annex 4.A are, in fact, digitally delivered.

One important point to note, however, concerning both the UNCTAD model survey and those adopted by the BEA and ONS, relates to overall estimates of digitally delivered services and trade by Mode of Supply. By design, they focus only on firms included in ITS surveys, and so, without supplementary information, struggle to cover digitally delivered services to non-residents (via Mode 2); or, indeed, at all, in the case of

the UNCTAD approach, as the emphasis in both cases is pure cross-border (Mode 1) trade. This reinforces the need to use complementary sources, as is the case in the BEA/ONS approach.

In addition, and again because the focus is on firms, complementary sources are essential to capture households' direct imports of digitally delivered services (likely a large portion of *de minimis* trade). The same is also true for household exports of digitally delivered services, although this type of trade can be relatively small.

Recommendation 4.9

For countries not able to estimate **actual** digitally delivered services trade (Recommendation 4.2), a second best, but acceptable approach, is to derive estimates by applying expert judgement shares.

These shares can be based on anecdotal sources, including estimates observed in other (and similar) countries but they must be applied at a sufficiently detailed degree of product disaggregation, at a minimum, at the main EBOPS 2010 categories.

If shares are applied using breakdowns or estimates, anecdotal or otherwise, by mode of supply, it is not unreasonable to assume that Mode 1 estimates for the category of potentially digitally delivered services identified in Annex 4.A are in fact digitally delivered.

Particular care should be applied in using proxy approaches developed for Mode 1 trade to estimate digitally delivered travel services (by Mode 2).

4.3. Compiling digitally delivered transactions using ITRS data

For countries that rely heavily on the International Transaction Reporting System (ITRS)[21] in the collection of their trade in services statistics, these can also provide scope to estimate digitally delivered services, at least for large enterprises that are known to predominantly provide digitally delivered services, such as Facebook or Google.

The experience in Brazil (see Box 4.5) shows that this approach is feasible, and, in turn, can provide a mechanism to derive separate estimates of intra-firm digitally delivered trade (which may be helpful in determining whether current official trade statistics require adjustment, for example with respect to transactions in intellectual property products, see also Annex B).

Box 4.5. Digitally delivered services in Brazil

The Central Bank of Brazil (Banco Central do Brazil [BCB]) traces international trade in services flows using the International Transactions Reporting System (ITRS). The Brazilian ITRS was originally conceived within the framework of foreign capitals control system but as this no longer exists, BCB restructured the system with a focus on supporting (i) the compilation of external sector statistics and (ii) the assessment and supervision of the foreign exchange market. In this regard, the ITRS covers all foreign exchange settlements between residents and non-residents.

The Brazilian ITRS has more than 50 different codes to identify the different types of services transactions, allowing national compilers to allocate transactions in the balance of payments with a good level of detail. It is possible to automatically determine the economic sector of the parties involved, particularly of the resident, as every transaction is registered (i.e. no threshold is in place) and has a national fiscal registration number identifying the resident party. For the non-resident party the name is provided.

Regarding digitally delivered trade, BCB contacted several of the largest enterprises operating in Brazil to better understand their business models and decide on an appropriate allocation of the transactions observed in the Brazilian ITRS to digital trade categories.

Virtually all of the foreign multinationals operating in Brazil that deliver services digitally to residents **also have international transactions with their foreign parents** (which is the focus here for measurement of digitally delivered trade). For example, one large digital MNE has a Brazilian subsidiary that sells online advertising space to Brazilian customers. The subsidiary is physically present in Brazil and employs over 100 staff (software developers and sales assistants). It purchases online advertisement services from its parent and provides them to local customers in Brazil.

Source: Central Bank of Brazil.

Recommendation 4.10

ITRS can prove to be a useful source to identify digitally delivered services at the total economy level, but efforts should be made (by investigating individual and large companies) to derive **product** breakdowns from other sources, as this information is rarely available in ITRS. In addition, care should be taken to ensure that transactions intermediated by DIPs located abroad only reflect the value of the intermediation services and not the value of service being intermediated if the service is provided by one resident to another.

4.4. Compiling digitally delivered transactions using administrative tax data

VAT data

Many countries are beginning to introduce new tax measures that allow them to collect VAT on services digitally delivered into their country by foreign actors, which can provide a new source of data for digitally delivered trade (see Box 4.6).

Box 4.6. VAT data in Argentina

Information on digitally delivered services has recently been developed in Argentina by capitalising on new legislation (Law No. 27430/2017, Senado y Cámara de Diputados de la Nación Argentina, 2017) that obliges non-resident providers of digital services products to declare their revenues on services provided, on which 21% VAT is applied. Resident financial intermediaries that act as agents for non-resident services products providers are also asked to provide similar information and payments.

In many cases, the services provided were not purely related to digital services products per se (for example e-commerce transactions, accommodation intermediation, etc.) and so to avoid imposing VAT on transactions not covered by the new law, the fiscal authorities (AFIP: Administración Federal de Ingresos Publicos[22]) set a threshold of 10 USD, above which it was assumed that the transactions did not relate to digitally delivered services products.

Initial results using these data look promising. The first set of data collected information from 699 intermediaries and 956 non-resident providers.

However, disaggregation by product detail could not be identified, so, additional information was requested directly from the intermediaries. Broadly (but not always), a detailed concordance between firms and the services supplied was developed by assuming that the non-resident firms export products related to their main activity (based on specific information by the reporting firm, e.g. its name). A detailed concordance on how matching was made to EBOPS categories is shown below.

For computer services (9.2): a) companies that manufacture and distribute antivirus software, such as Symantec or Panda (9.2.1 computer programs); b) applications that allow the creation and design of web pages, such as WordPress (9.2.2 other computer services); c) companies that offer hosting of web pages (web hosting), servers or domain (for example, Bluehost), (9.2.2 other computer services); and d) platforms for downloads of videogames or other computer software (such as Sega or PlayStation Network) that are classified with code 9.2.1 computer programs.

For information services (9.3.2): a) web hosting services for information, images, video or other content that can be stored -cloud computing (such as Google Storage or ICloud); and b) subscription services to digitised versions of newspapers/magazines.

For Audio-visual and related services (11.1.1): streaming services, i.e. transmission or digital distribution of multimedia content through the Internet, (Spotify and Netflix).

For business and management consulting and public relations services (10.2.1.3): services of companies that provide consulting services through videoconferences or other digitised means (e.g. Neelus).

Remote education services (e.g. OpenEnglish) were assigned to **other personal, cultural and recreational services (11.2.2)**.

Intermediation platforms facilitating connection between bidders and demanders of different business services were imputed **to other business services n.i.o.p. (10.3.5)**, (e.g. Habitissimo). Employment services that may be free, but charge premium services (e.g. DGNet, LinkedIn), were assigned to **10.3.5.1**.

Companies such as Instagram, Facebook and Twitter were assigned to advertising services, **market research and public opinion surveys (10.2.2)**, reflecting their core revenue stream.

Services of messages, calls and video calls provided through IP by companies such as Skype or Viber were assigned to **telecommunications services (9.1)**.

Payments made to companies for a membership that grants privileges, benefits or rights, but not a specific service (like Amazon Prime) were allocated to **other personal services (11.2.4)**.

Although the main revenue streams are derived via advertising (from data), 'free' dating platforms such as (Tinder, Badoo), were classified to **other personal services (11.2.4)**.

For companies offering a range of products (e.g. Google Play, anecdotal evidence was used to provide a split between products, e.g. computer programs (9.2.1) for downloaded games and audio-visual and related services (11.1.1) for streaming etc. services.

Because of the nature of the digital services provided, and the method of payment (mainly through credit cards), it was assumed that the main resident sector involved was the household sector.

Two caveats are needed with this approach in relation to coverage. The first relates to intermediation services for platforms intermediating goods, whose commission, in theory, is captured in goods statistics (valued at C.I.F). The second concerns the use of the 10 USD threshold (although anecdotal evidence suggests that this is currently not a significant problem).

Table 4.5. Imports of digitally delivered services paid by households in the third quarter of 2018

Component	Amount US$
11.1.1 Audiovisual services	70,202,546
9.2.1 Computer services	23,157,717
9.3.2 Other information services	2,749,113
11.2.4 Other personal services	2,563,827
9.2.2 Other Computer services	1,187,867
10.3.5.1 Employment services	758,212
10.2.2 Advertising services	537,844
11.2.2 Education services	525,317
9.1 Telecommunication services	239,222
10.3.5 Other business services n.i.o.p.	95,491
TOTAL	102,017,159

Source: Digital services imports by the household sector in Argentina's balance of payments (Juaristi LLorens and Dal Bianco, 2019[5]).

Recommendation 4.11

Many countries are beginning to implement regimes to collect VAT data from non-resident digital services providers. This can be a very useful sources of information on household imports of digitally delivered sources, and area where current coverage may be weak (even if total estimates of household consumption may be robust).

Mini One Stop Shop (MOSS)

Within the European Union, changes in legislation were recently introduced on VAT for telecommunications, broadcasting and electronically delivered services. These changes aimed to ensure that local VAT rates were applied to all services that were delivered and that the VAT revenue goes to the country of the consumer. To implement this legislation, the Mini One Stop Shop (MOSS)[23] scheme was developed.

Via the MOSS portal, taxable persons (i.e. VAT-able, and predominantly enterprises) can report sales of the aforementioned services to non-taxable persons (predominantly consumers), in member states in which they do not have an establishment, to account for the VAT due on those supplies[24]. The data[25] and VAT is then distributed to the relevant tax authorities within the scheme via the MOSS network.

The MOSS scheme is optional for enterprises, but without the scheme, the supplier is required to register in each MS in which it supplies services to its customers, which is a strong incentive to use the scheme. Non-EU taxable persons can also register with the MOSS scheme, and are free to choose the EU Member State where it reports its information. When choosing to register in the scheme, activities in *all* EU Member States should be included.

Because of its focus on digitised services, data derived from MOSS has already been explored to measure digital trade transactions, for example in Hungary (Box 4.7) and Denmark (Box 4.8). Both experiences highlight several statistical challenges.

The first challenge is that there is no further division of the type of service delivered, other than that it must be either telecommunications, broadcasting or electronically delivered services. To address this issue, Statistics Denmark used the names and VAT numbers of the enterprises involved to clearly identify the enterprises involved, and subsequently **manually** classified the types of services provided by the 60 largest companies (by value), accounting for 90% of the total reported value of services in MOSS.

In some cases, a split was required, using expert judgement, as certain enterprises are known to provide multiple types of services. As part of the process, certain transactions were separately identified to avoid double counting (such as bookings via Airbnb, which are already included in Travel services in the Balance of Payments). One recommendation noted from this work, by Statistics Denmark, is the utility of having information on the NACE codes of enterprises in the European business register, which at the moment does not provide sufficient information to connect with MOSS data.

Coverage of firms can also be an issue. MOSS is a voluntary scheme, and enterprises are entirely free not to use it, and instead take on the additional costs of registering separately in each country in which they supply telecommunication, broadcasting and electronically delivered services. At present it is difficult to assess to what extent this may be the case. One complicating feature of these alternative arrangements relates to whether services provided by affiliates abroad should have a cross-border trade element (See also Annex 2).

A related issue concerns the coverage of institutional sectors. The consumer in the MOSS scheme may include public authorities as well as private individuals. The former may have already been included in international trade in services surveys, creating a risk of double counting (in the balance of payments). Since this is difficult to identify in MOSS, and since several services (gaming, dating, and most audiovisual services) are typically only provided to private individuals, it is currently assumed that most of the supply reported through the MOSS system is consumed by private persons. However, for certain services, such as anti-virus and cloud services, this assumption may have to be revisited in future work.

Even though enterprises are required to report on a quarterly basis, the availability of quarterly reports may fluctuate (e.g. enterprises may not trade during a particular quarter, or forego the quarterly report for other reasons). Taking advantage of the fact that MOSS contains information on registration and termination dates (providing a means to identify possible missing quarterly reports), Statistics Denmark investigated this possibility, for large firms (using minimum thresholds of 1 million and 5 million DKK – approximately 150.000 and 750.000 USD – in quarterly MOSS sales). They identified only 26 (with a threshold above 1 million DKK) and 12 (with a threshold above 5 million DKK) missing reports, which accounted for almost all of the values that were not reported. Since only a few enterprises were involved, it was feasible to determine for each company the reason for not reporting, (one important explanation being the establishment of a local subsidiary).

Box 4.7. The use of MOSS data in Hungary: first results

Exports

A first step in assessing the potential, and the scope, of MOSS data to deliver estimates on components of digitally delivered services trade (in the service categories covered by MOSS) included a comparison of export data for 9 enterprises identified in MOSS and ITSS. The results revealed a high degree of consistency between the two sources (although in one case, the results revealed a need to reclassify the EBOPS category recorded in ITSS).

The 9 enterprises accounted for 78% of total Hungarian exports included in MOSS. As a percent of their total services 49% percent of their exports of services to the EU were digitally delivered and 17% in total. However, some perspective is needed, as MOSS only covers specific digital services, and only specific digital services provided to non-taxable persons (mainly households) in the EU, the MOSS data accounted for only 0.03% of total Hungarian services exports.

Imports

MOSS can also be used to derive information on imports of digitally delivered services by households (which are not covered in ITSS sources). Results for 2017 revealed that MOSS data was around 40% of the value of comparable estimates of households' imports of digitally delivered services (partly reflecting the fact that MOSS remains optional for reporting enterprises). As a share of total services imports, MOSS data amounted to 0.73%.

Future plans

Identifying which non-resident enterprises provide services in Hungary is not yet possible in the MOSS dataset, as only MOSS identifiers, and not company names, are provided. But this is scheduled to change in the near future, which will enable HCSO to better assess import data and to estimate trade by country and region of origin. In addition, it is expected that the coverage of MOSS data will grow in the future.

Source: Hungarian Central Statistical Office (HSCO).

Box 4.8. The use of MOSS data in Denmark

In Denmark, as elsewhere, the supply of digital services provided directly to private consumers has increased greatly in recent years. Before MOSS data became available, Statistics Denmark estimated these services using a variety of sources, for five different categories, including streaming, apps, gambling, games and other services.

The introduction and use of MOSS data have resulted in not-insignificant revisions to earlier estimates (except for betting services, which are not covered in MOSS). For example, imports of computer services were revised upwards to 2.8 billion DKK from 0.4 billion, while imports of audio-visual services by private individuals have been revised down (likely reflecting the fact that consumers typically pay for these services through subscriptions with local intermediaries). In total MOSS data showed that imports by private individuals accounted for 6% of all imported computer services and almost 30% of audio-visual services.

Source: Statistics Denmark (Burman and Sølvsten Khalili, 2018[6]).

4.5. Compiling digitally delivered transactions with household surveys

As noted in Chapter 3, there is some concern that some expenditures made by households, in particular on digitally delivered services, may not be well captured in current trade statistics.

Although the use of supply-use tables in most countries will be able to cast light on whether this is occurring in the raw data, allowing corrective adjustments to be made in definitive trade statistics and the national accounts (by comparing supply and demand estimates of specific products), explicit questions in household surveys asking consumers to identify the share of expenditures in certain products that were digitally delivered will be able to reinforce this balancing process, even if only through the application of assumptions on the share of consumption that was imported. Such assumptions could be based on expert judgement or in combination with/complements to estimates drawn from other approaches, such as VAT or ITSS, or ITRS data, applied at product levels of detail. National experiences suggest that household surveys that target total consumption of digitally delivered services (international and domestic) are of acceptable quality (see Box 4.9).

Recommendation 4.8

Household surveys should include questions asking respondents to identify the share of expenditures on digitally delivered services by specific product, following at a minimum the COICOP classification but preferably CPC or equivalent.

Such information will be useful in apportioning shares to digitally delivered trade in particular in comparison with other, typically production based, sources that can help check the quality of consumption and production-based approaches.

COICOP: Classification of Individual Consumption According to Purpose

CPC: Central Product Classification

Box 4.9. Household surveys on the consumption of digitally delivered services

Recently, Statistics Canada released the results of a household survey on consumption of digitally delivered products. The Digital Economy Survey (DES) was a household survey targeting individuals aged 18 and older. It covered the use and purchase of various digital services products, such as music and video streaming services, e-books, mobile apps, and online gaming subscriptions. It examined ways of earning money through the digital economy—for instance, by selling new or used products through online bulletin boards or platforms. There were also questions about the type of payment methods used—for example, cash versus debit or credit card.

Sufficient samples were allocated to each of the provinces so that the survey could produce province-level estimates. An initial sample of 12,000 dwellings was selected. Due to difficulties identified during testing, respondents were not asked to break down their expenses between Canadian and international sellers. One option being explored is to determine the trade component as a residual after excluding sales from Canadian enterprises (after accounting for exports).

Source: Statistics Canada. The Digital Economy Survey: http://www23.statcan.gc.ca/imdb/p3Instr.pl?Function=assembleInstr&lang=en&Item_Id=794699, and results: https://www150.statcan.gc.ca/n1/daily-quotidien/180829/dq180829b-eng.htm

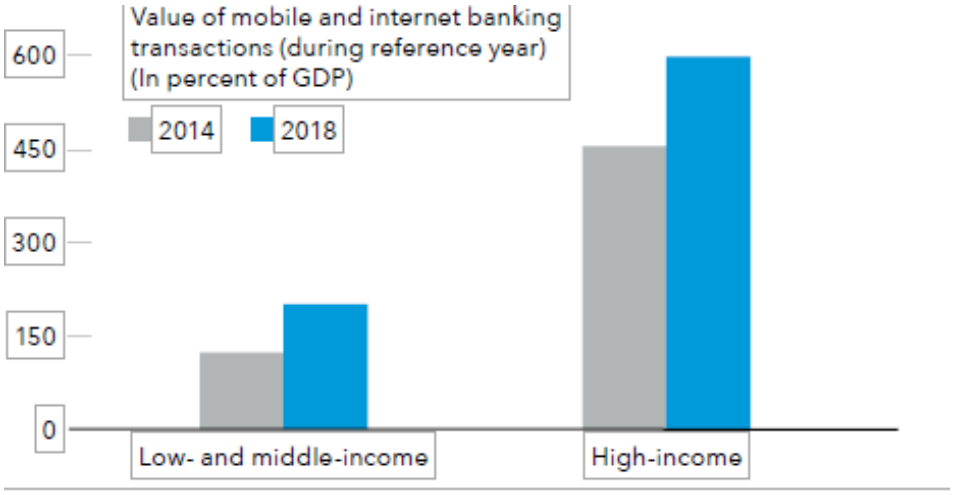
4.6. Digital financial services provided by non-bank entities

Rapid advances in digital technology and continuously evolving market dynamics are transforming the financial services landscape. New enterprises exploiting these technological innovations, “Fintechs” (financial technology firms) have emerged, bringing about new opportunities, but also challenges, to consumers, traditional financial services providers (banks), and regulators alike. Fintechs are non-bank institutions that use advanced technologies, such as big data and cloud-based technologies, to perform traditional banking activities repackaged in a new, often mobile-phone based format; they may also provide new types of services.

These services are often summarised under the name of mobile money, and can include funds transfers (remittances), payment, savings, credit, insurance, trade financing (including for small businesses) and other financial services. Examples of these new players are M-Pesa, MTN Mobile Money, Kopo, TransferWise, Azimo, Avuba, CurrencyFair, ClearXchange and Midpoint, and may also consist of partnerships between telecommunications firms and banks (see Box 4.10).

The IMF’s Financial Access Survey (FAS), the most comprehensive source of global supply-side data on financial inclusion, has been collecting country data on mobile money services since 2014. Survey results over recent years show that mobile money services are primarily found in low-income countries, especially in regions where the presence of traditional channels to access financial services, such as ATMs, still lag. However, in high-income countries, Internet banking is prevalent. Overall, mobile and internet banking services are growing rapidly, although at a different pace across economies (Figure 4.1).

Figure 4.1. Changing modes of accessing banking services: Mobile and Internet banking



Note: Weighted average by GDP, based on 32 countries for 2014 and 59 countries for 2018.
Source: FAS, World Development Indicators database, and IMF calculations.

The IMF has also engaged in a pilot project with African countries to produce economic indicators based on mobile money transfer data available from telecommunication companies and to develop a "tool-box" that can potentially be used by other countries with similar data infrastructure. B2C payments and receipts for goods and services are included among the derived economic indicators. East Africa continues to lead in terms of mobile money adoption and usage rates, and is the focus of the pilot project.

Box 4.10. Mobile money: how it works

Mobile money refers to a network that facilitates payments from one user to another, via a mobile device. It is a safe and easy-to-use electronic wallet service, which allows users to store, send and receive money using their mobile phone. Money is stored as credit on a smart card or in a system-provider's books, while continuing to use national currencies.

Users with a mobile money device and a registered SIM card can register a mobile money account with a secret pin code to/from which they can deposit, draw down, send or receive money. Deposits and withdrawals are facilitated by agents who provide virtual money in exchange for cash and cash in exchange for virtual money, for a fee. Sending and receiving of virtual money to and from registered parties is carried out through the mobile money platform by simply following a menu in the service provider's app, without requiring services of an agent. Unregistered users can also send and receive mobile money, however, only through agents since they do not have registered mobile money accounts.

Users can also make payments while abroad and pay for foreign goods and services. Transactions can be infrequent and small in value (more typical of households), as well as frequent and large (more typical of corporations). When making cross-border payments, different types of users place special emphasis on low-cost, security, convenience, predictability, and transparency - the assurance that intermediaries will preserve the confidentiality of information.

Source: (Egesa, 2017[7]).

Mobile money transactions are not confined to national borders. For example, non-residents may use the roaming network for transfers, similar to residents. Residents and non-residents may also each use the

mobile money services of their respective telecommunications services providers to arrange for such cross-border transactions. The telecommunications providers, in turn, typically use an integration technical partner to facilitate a seamless integration, which, amongst others, determines the exchange rates used for conversion, and validates in real time the destination of the mobile money system as well as the availability of funds on the recipient's online account.

Whether residents or non-residents use the same roaming network or different ones, funds are credited and debited to and from the respective mobile money accounts of the beneficiary and sender in the two countries where they are each resident, or through the accounts of designated agents in the two countries (if the beneficiary and/or sender do not have a registered mobile money account, see Box 4.10).

An important challenge for compilers is that these operations are usually packaged as a single product, although they cover distinct telecommunications, financial services, and (technical) intermediation services related to the deposit, withdrawal, transfer and foreign exchange conversions of money, to the transmission of short messages notifying senders and recipients of funds transferred and balances on their accounts, as well as fees for the agents that facilitate the exchange of cash for virtual (mobile) money and vice-versa.

In the case where a third party (integration technical partner) is involved, there are, in addition, revenue-sharing agreements between the integration technical partner, the mobile money agents handling the transactions, and the telecommunications companies that provide the mobile money services[26].

Table 4.6. Examples of mobile money transactions and their treatment in the balance of payments

Description of Mobile Money (MM) Transactions	Balance of payments transaction	
	Credit	Debit
Residents acquiring MM from a non-resident telecom company		Charges for the acquisition of MM
Non-residents acquiring MM from a resident telecom company	Charges for the acquisition of MM	
Residents sending MM to non-residents via a resident telecom company, *which may alternatively be using a non-resident integration technical partner*		Charges associated with MM transfer levied by the resident telecom company and shared with: -non-resident MM company; *-non-resident integration technical partner.*
Residents sending MM to non-residents via a resident telecom company, *which may alternatively be using a resident integration technical partner*		Charges associated with MM transfer levied by the resident telecom company and shared with the non-resident telecom company
Residents sending MM to non-residents via a non-resident telecom company		Full charges associated with MM transfer
Residents receiving MM from non-residents via a resident telecom company; *alternatively, a non-resident integration technical partner is used*	Revenues associated with MM transfers levied by the non-resident telecom company and shared with the resident telecom company	
Residents receiving MM from non-residents via a resident telecom company; *alternatively, a resident integration technical partner is used*	Revenues associated with MM transfers levied by the non-resident telecom company and shared with the resident telecom company and *resident integration technical partner*	
Residents using the MM received from non-residents (draw down; bill payment, etc.)		Charges for MM withdrawal/use
Non-residents using the MM received from non-residents (draw down; bill payment, etc.)	Charges for MM withdrawal/use	

Information on the overall size of the fees and commissions paid and received, as well as on how these are shared among the different commercial players involved in executing the international transaction, may not be readily available. In Uganda, one mobile money service provider indicated that around 60 percent of all revenues are paid out to mobile money agents, 5 percent to the integration technical partner and the remaining 35 percent is shared between the telecommunications companies, but it is unclear if this represents an (international) industry standard.

The example in Table 4.6 illustrates the potential transactions for an economy whose residents receive or send money abroad via mobile services, and their implications for recordings in the balance of payments.

Potential data sources for measuring cross-border digital financial services provided by non-bank entities

While data collection on the cross-border transactions involving mobile money is still in its infancy, a variety of potential data sources has been identified to support the compilation of statistics in those countries where these types of transactions are particularly important.

First, dedicated surveys of telecommunication companies that have developed and marketed mobile money can provide a key source of information, both for the gross flows involved, as well as for data on the payments (fees) made to the various intermediaries involved, including resident mobile money agents, non-resident integration partners, and the non-resident telecom partner.

Data on the revenue received from non-resident telecom companies arising from inward mobile money transfers from non-residents to residents can also be collected from these companies.

Another direct source of information are the resident integration technical partners. Given the limited set of questions, as well as the small number of telecommunications companies that are typically active in each (developing) country that offer such services, response burdens (at least in the context of the overall population of firms) do not seem onerous. Uganda, Jordan and the Philippines are currently conducting a pilot study to collect such information, see Box 4.11.

Instead of asking telecommunications companies to report the detailed figures, an alternative approach is to develop estimates derived from the total inflows and outflows of international mobile money transfers, by country and telecom partner, as reported by telecoms companies involved in cross border mobile money transfers to the telecommunications regulator (administrative source data).

Information on the country and telecoms partner are useful in applying the relevant tariffs for estimation purposes. As such, with data on mobile money tariffs of individual telecom companies, estimates of the outward transfer charges payable to the non-resident integration technical partners and the non-resident telecom companies (as well as the revenues receivable from non-resident telecom companies for inward transfers), could be developed.

For the exchange rate margins on the transactions received by the integration partner, estimates could be obtained using the information provided on the daily exchange rates used for conversion of mobile money transfers to different destinations together with information on the official mid-rate for the respective days and the amounts involved.

The margin payable would be the difference between the amount received in the domestic currency from the resident sender by the telecom company for outward transfer converted into the destination country's currency using the official mid-rate and the actual rate used by the telecom company.

A third option that could be explored is the ITRS, provided it is well developed to enable collection of such information.

For cases where international mobile money transfers are carried out directly using the roaming telephone facility, in a similar manner to domestic transfers, the potential source data are: (i) partner country data on

credits received by the counterparty telecom company for roaming charges and purchase of virtual money by non-residents; and, in their absence (ii) a survey among resident agents of non-resident telecom companies that provide international mobile money services, which can collect information on the transaction charges paid by residents for the acquisition of virtual money on a non-residents telecom company's mobile money platform, and the commission received by the resident agent from the non-resident telecom company.

The balance of payments debit would be the difference between charges less commissions received by the resident agents, noting however that the quality of the data will depend importantly on the design and stratification of the survey sample.

Box 4.11. Pilot study to collect data on mobile money transactions in Uganda (also used in Jordan and the Philippines)

In the course of 2018, a pilot study has been conducted in Uganda, Jordan and the Philippines to collect data from telecommunications companies on cross-border mobile money. The survey consisted of a single table, with several definitions:

Definitions

International mobile money transfers services cover services related to the transfer of funds from residents to non-residents or from non-residents to residents through mobile money platforms provided by telecom companies.

A mobile money agent is an agent of a telecom company providing a mobile money platform who is authorised to Register Mobile Money Customers, make deposits of virtual money into registered customers account and process cash withdrawals for registered and non-registered customers from customer's accounts that have virtual money.

An integration partner is the provider of the system that validates in real time the existence of the recipient customer on the destination mobile money system as well as the availability of sufficient funds on the merchants' online account of the telecom company sending the mobile money.

Table 4.7. Questionnaire – Uganda, Jordan and the Philippines

Payments and receipts for international mobile money transfer services (please report in Uganda Shillings).
Report for the quarter ending: _____

	Service	Amount (USHS)
A	Value of international transfers to non-residents	
B	Gross revenues from residents for international transfers to non-residents	
i	Payments out of gross revenues to resident mobile money agents	
ii	Payments out of gross revenues to non-resident integration partners	
iii	Payments out of gross revenues to non-resident telecom partners	
C	Value of international transfers from non-residents	
D	Gross revenues from non-resident telecom partners for international transfers to residents	

Source: OECD.

Annex 4.A. Potentially Delivered Services – Classification List EBOPS 2010 and CPC Ver 2.1

Annex Table 4.A.1. Potentially ICT-enabled services sub-groupings with the corresponding CPC Ver.2.1 products codes

1.1 ICT services - Telecommunications	
841	Telephony and other telecommunications services
842	Internet telecommunications services
84631	Broadcasting services
1.2 ICT services - Computer services (including computer software)	
8313	IT consulting and support services
8315	Hosting and IT infrastructure provisioning services
8316	IT infrastructure and network management services
8434	Software downloads
8713	Maintenance and repair services of computers and peripheral equipment
73311	Licensing services for the right to use computer software
83141	IT design and development services for applications
83142	IT design and development services for networks and systems
83143	Software originals
84391	On-line games
84392	On-line software
92919*	Other education and training services, n.e.c.
1.3 Sales and marketing services, not including trade and leasing services	
836	Advertising services and provision of advertising space or time
837	Market research and public opinion polling services
8596	Convention and trade show assistance and organization services
83812	Advertising and related photography services
1.4 Information services	
844	News agency services
845	Library and archive services
931	Human health services
961	Audiovisual and related services
8394	Original compilations of facts/information
8432	On-line audio content
8433	On-line video content
8461	Radio and television broadcast originals
84311	On-line books
84312	On-line newspapers and periodicals
84313	On-line directories and mailing lists
84393	On-line adult content
84394	Web search portal content
84399	Other on-line content n.e.c.
84632	Home programme distribution services, basic programming package
84633	Home programme distribution services, discretionary programming package

84634	Home programme distribution services, pay-per-view
96921	On-line gambling services
8399*	All other professional, technical and business services, n.e.c.
8462*	Radio and television channel programmes
1.5 Insurance and financial services	
712	Investment banking services
714	Reinsurance services
715	Services auxiliary to financial services other than to insurance and pensions
717	Services of holding financial assets
7119	Other financial services, except investment banking, insurance services and pension services
7132	Accident and health insurance services
7161	Insurance brokerage and agency services
7162	Insurance claims adjustment services
7163	Actuarial services
7164	Pension fund management services
7169	Other services auxiliary to insurance and pensions
71311	Life insurance services
71312	Individual pension services
71313	Group pension services
71331	Motor vehicle insurance services
71332	Marine, aviation, and other transport insurance services
71333	Freight insurance services
71334	Other property insurance services
71335	General liability insurance services
71337	Travel insurance services
7111*	Central Banking services
7112*	Deposit services
7113*	Credit-granting services
7114*	Financial leasing services
71336*	Credit and surety insurance services
71339*	Other non-life insurance services
1.6 Management, administration, and back office services	
821	Legal services
822	Accounting, auditing and bookkeeping services
823	Tax consultancy and preparation services
824	Insolvency and receivership services
851	Employment services
852	Investigation and security services
855	Travel arrangements, tour operator and related services
8311	Management consulting and management services
8312	Business consulting services
8319	Other management services, except construction project management services
8591	Credit reporting services
8592	Collection agency services
8593	Telephone-based support services
8594	Combined office administrative services
8595	Specialized office support services
8599	Other information and support services n.e.c.
1.7 Licensing services	
7333	Licensing services for the right to use R&D products
7335	Licensing services for the right to use mineral exploration and evaluation
7339	Licensing services for the right to use other intellectual property products

73312	Licensing services for the right to use databases
73340	Licensing services for the right to use trademarks and franchises
7332*	Licensing services for the right to use entertainment, literary or artistic originals
1.8 Engineering, related technical services and R&D	
811	Research and experimental development services in natural sciences and engineering
812	Research and experimental development services in social sciences and humanities
813	Interdisciplinary research and experimental development services
832	Architectural services, urban and land planning and landscape architectural services
833	Engineering services
891	Publishing, printing and reproduction services
8342	Surface surveying and map-making services
8343	Weather forecasting and meteorological services
8382	Photographic processing services
8392	Design originals
8393	Scientific and technical consulting services n.e.c.
8395	Translation and interpretation services
83815	Restoration and retouching services of photography
83819	Other photography services
83911	Interior design services
83912	Industrial design services
83919	Other specialty design services
814*	Research and development originals
8344*	Technical testing and analysis services
8399*	All other professional, technical and business services, n.e.c.
1.9 Education and training services	
921	Pre-primary education services
922	Primary education services
923	Secondary education services
924	Post-secondary non-tertiary education services
925	Tertiary education services
9292	Educational support services
92911	Cultural education services
92912	Sports and recreation education services
92919*	Other education and training services, n.e.c.

Source: (UNCTAD, 2015[1])

Annex 4.B. Eurostat's proposed concordance table for EBOPS and Modes of Supply

Annex Table 4.B.1. Proportional allocation of EBOPS categories to modes of supply

Level	BOP Item	BOP Sub-Item	BOP Item Name	Mode Type	Mode 1 (%)	Mode 2 (%)	Mode 4 (%)
1	S	S	Services				
2	SA	SA	Manufacturing services on physical inputs owned by others	2		100	
2	SB	SB	Maintenance and repair services n.i.e.	2; 4		90	10
2	SC	SC	Transport				
3	SC	SC1	Sea transport				
4	SC	SC11	Sea transport, passenger	1	100		
4	SC	SC12	Sea transport, freight	1	100		
4	SC	SC13	Sea transport, other	2		100	
3	SC	SC2	Air transport				
4	SC	SC21	Air transport, passenger	1	100		
4	SC	SC22	Air transport, freight	1	100		
4	SC	SC23	Air transport, other	2		100	
3	SC	SC3	Other modes of transport				
4	SC	SC31	Other modes of transport, passenger	1	100		
4	SC	SC32	Other modes of transport, freight	1	100		
4	SC	SC33	Other modes of transport, other	2		100	
4	SC	SC3E	Pipeline transport	1	100		
4	SC	SC3F	Electricity transmission	1	100		
4	SC	SC3G	Other supporting and auxiliary transport services	2		100	
3	SC	SC4	Postal and courier services	1	100		
2	SD	SD	Travel (59% of travel exp. and 75% of imp.)	2		100	
2	SE	SE	Construction (10% is included in Mode 3)	4	100		90
2	SF	SF	Insurance and pension services	1	100		
2	SG	SG	Financial services	1	100		
2	SH	SH	Charges for the use of intellectual property n.i.e	1	100		
2	SI	SI	Telecommunications, computer, and information services				
3	SI	SI1	Telecommunications services	1	100		
3	SI	SI2	Computer services	1; 4	75		25
3	SI	SI3	Information services	1	100		
2	SJ	SJ	Other business services				
3	SJ	SJ1	Research and development services	1; 4	75		25
3	SJ	SJ2	Professional and management consulting services	1; 4	75		25
3	SJ	SJ3	Technical, trade-related and other business services		75		
5	SJ	SJ311	Architectural services	1; 4	75		25
5	SJ	SJ312	Engineering services	1; 4	75		25
5	SJ	SJ313	Scientific and other technical services	1; 4	75		25
4	SJ	SJ32	Waste treatment and de-pollution, agricultural and mining services				
5	SJ	SJ321	Waste treatment and de-pollution	2; 4		75	25
5	SJ	SJ322	Services incidental to agriculture, forestry and fishing	4			100

Level	BOP Item	BOP Sub-Item	BOP Item Name	Mode Type	Mode 1 (%)	Mode 2 (%)	Mode 4 (%)
5	SJ	SJ323	Services incidental to mining, and oil and gas extraction	4	100		
4	SJ	SJ33	Operating leasing services	1	100		
4	SJ	SJ34	Trade-related services (part of distribution services)	1	75		25
4	SJ	SJ35	Other business services n.i.e.	1; 4	75		25
5	SJ	SJ35Z	Employment services i.e. search, placement and supply services of personnel	1; 4	75		25
2	SK	SK	Personal, cultural, and recreational services	1; 4	75		25
2	SL	SL	Government goods and services n.i.e. (not relevant for exp.)	1; 4	75		25

Source: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Proportional_allocation_of_EBOPS_categories_to_modes_of_supply_level.png

Annex 4.C. WTO's proposed concordance table for EBOPS and Modes of Supply (TISMOS)

Annex Table 4.C.1. EBOPS 2010 breakdown and default allocation by mode of supply

Indicator code	Item EBOPS 2010	M1	M2	M3	M4
1 SOXSW	*Services (including Distribution services)*				
2 ¦--SOX	*Commercial services*				
3 ¦ ¦---SA	*Manufacturing services on physical inputs owned by others*		100		
4 ¦ ¦---SB	*Maintenance and repair services not included elsewhere*		90		10
5 ¦ ¦---SC	*Transport*				
6 ¦ ¦ ¦--SC1	*Sea transport*				
7 ¦ ¦ ¦ ¦-----SC11	*Passenger (Sea)*	100			
8 ¦ ¦ ¦ ¦-----SC12	*Freight (Sea)*	100			
9 ¦ ¦ ¦ °-----SC13	*Other (Sea)*		100		
10 ¦ ¦ ¦--SC2	*Air transport*				
11 ¦ ¦ ¦ ¦-----SC21	*Passenger (Air)*	100			
12 ¦ ¦ ¦ ¦-----SC22	*Freight (Air)*	100			
13 ¦ ¦ ¦ °-----SC23	*Other (Air)*		100		
14 ¦ ¦ ¦--SC3	*Other transport*				
15 ¦ ¦ ¦ ¦-----SC31	*Passenger (Other)*	100			
16 ¦ ¦ ¦ ¦-----SC32	*Freight (Other)*	100			
17 ¦ ¦ ¦ °-----SC33	*Other (Other)*		100		
18 ¦ ¦ °--SC4	*Postal and courier services*	100			
19 ¦ ¦---SD	*Travel (excluding goods)*				
20 ¦ ¦ ¦--SDA	*Business travel*		100		
21 ¦ ¦ °--SDB	*Personal travel*				
22 ¦ ¦ ¦-----SDB1	*Health-related travel*		100		
23 ¦ ¦ ¦-----SDB2	*Education-related travel*		100		
24 ¦ ¦ °-----SDB3	*Other personal travel*		100		
25 ¦ ¦---SE	*Construction*				
26 ¦ ¦ ¦--SE1	*Construction abroad (exports)*			50	50
27 ¦ ¦ °--SE2	*Construction in the reporting economy (imports)*			50	50
28 ¦ ¦---SF	*Insurance and pension services*	100			
29 ¦ ¦---SG	*Financial services*	100			
30 ¦ ¦---SH	*Charges for the use of intellectual property n.i.e.*	100			
31 ¦ ¦---SI	*Telecommunications, computer, and information services*				
32 ¦ ¦ ¦--SI1	*Telecommunications services*	100			
33 ¦ ¦ ¦--SI2	*Computer services*	75			25
34 ¦ ¦ °--SI3	*Information services*	100			
35 ¦ ¦---SJ	*Other business services*				
36 ¦ ¦ ¦--SJ1	*Research and development services*	75			25
37 ¦ ¦ ¦--SJ2	*Professional and management consulting services*				
38 ¦ ¦ ¦ ¦-----SJ21	*Legal, accounting, management, consulting and public relations*	75			25
39 ¦ ¦ ¦ °-----SJ22	*Advertising, market research, public opinion polling*	75			25
40 ¦ ¦ °--SJ3	*Technical, trade-related, and other business services*				
41 ¦ ¦ ¦-----SJ31	*Architectural, engineering, scientific and other technical services*				
42 ¦ ¦ ¦ ¦-----SJ311	*Architectural services*	75			25
43 ¦ ¦ ¦ ¦-----SJ312	*Engineering services*	75			25

Indicator code	Item EBOPS 2010	M1	M2	M3	M4
44 ¦ ¦ ¦ ° -----SJ313	*Scientific and other technical services*	75			25
45 ¦ ¦ ¦-----SJ32	*Waste treatment and de-pollution, agricultural and mining services*		50		50
46 ¦ ¦ ¦-----SJ33	*Operating leasing services*	100			
47 ¦ ¦ ¦-----SJ34	*Trade-related services*	100			
48 ¦ ¦ ° -----SJ35	*Other business services n.i.e.*	75			25
49 ¦ °---SK	*Personal, cultural, and recreational services*				
50 ¦ ¦--SK1	*Audio-visual and related services*	70	10		20
51 ¦ °--SK2	*Other personal, cultural, and recreational services*				
52 ¦ ¦-----SK21	*Health services*	75			25
53 ¦ ¦-----SK22	*Education services*	75			25
54 ¦ ¦-----SK23	*Heritage and recreational services*	75			25
55 ¦ ° -----SK24	*Other personal services*	75			25
56 °------SW*	*Distribution services*	100			

Note: Distribution services (SW) is not an EBOPS 2010 standard item. It was added for the purpose of TISMOS.
Source: (Wettstein et al., 2019[8])

Annex 4.D. Crypto assets and Cryptocurrencies

Introduction

The introduction of Bitcoin in 2009 and its open-source protocol has precipitated a significant proliferation in cryptocurrencies as well as other types of crypto assets in recent years. However, guidance on how to record these crypto assets was not included in the current versions of the SNA and BPM.

In response, in 2018 the IMF[27] and the OECD[28] developed papers that were discussed at the meetings of the Advisory Expert Group (AEG) on National Accounts in 2018 and 2019, which has led to the interim guidance included in this Annex. As discussions evolve, this annex will be updated and upon a definitive decision being agreed on, guidance on crypto assets and cryptocurrencies will be incorporated into the main body of this Handbook.

General overview of crypto assets

Crypto currencies assets are a relatively recent phenomenon, developed mainly to serve as alternatives to traditional financial instruments. Their main characteristics are that they are exchanged via peer-to-peer architecture, which enables two parties to directly transact, without the need for trusted intermediaries, and that they rely on technologies, such as blockchain or decentralised ledgers, which store and transmit data in an encrypted form.

The OECD has proposed the following categorisation[29] of the various types of crypto assets:

- Crypto assets acting as a general means of payment: At present most cryptocurrencies do not satisfy this requirement but this may change over time.
    - with a corresponding liability: This includes any cryptocurrency issued by a monetary authority, as well as any that imply a claim on the issuer (or any third party).
        - issued by a monetary authority – *Currency (AF.21)*
        - not issued by a monetary authority – *Separate subcategory within Currency and deposits (AF.2)*
    - without a corresponding liability: This would include most of the well-known cryptocurrencies – *Separate subcategory within Currency and deposits (AF.2)*
- Payment tokens: This includes all crypto assets that only act as a medium of exchange within a platform or network.
    - with a corresponding liability: i.e. if they are convertible into a legal currency or another financial asset with the issuer – *Debt securities (AF.3)*
    - without a corresponding liability: These may for example be bought or obtained as a reward within the platform, acting as a means of payment within the platform, but not convertible into a legal currency or another financial asset – Provisional guidance for these crypto assets remains a work in progress, with two positions currently emerging *(a) they are not an asset and (b) they are Valuables (AN.13)*
- Security crypto assets: includes all crypto assets that provide a financial claim on the issuer.
    - Debt security crypto assets: include crypto assets that serve as evidence of debt – *Debt securities (AF.3)*

  - Equity crypto asset: include crypto assets that provide the holder with a residual claim on the assets of the institutional unit that issued the instrument – *Equity and investment fund shares (AF.5)*
  - Derivative crypto asset: include crypto assets that provide the holder with the right to buy (or sell) a particular financial (traditional or crypto) instrument or commodity at a predetermined price within a given time span or at a given date, or to settle a specific transaction at a specified date. It does not include derivatives that are derived on the basis of crypto assets, but are not themselves exchanged via peer-to-peer architecture based on cryptography – *Financial derivatives and employee stock options (AF.7)*
- Crypto assets acting as a store of value: includes all crypto assets whose main role, even if only in practice rather than design, is to act as a store of value.
  - with a corresponding liability: including many that are not yet regarded as a well-accepted as means of payment – *Debt securities (AF.3)*
  - Without a corresponding liability – *Valuables (AN.13)*

Implications for measuring digital trade

Because most forms of crypto assets are treated as financial assets, in most cases, transactions in the assets themselves have no impact on measures of digital trade. Indeed only those assets that arise from a process of production can be in scope. As noted above, the current emerging guidance (where the debate continues) restricts this to two types of crypto assets: *Payment tokens without a corresponding liability* and *Crypto assets acting as a store of value without a corresponding liability* (by definition all crypto assets with a corresponding liability are included as financial assets).

Given the on-going debate around the issue, the current guidance of this Handbook is that countries **should not include transactions in produced crypto assets within their measures of digital trade**. Those countries that are able to estimate them, should instead include them as a separate addendum item (not part of the previously presented template).

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Notes

[1] Although there are differences concerning the coverage of all services trade, namely with respect to those: provided by DIPs; and digitally delivered transactions via Mode 2 in EBOPS 2010 Travel services.

[2] Without prejudice to WTO discussions on whether digital deliveries should be treated as goods or as services.

[3] Many intra-firm international services transactions, for example, may not currently be recorded in international trade statistics as corresponding flows may instead be implicitly captured as primary income transactions. Although this is not uniquely a digital trade phenomenon, it is likely to have been exacerbated by digitalisation.

[4] For comprehensiveness, and in particular for those countries not able to derive separate estimates of international digitally ordered digitally delivered services in totals for digitally ordered trade, additional questions could ask for further disaggregation into: digitally delivered services, digitally ordered via DIPs; digitally delivered services digitally ordered but not via DIPs; and other digitally delivered services.

[5] As was the case for digitally ordered trade, many firms will struggle to definitively know if the transaction was international or not. Whilst this is also true for international trade in services surveys, the challenge for the firm is to identify the share of the trade that they have already identified as international (and included in official trade statistics) that is digitally delivered.

[6] See (UNCTAD, 2015[1]). This work was also presented to the UN Statistical Commission in the reports of the TGServ, E/CN.3/2016/13, http://unstats.un.org/unsd/statcom/47th-session/documents/2016-13-Partnership-on-measuring-ICT-for-development-E.pdf and the TFITS (E/CN.3/2016/24, http://unstats.un.org/unsd/statcom/47th-session/documents/2016-24-Interagency-TF-on-international-trade-statistics-E.pdf).

[7] Statistical Data and Metadata eXchange, Data Structure Definition. See https://sdmx.org/.

[8] And similar arguments could also be made for gambling services, which share many characteristics with insurance services. However, a strong case can be made for the inclusion of many gambling services within digitally delivered services, particularly those gambling services that provide for on-line platforms to 'play' against other gamblers, (e.g. on line roulette, poker etc.).

[9] Indeed similar practical, and user-driven, considerations where at the fore in considering the scope of ICT-enabled services.

[10] Although the most recent efforts on ICT-enabled services surveys have dropped financial and insurance services from the collection exercise.

[11] In practice, this may make little material difference to overall measures of total digital trade as (and increasingly) much of the share of international trade insurance and financial services that are digitally delivered is also likely to be digitally ordered.

[12] Another potential product concerns cryptocurrencies but for now this Handbook excludes them from the category of digitally delivered trade.

[13] *Trade-related* services relate to the distribution services of goods and services, and includes the commissions on goods and services transactions payable to merchants, commodity brokers, dealers, etc., **who do not own** the goods that they buy and sell (included in trade-related services), as well as the traders' margins.

[14] Agency commissions for transport services are included under transport in EBOPS, (see paragraph 3.250 of MSITS 2010).

[15] In practice the surveys only estimated Mode 1 (cross-border) ICT-enabled services.

[16] For Thailand the survey was restricted to the telecommunications sector. For more information see: http://unctad.org/en/pages/MeetingDetails.aspx?meetingid=1412.

[17] Costa Rica: Exports of Services Over Information and Communication Technology Networks (ICT), Rigoberto Torres Mora, Chief, International Accounts, Macroeconomic Statistics Department, Central Bank of Costa Rica, 16 April 2018, http://unctad.org/meetings/en/Presentation/dtl_eWeek2018p03_RigobertoTorresMora_en.pdf .

[18] Compilation of Statistics of ICT-enabled services: Experiences from a survey, Amitava Saha, Director in-charge, Services Trade Statistics Division, Directorate General of Commercial Intelligence and Statistics, Ministry of Commerce and Industry, India, 16 April 2018, http://unctad.org/meetings/en/Presentation/dtl_eWeek2018p04_AmitavaSaha_en.pdf.

[19] (UN DESA, 2017[9]).

[20] Arguably these services should be allocated to different EBOPS items and not included under construction services, which MSITS 2010 recommends only as being provided by Modes 3 and 4.

[21] The ITRS is a system of collecting data of individual international settlements and/or transactions as reported by banks, enterprises and/or households. It is important to flag that ITRS does have drawbacks for measuring international trade in services, as described in MSITS 2010 and the associated Compilation Guide. These include: higher potential for misclassifications, as banks classify transactions on behalf of the reporters; transactions are recorded when payments are made and not necessarily at the time of output and consumption; and the counterpart country responsible for the payment may not correspond to the partner country from or to which the service is delivered. However, these can at least partially be mitigated, as described in the example by Brazil, e.g. via stringent quality checks, and by ensuring that the reporters in financial institutions are well-trained. In addition, supplemental information may be included without increasing the burden on respondents. In addition, when reporting thresholds are absent or low as if often the case, data coverage may be higher in the ITRS than in ITSS.

[22] http://servicios.infoleg.gob.ar/infolegInternet/anexos/310000-314999/310227/norma.htm.

[23] https://ec.europa.eu/taxation_customs/business/vat/telecommunications-broadcasting-electronic-services/

[24] It is important to note that, where a taxable person has a fixed establishment in a EU Member State, supplies of telecommunication, broadcasting and electronic services to non-taxable persons in that Member State are declared through the domestic tax authorities and not through the MOSS scheme.

[25] Data distributed to the MOSS network contains quarterly information on VAT payments by enterprise and the VAT rate applied. The identification country, VAT-number, registration date and address for the enterprise are also included, as is the country of origin of any non-EU businesses that use the scheme.

[26] Note that the commercial bank which provides the account where the actual float is maintained typically does not receive any share from the revenues arising out of the transaction fees.

[27] https://unstats.un.org/unsd/nationalaccount/aeg/2018/M12_3e_Cryptocurrencies_IMF.pdf and https://www.imf.org/external/pubs/ft/bop/2019/pdf/Clarification0422.pdf

[28] https://unstats.un.org/unsd/nationalaccount/aeg/2018/M12_3e_Cryptocurrencies_OECD.pdf

[29] Which differs slightly from the IMF 2019 proposal.

5. Digital intermediation platforms

Because of (a) their importance, (b) the scope for targeted measurement of DIPs, and (c) particular accounting challenges, the Handbook includes a separate chapter on DIPs. It differentiates between DIPs that generate revenues through, (i) intermediation fees (whether paid explicitly or not), and (ii) advertising and/or data streams, providing detailed guidance on the former, defined as: online interfaces that facilitate, for a fee, the direct interaction between multiple buyers and multiple sellers, without the platform taking economic ownership of the goods or services that are being sold (intermediated). Although currently limited, the Chapter provides examples of existing initiatives, surveys and big data sources used to measure DIPs transactions.

5.1. Introduction

Chapter 2 defines fee-based Digital Intermediation Platforms (DIPs), and the services they provide, respectively, as the following:

> *Online interfaces that facilitate, for a fee, the direct interaction between multiple buyers and multiple sellers, without the intermediation platform taking economic ownership of the goods or rendering of services that are being sold (intermediated).*
>
> *Online, fee-based, intermediation services enabling transactions between multiple buyers and multiple sellers, without the intermediation platform taking economic ownership of the goods or rendering services that are being sold (intermediated).*

As shown in Figure 2.1 however, the scope of digital intermediation platforms includes non-monetary transactions. Digital intermediation platforms **not charging a fee** are defined as:

> *Platforms providing digital services to multiple end-users that are financed through advertising and/or data revenues, paid by units seeking to sell goods and services to end-users, rather than charging end-users explicit fees for the digital services that they receive.*

The OECD Advisory Group on Measuring GDP in a Digitalised Economy, defines this category of firms as a subset of the category '*Data and Advertising Driven Digital Platforms* (DADDPs)'.

This chapter will focus only on fee-based DIPs. DIPs **not charging a fee,** which involve non-monetary transactions, are out of scope for the current measure of digital trade but they will be considered in the broader range of measures complementary to digital trade discussed in forthcoming versions of this Handbook.

Although most transactions intermediated by DIPs charging a fee (and, so, included in conventional trade statistics) are covered by digitally ordered and/or digitally delivered, DIPs are separately identified in the conceptual framework (Figure 2.1) and reporting template (Table 2.1) for three important reasons.

Policy: DIPs are key drivers in the digital transformation, in particular through their intermediation of peer-to-peer transactions in the sharing/gig economy but also as providers of 'free' data and advertising driven business models providing services to households (referred to as DADDPs in the remainder of this chapter). In addition, both DIPs charging a fee and DADDPs, have transformed the ability of producers (in particular SMEs) to access the global marketplace.

Concepts: As demonstrated in Section 5.2, DIPs also raise conceptual challenges. Non-resident DIPs may facilitate an exchange between two residents for example, but the value of the international service should only reflect the intermediation service provided by the DIP, (see the gross versus net discussion in Figures 5.1 and 5.2 below).

Measurement: Exacerbating the conceptual challenges is the fact that, in practice, DIPs are difficult to identify and, even if they can be identified as being present in the country, it is not always clear if the intermediation service is provided by the resident entity.

Like all of the areas in this Handbook, guidance and investigations are very much at an exploratory phase. The extent of guidance in this chapter is therefore, currently, limited. This in part also reflects an attempt to avoid repetition in this Handbook. Chapters 3 and 4 contain a number of recommendations related to DIPs. Readers should refer to the relevant Chapters for those discussions and recommendations.

5.2. Accounting principles for DIPs

There are two key accounting issues that concern the recording of transactions intermediated by DIPs.

The first concerns the value of flows that should be recorded when a DIP located abroad intermediates between two resident parties (i.e. not in the same economy as the DIP).

- The related transactions in this scenario could be recorded in one of two possible ways. The first is to record a domestic transaction between the two resident actors with corresponding intermediation fees paid by both or one of the parties to the foreign platform: (the 'net' approach). The second is to 'follow the money' (the 'gross' approach) and record an import from the foreign platform by the end-consumer and an export from the producer to the foreign platform.
- Under a 'gross' approach the end-consumer would have imported the full value of the good or service being intermediated, including any intermediation fees paid to the DIP, whilst the producer would have exported the full value of the product being intermediated and imported intermediation services. Under a 'net' approach only the value of the intermediation services is included as international trade. For digital intermediation platforms facilitating exchanges in goods, a strong argument can be made that the intermediary is never the owner of the goods and so the only international transactions that should be recorded are those relating to the intermediation fee. Indeed **this is the agreement and approach advocated and recommended in this Handbook**.
- For digital intermediation platforms facilitating exchanges in services, it follows that the same rules should apply. It is important to note that this treatment differs from the recommendations given in BPM6 and the Manual on Statistics of International Trade in Services (2010) for subcontracting, which recommends that the flows are recorded on a gross basis, on the grounds that the arranger (of the subcontracted service) buys and sells the services. A similar argument could be made for digital intermediation platforms, but the argument made in this Handbook is that subcontracted services involve a higher degree of engagement on the part of the intermediary than (typically completely automated) digital intermediation platforms.

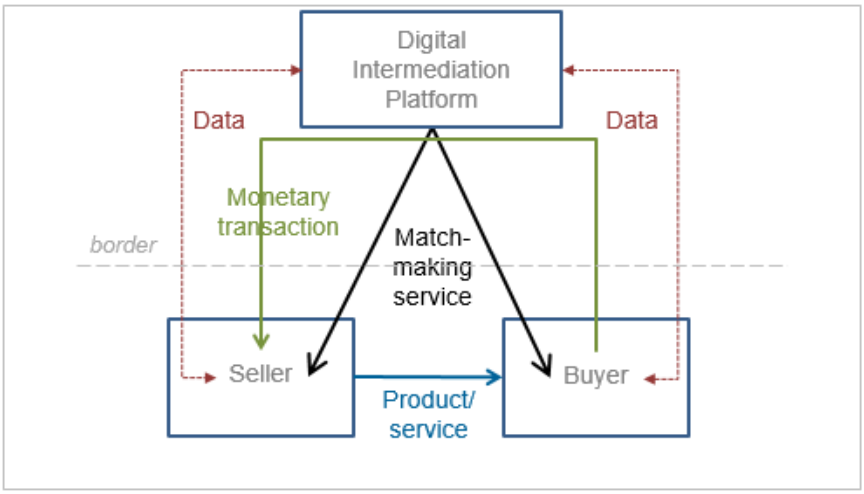
A second, related, complication arises concerning the recording of flows under the 'net' approach, when the payments for the intermediation services are implicit.

- Where these charges are explicit, then they should be recorded as being paid by one or both of the resident producer and consumer depending on who paid the explicit fees. However, any implicit charges incurred by the consumer (and often these are made clear in the contract of intermediation) can create significant compilation difficulties for the national accounts.
- Household-based surveys are only likely to record the actual price paid by the final consumer, reflecting any intermediation fees, whereas business surveys may only record, as output, the price paid by the consumer (excluding any taxes incurred by the consumer) before the inclusion of (implicit) intermediation fees incurred by the consumer, creating a disconnect between the 'output' price and the 'purchaser' price (i.e. the value of intermediation services received directly the consumer). For transactions 'intermediated' by conventional intermediaries (such as supermarkets) the accounts reconcile this difference through the addition of distribution margins. But DIPs services are not (at least for now) treated in the same way.
- Two possible options exist to square this circle. The first is to record a separate payment to the platform by the end-consumer. Although intuitively appealing, with a supply-use framework, this would mean that the payment by the end-consumer was for a product classified to the product being intermediated, whether this was a good or service (and not as a payment for an identifiable intermediation service). The second is to reroute the implicit flows, such that the end-consumer pays only to the producer of the goods or services being intermediated, with the producer assumed to pay all of the intermediation services. Partly because of the difficulty involved in estimating the implicit value of the intermediation service

(especially in household surveys), in addition to the counter-intuitive recording of the transactions in a supply-use framework (as described above), the approach advocated by the OECD Advisory Group on Measuring GDP in a Digitalised Economy is to adopt the second approach: i.e. to record output of the producer as being equivalent to the purchaser's price (excluding any taxes incurred by the consumer), with all of the implicit intermediation fees incurred by the producer.

To illustrate the complexities involved in recording flows by DIPs, Figure 5.1 describes an example of a DIP transaction, such as Uber. In the "physical world," a taxi would have to pass in front of a customer who would pay for the journey in cash or by card. However, the Uber App adds a new tradable digital service that enables the transaction by matching the car driver and the customer and manages the payment. The transaction between the driver (seller) and the rider (buyer) takes place in a particular country but the supporting transactions, that include the provision of the matching services, payments and insurance coverage, are potentially provided from another country. Furthermore, in the case of tourists, the consumer will not be a resident of the same country as the driver, adding another layer of complexity.

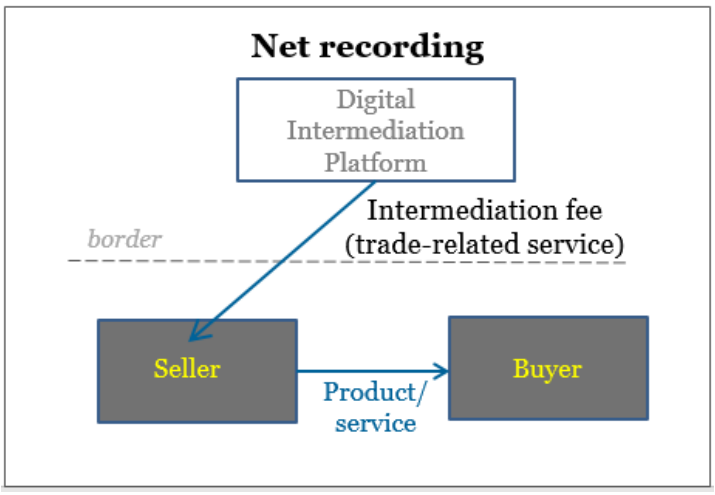
Figure 5.1. Example of transactions via digital intermediation platforms: unpacking a DIP transaction



Following the flows in Figure 5.1 and the 'ownership' principle that underpins the accounting frameworks, the only transaction that should be recorded in international trade statistics would be the cross border provision of intermediation services to both the seller and the buyer, in line with the intermediation fees charged (and it is assumed for simplicity here that the fees are explicitly paid by both the buyer and the seller).

This 'net recording' of the associated transactions is illustrated in Figure 5.2. Such a net recording is preferred because it avoids creating significant inflationary distortions to trade statistics and because it treats digital intermediation platforms facilitating exchanges of goods and those facilitating exchanges in services consistently.

Figure 5.2. Proposed net recording of trade transactions related to digital intermediation platforms



Note: Where the intermediation fees are implicit the current guidance recommends attributing the flows of intermediation services (the difference between what the Buyer pays and what the Seller ultimately receives after accounting for intermediation fees) to the Buyer only (as in the example above). However, where the flows are explicit, the recommended recording is for the explicit flows to be recorded for both the Seller and Buyer to the DIP for intermediation services.

As the example above illustrates, the residency of the buyer, seller, and digital intermediation platform needs to be carefully considered in the recording of the associated trade flows. For example, the goods or services produced by residents may be intermediated via a non-resident digital intermediation platform, or via a domestic (resident) digital intermediation platform. At the same time, the goods or services purchased by a resident from resident sellers – traditionally not considered an international trade transaction – may be facilitated by a non-resident digital intermediation platform[1].

Table 5.1. Recording of trade transactions involving digital intermediation platforms

Seller	DIP	Buyer	Treatment of transacted product	Treatment of Intermediation services
If the seller pays the intermediation fee OR if no explicit intermediation fee is charged to the final consumer				
Ctry A	Ctry A	Ctry B	Import by country B from country A	None (domestic transaction)
Ctry A	Ctry B	Ctry B	Import by country B from country A	Import by country A from country B
Ctry A	Ctry B	Ctry A	None (domestic transaction)	Import by country A from country B
Ctry A	Ctry B	Ctry C	Import by country C from country A	Import by country A from country B
If the buyer pays an explicit intermediation fee				
Ctry A	Ctry A	Ctry B	Import by country B from country A	Import by country B from country A
Ctry A	Ctry B	Ctry B	Import by country B from country A	None (domestic transaction)
Ctry A	Ctry B	Ctry A	None (domestic transaction)	Import by country A from country B
Ctry A	Ctry B	Ctry C	Import by country C from country A	Import by country C from country B
If both the seller and the buyer pay an explicit intermediation fee				
Ctry A	Ctry A	Ctry B	Import by country B from country A	Import by country B (of *part* of the intermediation services) from country A (the remainder of the intermediation services reflect a domestic transaction)
Ctry A	Ctry B	Ctry B	Import by country B from country A	Import by country A (of *part* of the intermediation services) from country B (the remainder of the intermediation services reflect a domestic transaction)
Ctry A	Ctry B	Ctry A	None (domestic transaction)	Import by country A from country B
Ctry A	Ctry B	Ctry C	Import by country C from country A	Import by country C (of *part* of the intermediation services) from country B and import by country A (of the remainder of the intermediation services) from country B

To illustrate the proposed net recording of these trade flows involving different countries of residency, Table 5.1 provides an overview of all possible combinations.

This is not however the only complication presented by DIPs. There are also challenges concerning their industry of classification and, indeed, as a consequence[2], the product classification of the intermediation service product they provide. In a nutshell, the question is, should DIPs be classified to the industry in which they intermediate, or should they be classified to a more generic industry providing digital intermediation services?

This remains a matter of deliberation. However, the UN Expert Group on Industrial Classifications, provided provisional guidance (from its September 2017 meeting) concerning the treatment of platforms such as Airbnb where there was support for the idea that these platforms should be classified to ISIC sector 7990 "Other reservation services and related activities", recognising the parallels with other non-digital matching services such as high-street travel agencies. By extension therefore, their (current) recommendation implies that DIPs that intermediate services transactions should be classified to the product in which they intermediate that generates the most revenue (and, in turn, their output should be considered to be output of the related product). DIPs intermediating transactions in goods would necessarily be classified to the wholesale and retail sector (under ISIC 4791 *"*Retail sale via mail order houses or via Internet*"*).

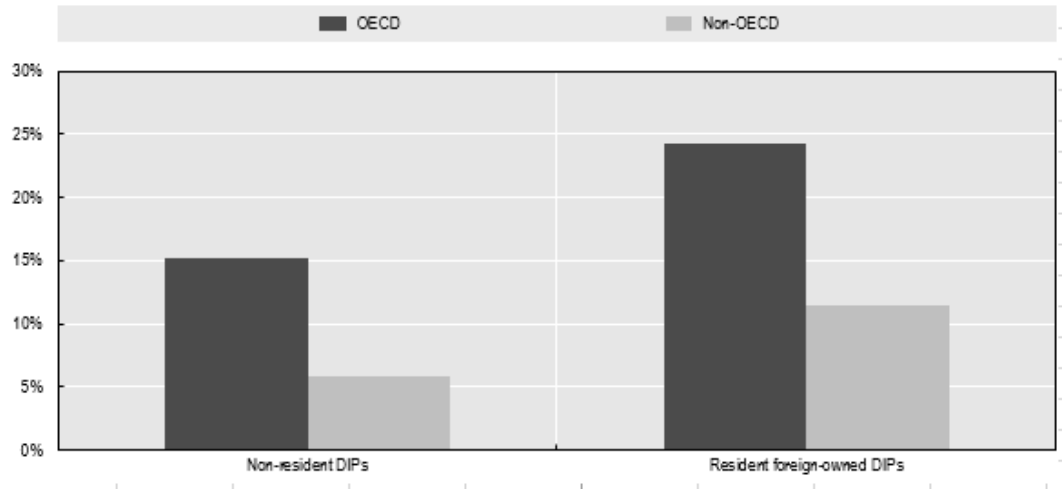
It is useful in this context to note this guidance is broadly (at least with respect to the idea that the platform is classified to the activity being intermediated) in line with recent court rulings. For example, in a recent case heard by the European Court of Justice (December 2017), the Court ruled that Uber was a transport company (which are excluded from EU rules permitting freedom to provide services) and not (as argued by Uber) in the business of providing computer services, which are governed by the directive on services in the EU internal market.

Although statistical standards do not have to follow these rulings, the point well illustrates the nature of challenges for measurement, but also for trade policy, as commitments under GATS may differ by the type of service concerned. Also, whether the driver is considered an employee of Uber – a question all the more relevant as several legal cases have ruled that they should be considered as such – has potential implications for the classification of the service by GATS mode of supply (e.g. Mode 3 versus Mode 1).

5.3. Identifying digital intermediation platforms

At present, very few countries are able to identify DIPs (either domestic or foreign-owned) in their economy, and even fewer are able to identify payments to non-resident DIPs (Figure 5.3). Digital intermediaries *should* be in the business register (often included under various industry headings), but formal identification remains difficult in the absence of a dedicated industry classification to which these enterprises should be assigned.

Figure 5.3. Percentage of respondents that can identify:



Source: (OECD, 2018[1]).

Efforts are being developed in this area, however, notably within the framework of the OECD's Advisory Group on Measuring the Impact of Digitalisation on GDP, and their Digital Supply-Use tables. These include a specific aggregation of firms under the category of *fee-based DIPs* (see also Annex A) and breakdowns of key transactions in products that are intermediated via platforms.

The current guidance in this respect includes platforms intermediating the sale of *goods* under ISIC 4791, preferably with a new sub-code that allows them to be separately identified as DIPs as opposed to e-vendors. For platforms intermediating services, the guidance is to record the platforms under the service they intermediate. That being said, practical guidance on identifying the DIPs remains a work in progress.

Many countries responding to the OECD-IMF Stocktaking Survey reported that manual identification of the largest DIPs, for example, based on business name, could generate meaningful results. A recent EC study using such an approach identified nearly 500 peer-to-peer digital intermediation platforms active in Europe (2016), but noted that only 4% of these (i.e. fewer than 20) are very large with over 100,000 unique daily visitors[3].

One approach (Box 5.1) adopted by Statistics Netherlands used web scraping in combination with data from commercial providers, that linked information on Dutch websites (e.g. websites with a presence of shopping carts and/or certain *calls to action*[4]) with the statistical business register.

Box 5.1. Using big data to identify DIPs in the Netherlands

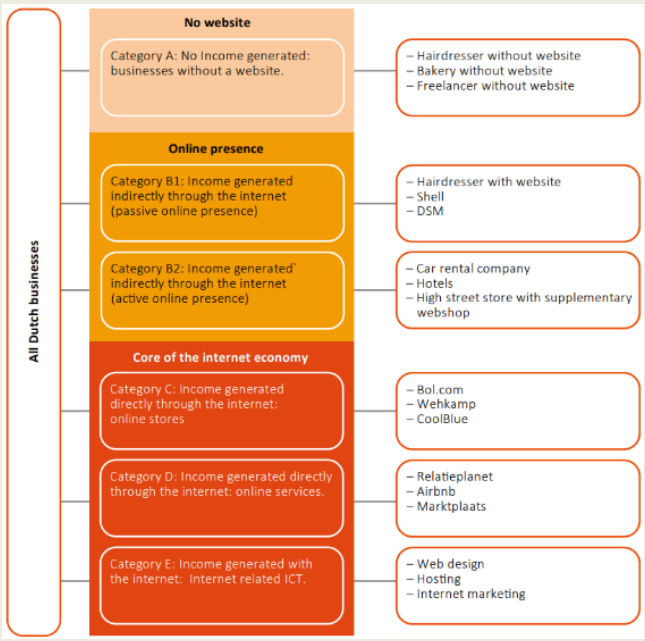
In 2016, Statistics Netherlands engaged in a partnership with Google and Dataprovider, to estimate the size of the internet economy in the Netherlands. Enterprises were in scope if their website generated sales.

Dataprovider made structured information available on, amongst others, business names, chamber of commerce numbers, shopping cart systems, and site traffic estimation, for approximately 2.5 million websites that either had a .nl top level domain, were written in the Dutch language, or were hosted in the Netherlands and displayed either a Dutch address or phone number.

These data were subsequently combined with the official Statistical Business Register (SBR), taking advantage of the fact that the Dutch SBR already records the websites of enterprises.

The figure below illustrates the main categories of enterprises identified and classified using the Dataprovider information as well as expert judgement. While not fully aligned with the conceptual framework introduced in this Handbook, category D ("Online Services +") includes DIPs, demonstrating the potential scope of such an approach to identify DIPs separately.

Figure 5.4. A categorisation of the businesses according to their use of the internet – Netherlands



Source: (Statistics Netherlands, 2016[2])

5.4. Compiling transactions facilitated by DIPs

The current difficulties involved in identifying resident and non-resident DIPs means that there is only limited guidance, so far, on national approaches used to measure international trade DIP transactions.

Responses to the OECD-IMF Stocktaking Survey indicated the likelihood that, in most cases, international trade in services for DIPs intermediation services are being picked up in EBOPS category *trade related services*, but further investigation will be needed.

Countries are exploring a number of options, including the use of credit card data in Belgium, Estonia, Finland, France, Israel, Latvia and Mexico, although as demonstrated in Chapter 3 (Section 3.4), credit card data is not a perfect source. Payments may, for example, be made to locally registered entities (allocated to Merchant Category Codes) that only exist to channel revenues to a foreign affiliate or parent that actually provides the intermediation service. In addition, payments made to foreign entities may be in relation to transactions intermediated between residents. Considerable care is needed therefore in adopting credit-card data to ensure that:

1. imports of intermediation services are not incorrectly imputed as imports by households when the payment, if any, should be recorded as an import by the supplier of the good or service being intermediated;
2. payments for intermediation services by suppliers of goods and services being intermediated are in fact intermediated by a foreign unit, as opposed to a foreign unit that handles payment on behalf of a resident unit actually providing the intermediation service; and
3. payments made to foreign intermediation providers only include the value of the intermediation service.

An (in)ability to identify DIPs is not just a challenge for statistical compilers. Chapter 3 also highlighted the significant difficulties involved for survey respondents, in particular households, in determining whether their transaction was with a foreign or resident DIP (exacerbated by the fact that DIPs identified as resident by respondents may only be local domain names, with no actual presence in the country. See Section 3.3 for a discussion of household surveys).

DIPs services related to tourism statistics

One area where some progress is being made, however, is in the realm of tourism statistics. Travel services are among those where DIPs have been particularly disruptive.

Contrary to most other services transactions, which are measured via enterprise surveys, travel services are typically captured by surveying the demand-side (tourism expenditure surveys).

The results from the OECD-IMF Stocktaking Survey indicated that several countries have developed statistics, or are in the process of doing so, to identify travel booked through online DIPs, via additional questions in tourism expenditure surveys.

For example, INE (the Spanish national statistics agency, see Box 5.2) established that in 2017, 68% of outbound tourists booked accommodation (excluding hotels) using an online intermediation platform. Italy used a similar approach (see Chapter 3, Box 3.2). France (see Box 5.3) included similar questions in its household survey and targeted domestic and outbound tourism.

Most purchases by households using DIPs will not incur a specific intermediation fee. As such, because only the supplier of the goods or services that are being intermediated is assumed to pay the intermediation fee (the rationale for which is explained in Section 5.2), there is no need to include a specific payment for intermediation services as an ‘import’ of the household receiving the final intermediated good or service. All that is needed is an ability to identify whether the good or service purchased by the household was imported and purchased via a resident DIP in which case no imported intermediation services are recorded, or a non-resident DIP, in which case imported intermediation services are recorded.

Box 5.2. Use of digital platforms to book accommodation in tourism statistics - a demand approach: Experience of the INE, Spanish National Statistics Institute

The Residents Travel Survey (RTS) is conducted by the INE to measure the number of trips made by residents in Spain to a destination within the country (domestic tourism) or abroad (outbound tourism) every month. The main characteristics of these trips are also studied: length, expenditure, purpose, accommodation, types of transport, etc.

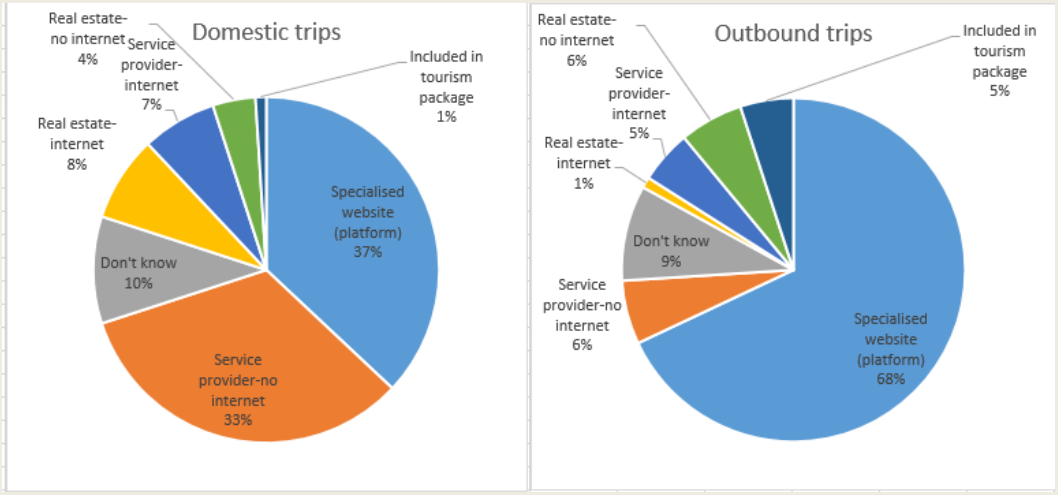
Different forms of accommodation are considered, including those provided either on a commercial basis as a paid service (rented accommodation) or on a non-commercial basis (non-rented accommodation), such as accommodation provided without charge by friends or relatives or on own account. Linked to the type of accommodation, information on how the booking was made is collected, including a specific category for digital platforms when the chosen accommodation is a rented holiday home (or a room in a private dwelling), as shown in the table below.

Table 5.2. Spanish Accommodation Survey

Q1. What was the main type of accommodation used during the trip?
(1) Hotels or (2) Similar establishments
(3) Rented dwelling or (4) Rented room in private home
(5) Rural tourism accommodation or (6) hostels
(7) Camping or (8) cruise
(9) Other rented accommodation
(10-14) Non-rented accommodation (Q2 not applicable)
Q2. How did you book the main accommodation?
(1) Directly with the service provider through its web or App
(2) Directly with the service provider in person, by mail or by phone
(3) In a travel agency or tour operator (*or real estate if Q1 was 3 or 4*) through its web or App
(4) In a travel agency or tour operator (*or real estate if Q1 was 3 or 4*), in person, by mail or by phone
(5) through a specialised web page (e.g. AirBnb, Homeaway, Booking, Homelidays, Niumba, Rentalia, Housetrip, Wimdu, Interhome, Friendly Rentals, etc.) *only if Q1 was =3 or 4*
(6) face to face
(7) don't know

Results (see the graph below) show that the role of digital platforms in booking vacation homes differs between whether the destination is within Spain or abroad. When travelling within the country, residents chose to book their holiday home through a digital platform in 37% of cases in 2017. But making the arrangements directly with the service provider offline was still an important choice (33% of trips). On the other hand, when traveling abroad, platforms represented up to 68% of the trips using this kind of accommodation.

Figure 5.5. Spanish domestic and outbound trips



Considering all domestic trips made by residents in Spain in 2017, using any type of accommodation, those to rented holiday homes booked through platforms represented 2% of trips, 2.6% of nights spent and 4.0% of total expenditure. In the case of outbound trips, rented holiday homes booked through platforms represented 9.3% of trips, 7.5% of nights spent and 7.4% of total expenditure.

Source: Spanish National Statistics Institute (INE).

Box 5.3. Digital intermediation platforms in tourism: experience of France

By including questions in their panel survey on resident households, which covers both domestic tourism and trips abroad, France is able to identify if various travel services have been ordered using DIPs; no such questions are included in the border survey on foreign visitors. The survey contains specific questions on the mode of reservation for transportation and for accommodation, see the table below:

Table 5.3. French Accommodation Survey

How was the booking of your transportation/accommodation made?
(1) phone
(2) internet / application
(3) face-to-face
What type of operator was used?
(1) travel agent / tour operator (non-digital or online)
(2) directly with the carrier/hotel (non-digital or online)
(3) online intermediation platform (with examples for transport / accommodation)
(4) aggregator / search engine (with examples for transport / accommodation)

Source: Banque de France.

Estimating DIPs intermediation fees

As described in Section 5.2, when DIPs fees are not explicitly charged (as a separate payment), the payment is assumed to be paid by the supplier of the good or service being intermediated (where they are explicitly charged to final consumers then these are treated as separate transactions, similar to explicit charges for delivery costs). At present, few if any countries have concrete experience in this area.

Recommendation 3.5 in Chapter 3 described one approach for estimating fees paid (imported) by suppliers of goods and services being intermediated. For households as final consumers, as described above, no such estimation is needed (as the supplier of the goods and services being intermediated is assumed to pay for the service). However, some payments made by resident unincorporated households[5], who will typically be outside of the scope of surveys covered in Recommendation 3.5, are also needed (Recommendation 5.1[6]).

Recommendation 5.1

Household income surveys (including Labour Force Surveys) should include questions on the value of goods and services provided by DIPs. Because respondent households will not be able to reliably determine whether the platforms are resident or foreign, survey questions should target sales made via the most popular foreign-based platforms. Average intermediation fees (imports of services) paid to the foreign platforms can be determined using rates (percentages or fixed costs divided by average value of products intermediated) charged by DIPs in the domestic economy, with the value of imported intermediation services determined as the rate multiplied by the value of the product being exported.

Even though households as final consumers do not pay for (import) intermediation services (unless explicitly invoiced), household consumption surveys can prove to be a useful source of information on imports of digital intermediation services by resident suppliers that use foreign platforms to sell goods and/or services to other residents. When combined with publicly available information on fees, surveys asking households to estimate their consumption made through well-known (non-resident) platforms could serve as a basis for estimating the value of imports of DIPs services imported by resident suppliers.

Box 5.4 (United Kingdom), highlights that this may be feasible. It describes efforts made in the United Kingdom to identify 'sharing-economy' transactions with explicit references made to popular sharing economy DIPs. Although the approach does not differentiate between whether the platforms are resident or not, it is not impossible to foresee how such a distinction could be added, especially for large operators.

Box 5.4. Towards measuring the sharing economy

The Office for National Statistics (ONS) of the United Kingdom, included several new questions in its Opinion and Lifestyle Survey, to capture information on the sharing economy. Following Eurostat requirements, the survey included, since 2017, questions on the use of intermediary websites or apps to arrange accommodation and/or transport, as indicated in the table below.

Table 5.4. United Kingdom Transport and Accommodation Survey

Transport	In the last 12 months, have you used any website or 'app' to arrange transportation services (e.g. car travel) from another private individual? (1) yes, intermediary websites or 'apps' dedicated to arranging transport services (such as Uber, Lyft, BlaBlaCar, Liftshar, etc.) (2) yes, other websites or 'apps' (including Facebook, Twitter, etc.) (3) No, I have not.
Accommodation	In the last 12 months, have you used any website or 'app' to arrange accommodation (room, apartment, house, holiday cottage, etc.) from another private individual? (1) yes, intermediary websites or 'apps' dedicated to arranging accommodation (such as Airbnb, HomeAway, Onefinestay, SpareRoom, etc.) (2) yes, other websites or 'apps' (including Facebook, Twitter, etc.) (3) No, I have not.

The main findings were that 28% of adults used intermediary websites or apps to arrange accommodation, and that 22% used these digital intermediation platforms to arrange transport.

The ONS is currently exploring the use of additional data sources, including the household expenditure survey as well as the Labour Force Survey (LFS), where initial results on questions on whether respondents have used a DIP to find work, and whether it was their main source of earnings suggested that the questions fitted will within the overall questionnaire, even if they may need to be reworded.

Source: (UK Office for National Statistics, 2017[3])

Recommendation 5.2

Household consumption surveys should include questions on the value of goods and services purchased through well-known non-resident DIPs. Combined with information on commission percentages. Such an approach can provide an estimate of the value of intermediation services imported by resident suppliers of goods and services that use those intermediation services to sell goods and services to other residents.

One option that is being considered (and is currently being explored) by a number of institutions, is the possibility of targeting large global DIPs directly with a questionnaire asking for breakdowns of the value of intermediation services exported by importing country. When combined with information of the rates charged by the DIP for a given good or service, this could also help to provide an estimate of the underlying good or service being intermediated (and for goods whether the good was also transported across borders). Such an approach, assuming that it was feasible, and that data could be shared across countries, would significantly improve the coverage of DIPs in international trade statistics.

Recommendation 5.3

National and international statistics agencies should explore the possibility of targeted surveys to large global DIPs, with cross-border data sharing arrangements.

5.5. Conclusion

As this chapter shows, despite their significant role in the digital transformation, and in particular the specific challenges they present for international trade statistics, current national practices in capturing platforms information are limited.

A key complication in this regard reflects the identification of the platforms themselves, and it is hoped that additional momentum will be advanced here in updates to the ISIC classification system and indeed as countries begin to develop their digital supply-use tables.

One area where nothing is included in this current chapter, and whose absence may go unnoticed, concerns the valuation of 'free' services provided by DADDPs. Efforts to measure these services will also need to be advanced under the auspices of the work on digital SUTs but at present the national accounts community is some way off from making recommendations in this area, which is why this chapter is also currently silent. As this work stream develops, insight will be added to this Handbook.

It is important to stress, however, that an absence of values of 'free' services provided by DADDPs is not the same thing as saying that the revenues and services provided by these platforms is also absent. One does not follow the other, and there is no reason to believe that payments for the services provided by these platforms are not systematically recorded in current international trade statistics.

References

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UK Office for National Statistics (2017), “The feasibility of measuring the sharing economy: November 2017 progress update”, https://www.ons.gov.uk/economy/economicoutputandproductivity/output/articles/thefeasibilityofmeasuringthesharingeconomy/november2017progressupdate. [3]

Notes

[1] As noted elsewhere, ITS surveys may struggle to cover transactions involving non-resident digital intermediation platforms. Furthermore, even in cases where such digital intermediation platforms headquartered overseas have some resident commercial presence, these entities may only have narrow functions such as advertising, and therefore do not (or cannot) report statistics related to trade between consumers and the overseas DIP.

[2] Following the logic that DIPs that trade services are classified to the industry of the product that generates most of their revenue or value added.

[3] http://ec.europa.eu/newsroom/just/item-detail.cfm?item_id=77704

[4] A marketing term that refers to instructions designed to provoke an immediate response. On a website, it refers to a clickable button 'buy', 'order', 'register', etc.

[5] A similar approach was used in Statistics Netherlands in the context of the 2015 revision of the National Accounts (Hiemstra, 2017[4]).

[6] Research by the European Commission indicated that the total average transaction fee for Airbnb was around 15.5% in 2016. Likewise, the transaction fee for Uber was to be around 20%.

Annex A. Extract from OECD "Measuring the Digital Transformation": the digital transformation and economic statistics

Why do we need to measure the digital transformation in economic statistics?

Digital technology, in its broadest sense, has had a significant impact on the economy in recent years - transforming and disrupting many production processes and activities, whilst also generating significant benefits to society at large. Consumers increasingly purchase goods and services online (e-commerce) and have access to a range of (typically) free services – search engines, social networks, media etc.; businesses are able to capitalise on digital tools, including data, to boost productivity and penetrate new markets.

The pace of change has been unprecedented and in its wake, many have questioned the ability of statistical information systems and concepts to keep up. From a conceptual perspective the answer is that they have - at least with respect to the current GDP accounting framework, the 2008 System of National Accounts (Ahmad and Schreyer, 2016[1]). But it is also clear that some aspects of the statistical information system, notably concerning the classification of firms, products and transactions, have lagged behind the pace of the digital transformation. In addition, questions are being raised about the scope of the GDP production boundary, to capture for example new digitally enabled services that households produce for themselves.

Notwithstanding the evidence that digitisation has exacerbated longstanding measurement challenges, particularly with regard to price and quality changes in rapidly changing industries and products, these effects are mitigated when looking at broader measures of economic activity and inflation, and cannot explain the current productivity slowdown (Ahmad, Ribarsky and Reinsdorf, 2017[2]), (Reinsdorf and Schreyer, 2017[3]). However, the inability to articulate the actual size of the digital economy – through references to actors, products, transactions etc. – in the core accounts continues to create questions about what is and is not captured in macro-economic statistics; in turn, fuelling the broader mis-measurement hypothesis. These challenges can be met with a digital satellite account that delineates key digital actors and transactions within the National Accounts Framework.

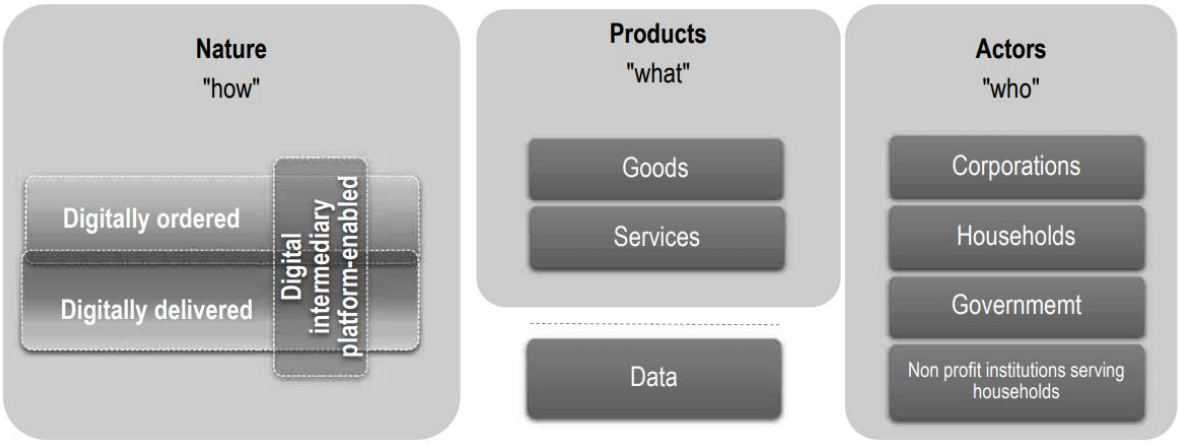
What are the challenges in developing a digital satellite account?

In response, in 2017, the OECD created an Informal Advisory Group on Measuring GDP in a Digitalised Economy (Ahmad and Schreyer, 2016[1]), to develop new classifications and accounting tools that are better equipped to show this digital reality and provide metrics that highlight the scale of digital transformation.

From the outset the emphasis in designing the framework was for it to be able to provide a broadly holistic view of the digital economy that could respond to the multitude of questions asked by analysts and policy makers; notably those that current mainstream statistical information systems cannot respond to.

The multi-dimensional nature of these questions meant that the framework could not be built exclusively around mono-dimensional aspects such as industries (producers), or consumers (households and industries), or products (digital and non-digital) or transactions (digitised and non-digitised), as each approach, on its own, only provides a partial view. That being said, a central unifying theme, broad enough to reflect the multidimensional policy needs, is elusive but revolves around the concept of digital transactions. A consensus has emerged around the idea that any framework needs to be able to separately identify transactions based on their "digital nature" (i.e. digitally ordered, digitally delivered and/or digital intermediary platform enabled), partly because of their different economic impact, but also because of the different ways in which transactions are recorded in the accounts. The following figure presents an overview of the conceptual unifying framework.

Figure A.1. Conceptual unifying framework



Source: (OECD, 2019[4]).

Importantly the framework has been designed to capitalise on blocks that can, at least in theory, be readily derived from current information sets and in line with current international accounting standards. But, as depicted in the first column of the Figure it also goes further through its inclusion of many non-monetary digital transactions that are typically not included in GDP but that may have important economic implications, for example in considerations of measures of welfare. A special mention in this respect concerns the explicit reference to data; see the third column of Figure A.1. In the current international accounting standards, the acquisition of data without a monetary transaction is treated as "free", therefore, in the accounts much of these data neither appear as a good or a service. There is however considerable interest in monetising these flows, and indeed their value in the underlying databases (where they are included under the category of enablers) that support their business models to better understand how they contribute to production (Ahmad and Van de Ven, 2018[5]).

The operationalisation of these principles to develop a digital satellite account builds on national supply and use tables (a core part of current national statistical information systems), which provide detailed information on the production process, the origin of various goods and services (supply) and the destination of these goods and services (use) (Mitchell, 2018[6]). The digital satellite account goes further by requesting more detailed breakdowns of goods and services based on the mode of ordering and delivery, providing more information on probably one of the most visible manifestations of digitalisation, i.e. electronic ordering (e-commerce), electronic delivery and platform enabled transactions; and recommending breakdowns and new groupings of producers more relevant for the digital economy, e.g. digital intermediation platforms, e-

sellers, and firms dependent on intermediation platforms. In addition, the framework separately distinguishes digital enablers, in both the producers' and the products' dimension.

International actions to further promote the implementation of the digital satellite account

The proposed template for capturing information on the digital economy within a macro-economic framework, the digital satellite account, received positive support at the previously mentioned Informal Advisory Group of experts as well as the Advisory Expert Group (AEG) on National Accounts and is expected to gain formal agreement from the relevant OECD bodies in 2019.

Countries will be requested to start populating the proposed template in the beginning of 2019. Due to its complexity, and the novelty of information required, including the requirement to make new delineations in actors, and modes of supply (the "how" in Figure A.1), it is not expected that countries will be able to fully populate the template at this early stage in the process. But the template is intended to motivate the up-take and development of changes in statistical information and classification systems that will be required in the medium term. That being said, even a partial approach in the short-term will be able to deliver significant new insights as the template deliberately builds on work already undertaken or initiated by countries and the international statistical community that aims to separately identify key elements of the digital economy. Some countries have already started to populate parts of the satellite account and have developed indicators on topics such as e-commerce, digital enabling industries, and consumer use of digital products and services.

Completion of the digital template, which is the first step in creating a more comprehensive satellite account, will be supported by exchanging country practices and information on ongoing initiatives aimed to address specific measurement aspects of the digital economy.

Annex B. Recommendations from the OECD Informal Reflection Group on the Impact of Globalisation on the Measurement of GDP

GDP continues to be a useful aggregate but may require a more differentiated reading.

GDP remains key for production and productivity analysis. But there is a tension between the reality of modern production where labour, physical and intangible capital that are used to produce output can be located in different parts of the world, and our ability to measure domestic production in an economically meaningful way when the location of moveable assets, such as intangible capital, can be readily shifted from one country to another.

Nominal GDP maintains its interpretation as the income generated in a particular territory through the use of the factors of production, including intellectual property. Measures of the drivers of real GDP and of domestic productivity require a more cautious interpretation than in the past when MNEs use intangible assets. For instance, intellectual property assets may be accounted for in one country but provide capital services across affiliates abroad. This complicates the measurement and interpretation of the volumes of factor inputs, and by extension, of productivity (see also below).

Even a differentiated interpretation of GDP does not dispense with the thorny question in which country a particular activity and the incomes derived from it should be recorded in the first place.

This question arises in particular in conjunction with the management of intellectual property products (such as the sale of licences) or with factoryless management of physical production elsewhere.

Clear guidelines concerning statistical residency and economic ownership of assets are critical as intuitively appealing options such as proportional allocation, allocating all value-added entirely to the headquarters, or to the original producers of the asset, create other problems, including the disconnect (although not insurmountable) that taxes on income may be paid in one country but the actual income generated is shown in another in the national accounts. That said, of the various options the idea of allocating the activities of Special Purpose Entities to the country of their headquarters has some traction, although, even if fully implemented, it would not resolve all issues (for example the tax issue) and further guidance may be needed in identifying and determining SPEs, and indeed the ‘headquarters’ if such a recommendation was adopted. Incidentally, this is a question that also arises in a national context, for instance when R&D investment has to be allocated to sub-national entities.

Recommendation B.1

A reflection on how to determine statistical residency of units should be undertaken, reviewing whether current criteria are still up to the task. Concerning more specifically production arising from moveable assets, such as intellectual property but also some tangible assets, clearer and more prescriptive criteria and practical guidance should be elaborated to determine in which country (or indeed countries for partitioned assets) an activity should qualify as production, who the economic owners of assets are, and when the activities should be instead recorded as accounting vehicles that do not enter the measurement of GDP. This entails working out an implementable definition of economic ownership with lists of criteria to establish the presence of production, such as managerial and strategic decision-making, financial planning etc.

Also of note in this context is the need to ensure that any guidelines and recommendations can be implemented in way that does not generate global accounting inconsistencies through asymmetric treatment by different NSOs or other inconsistencies in the well-established implementation of the SNA framework.

Theoretically, from a production-perspective, the productivity of MNEs can only be properly measured at the level of the MNE, i.e. across national borders.

One approach towards conceptualising production within an MNE is to assert that the production function of an MNE is naturally defined over its entire operations, wherever these take place. Put differently, the only meaningful way of formulating the production process and of capturing in particular the role of movable and intangible assets is by considering an integrated production function that stretches across borders. While this does not help in the quest for a 'good' measure of domestic productivity, it points to the usefulness of constructing international 'MNE' accounts.

Recommendation B.2

Develop MNE accounts to track outputs and inputs – including Intellectual Property inputs – consistently and so draw a picture of MNEs' production processes in nominal and real terms. MNE accounts would complement conventional national accounts and, with breakdowns by the country of their affiliates, provide insights on the potential impact of relocations.

The most promising avenues to deal with the impact of globalisation on the measurement of GDP and national accounts, and indeed other macro-economic frameworks such as the balance of payments, require some form of exchange of information and data between countries.

Just as it has become difficult to conceptualise domestic production in a globalised world, it has become difficult to carry out statistical operations on a purely domestic basis. A first step is ensuring coherence and consistency of treatment of similar transactions across countries along with an exchange of information between NSOs to develop a common understanding of ownership and structures of MNEs. In a second step, exchange and comparison of selected statistical data on MNEs may be envisaged to paint a full picture of the geography of production. It is important to ensure that the implementation of current and possible future guidelines (e.g. regarding Special Purpose Entities) does not result in accounting asymmetries.

Also, national accountants and international tax policy makers should engage in discussion on how far the tax base and GDP can meaningfully divert and how international information exchange in the context of the OECD's Base Erosion and Profit Shifting (BEPS) project and information exchange between NSOs can complement each other.

Naturally, any progress in international harmonisation of taxation itself (as under the BEPS Initiative) will also help the statistical case as there will be reduced incentives to shift assets for fiscal reasons in the first place.

Valuation of intellectual property assets remains a major challenge.

With the rising importance of intellectual property assets as a source of value creation, their measurement in countries' balance sheets and as an input is important. At the point of production, intellectual property products produced for own use are typically valued as the sum of costs, which is prudent. Subsequent changes in value are in theory captured as holding gains or losses but to what extent these revaluations are captured in practice is not clear. Although of limited consequence for GDP, this may not be the case for multi-factor productivity measurement. In addition, if the assets are subsequently transferred to an affiliate abroad, it is (a) not always clear how this is captured on the balance sheets of the exporting country, and (b) how the asset is subsequently depreciated in the receiving country – i.e. whether the relevant parameters (such as the remaining service life) reflect its age at the point of transfer. Both potential mismeasurements may affect sectors' and countries' level and changes in net worth.

Recommendation B.3

Improve methods to value investment in IP assets, i.e., the output of research and development activity and investigate methods for the treatment of internationally transferred assets (remaining service life, symmetry in treatment…).

Communication on what GDP measures and what it doesn't is more important than ever.

It will be important to further enhance transparency about methods used and granularity of information provided for macro-economic aggregates. Key users of GDP such as Central Banks already focus on a wide variety of indicators and typically use many models to minimise the risk of reacting solely to any one indicator, but added break-downs of national accounts aggregates and methodological descriptions in particular for international transactions will add to these efforts.

Similarly, communication on GDP and other indicators may need reinforcing. At one level, this concerns the general concept of GDP as a measure of production and associated incomes but not a measure of welfare. At another level, communication relates to explaining the driving forces behind movements in GDP. One reason why the 'Irish case' did not transform itself into in a major political issue lay in the efforts by CSO Ireland to be transparent and pedagogical in its communication.

Recommendation B.4

Develop a common understanding for the most pertinent additional break-downs that should be provided in the national accounts. This would in particular include but not necessarily be limited to:

- a standardised break-down of key accounts, including institutional sector accounts and Supply and Use Tables into activities of purely domestic enterprises, affiliates of foreign MNEs, and domestic MNEs. The objective here is to identify the role of MNEs in domestic production, income and in the fiscal space and the possibility to develop aggregates excluding MNEs;
- a break-down of gross operating surplus into the value of capital services by type of asset. This is well established in the economics literature and conceptually recognised in the 2008 SNA, but only partially put in place in countries. Growth accounting with a well-developed set of capital services measures will, for instance, allow measuring the share of GDP growth that is due to IP assets, which will be even more powerful if coupled with breakdowns by the category of firms described above.

Recommendation B.5

Elaborate communication strategies around GDP and other national accounts aggregates both new (such as those described above) and existing (such as net national income or household disposable income).

Volatility matters from a practical perspective.

Volatility, in and of itself, does not necessarily make GDP wrong, if it reflects volatility of the underlying series and thus one type of economic reality. But volatility in conjunction with large revisions can be a source of concern for users, for instance if monetary policy were to target nominal GDP. Also, GDP has been used as a reference indicator for multiple purposes including of an administrative nature because production processes used to be largely domestically defined and relatively stable. As there is nothing inherent in GDP that qualifies it as the single or best scaling variable and as the national accounts offer a number of meaningful and potentially more stable alternatives, these should be considered. These should include concepts net of depreciation given the growing importance of quickly depreciating assets.

Recommendation B.6

For certain administrative or analytical uses, e.g. tracking debt sustainability, broad stability of a reference measure is a valued characteristic, and it may be appropriate to use or develop alternative aggregates specifically designed for this purpose – for instance, an 'administrative GDP+/GNI+/NNI+'. These should be derived from existing national accounts.

Annex C. Extract from OECD "Measuring the Digital Transformation": Measuring Cloud Computing Services

Why do we need indicators on cloud services?

New technologies and business models are fundamentally changing the way businesses access and use software and hardware. Cloud services mark a paradigm shift in ICT provision, allowing businesses and individuals to access "on-demand IT services over a network". Data processing and storage takes place in a remote data centre which will typically have a scalable and resilient modular design. These can offer businesses, especially small and medium sized enterprises, cost reduction opportunities and increased flexibility.

While there are undoubtedly broader impacts for businesses, such as enabling wider access to the latest technologies by lowering barriers to adoption, the most important, fundamental impact of moving to cloud provision of business ICT is on cash flow. Simply put, firms can now access powerful ICTs on a "pay-as-you-go" basis, avoiding the need to finance large capital expenditures on servers, maintenance, and the like. For established businesses this makes managing their money much easier, and the scalability of cloud services reduces risk exposure. For new firms, this can reduce investment needs and lead to more start-ups securing funding.

As a consequence of this shift, ICTs may become less visible in firms' production costs while simultaneously becoming ever more vital for their productive activities. Alongside this, the shift to cloud is likely to reduce the efficacy of existing policies incentivising purchases of ICT equipment and software. It is vital that cloud services use can be measured so that their impacts on firm-level performance and aggregate productivity can be taken into account, as well as so that infrastructural needs (e.g. bandwidth) and other policy implications can be managed.

What are the challenges?

Statistical frameworks such as the System of National Accounts and the Balance of Payments Manual are founded on the principle that production is inextricably linked to a specific location. However, the nature of cloud services is that they can be used from anywhere with a reliable Internet connection, and could be "produced" from any one, or a combination of, the provider's datacentres anywhere in the world. Even where a given' customer's data is known to be housed in a given datacentre in a given location, it is also likely to be duplicated (e.g. backed up) in one or more other locations, with the network dynamically determining where the data should be accessed based on factors such as network traffic, the load on the each datacentre, maintenance, etc. This means it is likely to be very challenging, if not practically impossible, to identify the location of production of any given unit of cloud services. Furthermore, digitally traded services are known to be especially challenging to measure, even without locational ambiguities.

In addition, the capital-substituting nature of cloud services can have material implications for economic statistics including GDP. Fundamentally, businesses (and others) are using ICTs in their business

processes as they have traditionally; using software and hardware for data storage, processing, access, analysis, etc. (although the scale, scope, tools, etc. have, of course, evolved greatly). However, the way they access these is changing considerably – from a model of local provision, to providing terminals locally from which cloud services are accessed. In National Accounts terms, this implies a switching from investment in hardware such as servers to increased intermediate consumption expenditure, which reduces value added and GDP ceteris paribus. In practical terms it fundamentally changes the information that businesses report in surveys and there is a need to understand what is being reported as current and capital expenditure, and why. A challenge related to this is the lack of a specific product, or sub-product breakdown for cloud services in the Central Product Classification (CPC). Furthermore, source data and product categories do not always align well with common definitions of cloud computing. This makes it difficult to assess the pace with which cloud services consumption is increasing and how this compares to falls in firms' ICT investment.

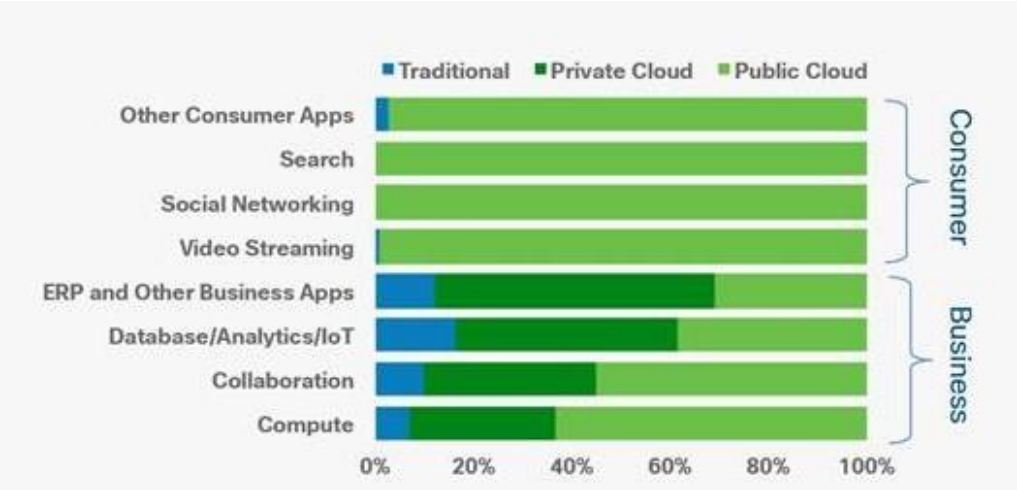
This shift also implies a concentration of ICT investment in the balance sheets of a relatively small number of cloud services providers; many of which have global operations with both service delivery as well as data centres in many countries. This capital formation needs to be appropriately captured in national statistics, with nuances such as whether a cloud service provider builds their own servers/datacentres (own account investment) or procures them from third parties taken into account.

Measures of price change are also an important; existing deflators do not always appear to be accounting for the rapid quality improvements observed in cloud services. By using archived online price lists and press releases from cloud services providers to construct a price index for cloud services, it has been shown that quality-adjusted prices are declining even more rapidly than nominal prices. Nevertheless, there are significant challenges with such an approach, including the wide range of different products offered by each provider, a lack of expenditure weights for these products, and the fact that quality improvements tend to be continuous. A further complicating factor is the proliferation of cloud computing services that are provided to end users free of charge or adopt a "freemium" model where basic service is free but payment is required for additional features such as extra storage. This is especially common in products are targeted at individuals rather than businesses, such as personal email services. Such services are likely uncounted in measures based on transactions and may also act as a substitute for paid software.

Business ICT use surveys give an indication of how many firms use cloud services in each country. Additional detail on services used and the perceived outcomes in terms of production costs, sales, and productivity can be collected to provide contextual and policy relevant information. Nevertheless, the extent and impacts of cloud services can only be understood by finding ways to measure the volumes of cloud services used, amounts paid, the extent of substitution from "traditional" ICT provision models toward cloud services, etc. ICT usage surveys are not seen as a good means for collecting reliable monetary data e.g. expenditure on cloud services. This would more naturally fit with the business expenditure component of structural business statistics. However, without a specific cloud services category in the CPC, such presentations are likely to rely on individual countries collecting experimental additional breakdowns.

Much relevant information might be available from cloud services providers themselves, including information on installed capacity, use volumes, and the types of applications using cloud services (Figure C.1**)**. However, these large multinational companies can be challenging to gather data from and viable strategies which minimise the burden on them (e.g. by avoiding multiple countries making separate data requests) need to be identified. From the cloud service providers' side, the commercial sensitivity of such information is a key concern.

Figure C.1. Global data centre workloads and compute instances by applications: Traditional vs. cloud (2016)



Note: In traditional data centres, one server carried one workload and compute instance. With increasing server computing capacity and virtualization, multiple workloads and compute instances per physical server are common in cloud architectures.
Source: Cisco Global Cloud Index, 2018.

Options for international action

Given the evident role of cloud services a keystone digital technology, they have been distinguished separately in digital supply-use tables being developed by the OECD. Countries now need to collect separate data on cloud services and demonstrate the viability for including a separate category for cloud services in a future revision of the CPC. Alongside this, it may be useful for the OECD and others to build upon previous work to establish internationally agreed definitions and classifications of types of cloud services for statistical purposes and to operationalise these in business ICT usage surveys to gain additional insight on the use of different cloud services.

In addition, it may be possible to agree with a number of the largest firms to provide standard data to the OECD under a non-disclosure agreement, which the OECD can then aggregate and publish to provide an overall view of the cloud services market. As it is likely that cloud services providers will have some knowledge of where their customers are based (e.g. based on the payment address), this approach might help to shed light on the flows of cloud services being provided into different countries.

Annex D. A Toolkit for Measuring the Digital Economy: Extract from the 2018 G20 Ministerial Declaration

Following the 2017 Ministerial Declaration that encouraged countries to reflect the measurement of the digital economy in national statistics in a comprehensive way and review existing statistical frameworks, the Argentine G20 Presidency, in collaboration with a steering committee of international organizations (IOs) led by the Organisation for Economic Co-operation and Development (OECD)[1], has produced a draft "G20 Toolkit for Measuring the Digital Economy". The toolkit highlights methodological approaches and indicators used to monitor the digital economy, and key gaps and challenges regarding digital economy measurement for further study. This Annex comprises an abridged version of this Toolkit.

Objectives and scope

The Toolkit aims to provide a first assessment that could serve to propose possible measurement approaches that support evidence-based policymaking, diagnoses the challenges and opportunities of the digital economy, identifies the issues that could be addressed by public policies, and serves as a potential guide for countries to implement standardized measurement activities.

Indicators and initiatives to measure the digital economy

Rather than producing new content, the document brings together more than 30 key existing indicators and methodologies produced by major international organizations to monitor and assess the size and penetration of the digital economy, organized in four themes: i) Infrastructure, including access to mobile and fixed networks, the development of Next Generation Access (NGA) networks, the dynamics of household and business uptake; ii) Empowering society, including access to and use of digital technologies, people's use of the internet, education, financial inclusion and interaction with government; iii) Innovation and technology adoption, including new digitally enabled business models, the role of ICTs as an engine for innovation, and the adoption of ICTs and other emerging technologies by businesses; iv) Jobs and Growth, including indicators related to the labor market, employment creation, investment in ICTs, value-added, international trade, e-commerce, and productivity growth.

The toolkit also includes other studies, surveys, pilot initiatives, and various measurement efforts in G20 countries and international and regional organizations, to complement standard measures and potentially expand coverage to more countries or new areas within countries.

Gaps and challenges

Acknowledging that data are far from being comprehensive, country coverage is limited, timeliness is often an issue, and differences in data collection methodologies and approaches across countries persist, the toolkit identifies two types of gaps: methodological and availability.

Methodological gaps relate to what existing indicators measure, how they capture the digital economy and how to address issues such as the need to improve existing indicators, identification of new measures to be developed, or the review of data sources and collection methods.

- There are important difficulties in measuring data flows. G20 members may wish to explore ways to better utilize existing usable data sets.
- Although educational attainment and occupation indicators are available, there is a lack of widespread measurement of skills, abilities and competencies that would allow for cross-country comparison.
- Measures of the use and benefits of emerging technologies, such as artificial intelligence, internet of things, 3D printing, robotics, distributed ledgers or data science-based processes should be improved to capture their use in different industries and their impact on the change in aggregate and business-level value added.
- More emphasis should be placed on the development of methodologies to measure digitally enabled trade and produce related indicators.
- The collection of e-commerce statistics involves methodological challenges such as differences in industry coverage, actors involved, and type of survey used to gather data across countries. Consistent and comparable data on the growth and adoption of e-commerce by both individuals and businesses in all industries is helpful in identifying barriers to trade.
- Existing indicators do not always allow for sex and age breakdowns to examine the use of new technologies, jobs, or potential biases in how society is affected by digitization.
- Existing indicators do not always reflect the socio-economic impact of the digital transformation. Having this type of indicators being developed could help to create targeted approaches to develop and implement digital technologies.
- The use of more diverse sources of data is another area where we see important challenges. The number of indicators produced jointly with the private sector and other actors of civil society is limited, and almost exclusively related to infrastructure. Interaction between businesses, government and actors from civil society to explore new sources of data, tools, and alternatives to exploit available data could have a positive impact on countries' measurement capacities.
- While household and business surveys are used in several G20 countries to measure the digital economy, the use of administrative records remains very limited.
- Information on the extent of regional disparities or dispersion within countries is often absent from key standardized measures of household or business uptake of digital technologies. Although surveys generally collect regional codes, indicators are usually not tabulated by that dimension in international comparisons. Collaboration between international organizations and G20 countries to make regional data available, for example by advancing on methods to make microdata more accessible, should help to make progress on this front.
- Current indicators may not adequately reflect the transformation unleashed by digitalization and the value added to national economies, particularly in developing countries. We see a challenge to report on the rate of growth of digitalization across various indicators to highlight the impact of digitalization along its various dimensions.

Availability gaps are closely linked to effective implementation. Even in areas where international standards to guide statistical collection exist, countries may lack the capacities and resources to implement them systematically, disseminate the resulting information openly, or make efforts to ensure that data are comparable.

There is a clear lack of coverage in developing countries compared to developed countries due to differences in statistical capacity among countries, or user needs and priorities for statistical collection. Moreover, the timeliness of available data varies widely across countries for critical indicators.

Actions for improvement and forward agenda

New and more flexible approaches could be developed to meet the specific priorities and resources of G20 countries. To make statistical systems more flexible and responsive to the new and rapidly evolving digital era, G20 members could: i) experiment with concepts and data gathering within existing measurement frameworks, ii) exploit the potential of existing survey and administrative data, iii) add questions to existing surveys, iv) periodically augment existing surveys with topic-specific modules, v) develop short turnaround surveys to meet specific needs, vi) define policy needs and, in cooperation with other stakeholders, set priorities for internationally comparable measurement; and vii) work with stakeholders, including international organizations, to harness the potential of big data for developing indicators to measure the digital economy.

The toolkit identifies actions that could inform the measurement agenda of G20 members in the next few years, considering the rapid pace of change in the digital economy:

1. Promote a comprehensive, high-quality data infrastructure and collection tools for measuring the adoption of digital technologies at the individual and business levels, together with its associated risks and benefits, including collecting data on key characteristics such as sex, age, skills and education, region, as well as business size, sector, and location, where appropriate.
2. Work towards improving the measurement of the digital economy in existing macroeconomic frameworks, e.g. by developing satellite national accounts.
3. Foster more fluid communication and cooperation between international organizations and G20 countries to share national initiatives, adhere and disseminate international standards and best practices, improve comparability of indicators, and reduce differences in coverage and timeliness of the data, with greater emphasis on capacity building in developing countries where resources, both monetary and human, are scarce.
4. Encourage interactions among government, business and other actors of civil society to strengthen the evidence base and complement official statistics, improving the design of frameworks that facilitate and allow a better use of data in business-to-business (B2B), business-to-government (B2G) and government-to-businesses (G2B) contexts.
5. Enable the collaboration between the public and private sectors to plan and implement business surveys about innovation and the uptake of new digital technologies, including joint efforts to identify and anticipate the demand for skills and competencies.
6. Encourage development partners, in collaboration with international organizations, to assist less developed countries in the collection of relevant statistics needed to enable evidence-based policy making in this area.
7. Promote the use of interoperable tools and data formats that facilitate access to and sharing of public sector data, in an effort to drive innovation, and make government activities more open and transparent.

Annex E. Recommendations from the US Department of Commerce report: Measuring the Value of Cross-Border Data Flows (2016)

The US Department of Commerce's research on *Measuring the Value of Cross-Border Data Flows*, brought together 46 stakeholders, who developed the following recommendations to improve the availability and quality of statistics and economic analysis related to cross-border data flows and the larger digital economy. The full report is available at https://www.ntia.doc.gov/files/ntia/publications/measuring_cross_border_data_flows.pdf

- Improve the overall coverage and quality of the government statistics on the service-sector.
- Develop a standard nomenclature or standard definitions for concepts related to cross-border data flows, distinguishing between concepts such as digital economy, digitally intensive, digitally enabled economy, and ICT.
- Develop a greater understanding of how firms use cross-border data flows and what economic value the data flows provides. These metrics should cover the entire U.S. economy as well as specific sectors.
- Develop improved and consistent macro-economic statistics to measure the value of cross-border data flows and the digital economy, such as the contribution of data flows and the digital economy to GDP. These metrics should cover the entire U.S. economy as well as specific sectors.
- Continue the Department-private industry dialogue to facilitate data sharing and the linking of public and private datasets, where possible.
- Continue the collaborative efforts of the Department and international organizations to ensure that metrics on cross-border data flows and the digital economy are widely available for countries around the world

Annex F. OECD-IMF Stocktaking Survey on Measuring Digital Trade

As part of the collective efforts to address the broader measurement challenges related to digital trade, the OECD and the IMF have conducted two main stocktaking exercises, in 2017 and in 2018, among their respective Members. The stocktaking exercises aimed to collect views of countries (statistical offices and central banks) on the conceptual and measurement framework for digital trade that is currently presented in Chapter 2, as well as to develop a large inventory of measurement practices on all aspects related to digital trade.

The first survey was developed and sent out among OECD members (35) and OECD key partner countries and invitees (10) in early 2017. The results, which were based on 35 responses, were presented at the March 2017 meeting of the OECD Working Party on Trade in Goods and Services (WPTGS). The IMF sent out the same survey later that year to a selection of 51 non-OECD countries, targeting institutions responsible for balance of payments compilation, from which 39 responses were received. The joint results, including the views of 74 countries in total, were presented at the IMF BOPCOM meeting in October 2017 (IMF and OECD, 2017[7])[2].

The second survey was conducted simultaneously by OECD and IMF in early 2018, to a similar set of countries, with 38 responses from OECD members and key partners and 38 responses from countries approached by IMF. The joint results for 76 countries were presented at the OECD WPTGS meeting in March 2018[3]. As per the conclusions of this meeting, the survey questions of both surveys will be combined into an online tool to exchange experience and monitor progress, to further support the national work in developing statistics on digital trade.

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Notes

[1] The draft document "A G20 Toolkit for Measuring the Digital Economy" was produced by the G20 Argentine Presidency with the support of the International Telecommunication Union (ITU), the United Nations Conference on Trade and Development (UNCTAD), the European Union, The World Bank Group (WBG), the International Monetary Fund (IMF), and the International Labour Organization (ILO).

[2] More information about the survey questions and results can be found in the OECD-IMF paper presented to IMF BOPCOM, here: https://www.imf.org/external/pubs/ft/bop/2017/pdf/17-07.pdf

[3] More information about the survey questions and the results can be found here: http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=STD/CSSP/WPTGS(2018)3&docLanguage=En