13th Meeting of the Advisory Expert Group on National Accounts,
1-3 October 2019, Washington D.C., USA

Agenda item: 2.3.2

Progress on the Digital Supply-Use Tables Framework

Introduction

The framework that sets out the Digital Supply-Use tables (digital SUTs) has been refined and finalised over the past year. The framework, of which a draft version was presented at the 2018 AEG meeting, creates an avenue to provide information on various digital indicators aligning with the 2008 System of National Accounts (SNA) (UN et al, 2009). Over the past twelve months, the Informal Advisory Group on Measuring GDP in a Digital Economy (Advisory Group) has further improved the digital SUTs, also taking into account feedback from various constituencies, including the AEG, ECB, the UK Economic Statistics Centre of Excellence (ESCoE), the OECD Working Party on Measurement and Analysis of the Digital Economy (WPMADE) and the OECD Working Party on National Accounts (WPNA). This led to some relatively small changes in comparison with the version that was presented at the AEG last year. The most significant change is the addition of a column to incorporate an estimate of transactions that are digitally delivered, enabling the framework to be consistent with the measurement of digital trade. Additionally, small changes have been made to fine-tune some of the terminology and definitions used in the tables. The final framework was presented to the members of the Advisory Group in July and endorsed by the OECD Working Party on National Accounts in September via written consultation. A paper describing the final framework is attached to this cover note.

Countries have continued to make progress in measuring digital activity consistent with the SNA, as demonstrated by various releases in 2019.[1] However, it is clear that the digital SUTs should still be considered as quite ambitious, and the expectation remains that countries will not be able to fully populate the tables right from the start. For that reason, the Advisory Group started to discuss a list of high priority indicators, which would help in co-ordinating the initial results that can be derived from the digital SUTs. A concrete proposal for a set of high priority indicators was sent out to the members of the Advisory Group in September and is attached to this cover note. It will also be discussed at the Joint Meeting of the OECD Working Parties Financial Statistics and National Accounts, to be held in the week of November 4 – 8, 2019. After the approval of the high priority indicators, countries are expected to come up with first estimates for the relevant variables, albeit most probably on an experimental and ad hoc basis in the beginning. At the same time, countries are encouraged to exchange information on their compilation methodologies, in order to

[1] See e.g. work done by the Australian Bureau of Statistics (2019), "Measuring digital activities in the Australian economy"; by the Bureau of Economic Analysis (BEA), "Defining and Measuring the Digital Economy"; and by Statistics Canada (2019), "Measuring digital economic activities in Canada: initial estimates". Links to these works are in both attached documents.

start determining best practices, which may assist countries in further improving the quality and coverage of their digital SUTs.

Documentation

- OECD, "Guidelines for Supply-Use tables for the Digital Economy", paper presented at the 3rd meeting of the Informal Advisory Group on Measuring GDP in a Digitalised economy (Paris, 1-2 July, 2019), and sent, for consultation, to the members of the OECD Working Party on National Accounts. *(Added to document below)*

- OECD, "High priority indicators in the Digital Supply-Use Tables", proposal sent to members of the Informal Advisory Group on Measuring GDP in a Digitalised economy. *(Added to document below)*

Main issues to be discussed

The AEG is invited:

- To offer their opinion on the proposed high priority indicators, selected on the basis of an initial discussion at the July 2019 meeting of the Advisory Group, cognisant of the need for statistical organisations to compile and disseminate these high priority indicators relatively quickly.
- To reflect on any data sources, methods or compilation intelligence that might be applied to assist with, or speed up, the compilation of the digital SUTs.

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STATISTICS AND DATA DIRECTORATE
COMMITTEE ON STATISTICS AND STATISTICAL POLICY

Working Party on National Accounts

Guidelines for Supply-Use tables for the Digital Economy

Prepared for the meeting of the Informal Advisory Group on Measuring GDP in a Digitalised Economy, to be held on **July 1-2, 2019**

This document outlines the final conceptual framework for measuring digital activity in the form of digital supply-use tables. The document incorporates formal and informal feedback gathered since the initial proposal was put forward at the meeting of the Informal Advisory Group in November 2018.

It includes a detailed guide on the new classifications used within the framework as well as the template used to collect the proposed tables.

John MITCHELL
John.MITCHELL@oecd.org

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1. Introduction

A framework for measuring elements of the digital economy in the form of Supply-Use Tables for the Digital Economy (Digital SUTs) was put forward for discussion at the meeting of the Informal Advisory Group on Measuring GDP in a Digitalised Economy on November 9, 2018, and of the Advisory Expert Group (AEG) on National Accounts on November 28, 2018, (OECD, 2018). Both groups responded positively to the proposal, in particular welcoming the balance that the framework struck between aligning to the 2008 System of National Accounts (SNA) (UN et al, 2009), while still creating an avenue to provide information on various digital indicators at a more granular level. There was broad support to finalise the framework and for countries to start populating it.

This paper presents the final framework including more detail on the template of the Digital SUTs and the steps required to complete it.[1] It is important to acknowledge up-front that the framework and indeed the template (Digital SUTs) that supports it, are designed, in part, to act as road maps that help to motivate the development of new data sources, where these are needed. In this sense it is clear that many, perhaps most, countries, will not currently, or indeed in the short to medium term, be in a position to fully populate the tables but they have been deliberately set up in a way that allows countries to continually add to the tables on an ongoing basis.

Many items included in the tables can be readily produced from aggregations of current statistics, and even partially completed tables will significantly help to fill the current information gaps and assuage concerns that the digital economy is absent from official statistics. Moving forward, the sharing of methods, assumptions and compilation practices used in populating Digital SUTs will help to provide momentum for all countries in fostering the compilation of internationally comparable data on the digital economy.

The Digital SUTs and indeed the framework do not advocate a single measure of the digital economy. This is deliberate, and reflects the fact that the tables are designed to meet a multitude of needs and demands, which cannot be met by any single measure. When fully completed, the Digital SUTs will be able to provide a raft of information on the digital economy including, among many others, the scale of:

- e-commerce transactions;
- digitally delivered services;
- digital intermediation platforms' and e-tailers' sales and value-added;
- transactions in digital goods and services;
- value-added of various categories of 'digitally dependent' and purely 'digital' firms;
- non-monetary transactions in data and free digital services and assets.

The Digital SUTs will be further complemented in the future by the addition of a specific spreadsheet regarding investment and employment. This will cover each industries capital

[1] The paper builds upon the original paper presented at the meeting of the Informal Advisory Group and the AEG and subsequently sent to members of the groups for formal feedback. There are some minor changes in the template and some definitions due to the formal feedback received; however, these do not alter the fundamental premise of the framework.

investment in ICT goods and services as well as various labour metrics for the new digital industries.

The paper is structured as follows. Section 2 explains the setup of the Digital SUTs, i.e. the various worksheets included in the template and the steps required to complete them. More in-depth definitions of the specific components within the tables are subsequently provided in Section 3, providing, in turn, some preliminary ideas on how to potentially estimate them.

2. Broad summary of the Supply-Use tables for the Digital Economy and the steps required to complete them

2.1. Introduction

The starting point in developing the Digital SUTs has been the standard questionnaire used by the OECD to collect supply and use tables. The structure of these tables has been adapted to incorporate additional information on the digital economy by grouping and defining industries, products and transactions around key characteristics of the digital transformation. In doing so, an important criterion has been to reach a balance between information that is relevant to users while still being practically possible for compilers. Section 2.2 provides a concise overview of these additional breakdowns (and in some cases aggregations) of industries, products and transactions. Section 2.3 presents the collection template for Digital SUTs and a metadata sheet. Finally, Section 2.4 provides guidance on completion.

2.2. Overview of additional products and industries required in Digital SUTs

The adaptations made to standard supply and use tables are primarily driven by the need to explicitly identify the contribution of actors (industries) and products that are widely understood as being in scope for discussions on the digital economy. The choice of SUTs as a framework for measuring digital activity is a reflection of the ability of SUTs to cover economic transactions from multiple angles. In this regard, the Digital SUTs provide an alternative grouping of firms around new industry aggregations (columns), whilst also creating aggregations (and new classifications based on the nature of transactions) of products (rows and columns). These can be summarised as follows:

- Seven additional industry columns in Supply and Use Tables (and higher-level aggregations of these columns), aggregating firms around different characteristics of their provision of digital enablers or digitised services that fall under a broad umbrella of 'digital industries' (Columns 1 – 10 in the Digital SUTs)[2].
- Two additional columns in the Supply Table delineating the nature of the delivery of the service as either digitally delivered or not-digitally delivered (for example, Columns 12a and 12b).
- Four additional rows, in Supply and Use Tables, representing digital products and aggregations that fall within the SNA production boundary (Rows 25, 31, 37, and 43).
- Three additional rows, in Supply and Use Tables, representing data and digital service products that are currently outside the SNA production boundary (Rows 109, 115 and 121)[3].
- Five additional rows under each product (and aggregate), separating transactions by whether they were: digitally versus non-digitally ordered, with digitally ordered transactions further broken down into *ordered directly from the counterparty*, *ordered via a resident digital intermediary platform*, and *ordered via a non-resident platform* (see, for example, Rows 2 - 6).

[2] The columns and rows mentioned throughout this paper correspond to the worksheets supply 1 and use. The worksheet supply 2 does not align to the rows stated due to the absence of sub-totals rows.
[3] Within the template, these rows are placed below the other products and aggregates, reflecting their exclusion from the aggregates due to them being outside the SNA production boundary.

- Three sub-total rows, displaying the aggregated estimates for the following product categories (covering only those transactions currently included with the SNA production boundary):
  - ICT goods and digital services – within the SNA production boundary (Row 7).
  - Non-digital products - significantly affected by digitalisation (Row 13).
  - Non-digital products - other (Row 19).

The classifications for the remaining rows and columns follow those used in conventional supply and use tables. While it is encouraged to populate estimates of digital services outside of the SNA production boundary, these should not be included in any sub-total or aggregate. Therefore, the aggregates for the main economic aggregates should be identical to those in the conventional supply and use tables.

The standard questionnaire to collect supply and use tables has been used as starting point for developing the Digital SUTs to ensure that most countries are able to populate large parts of it and to ensure a high degree of comparability in results across countries. However, as standard supply and use tables already start from a high level of aggregation, it has to be borne in mind that this will not always provide the best starting point in deriving the more detailed results as requested in the Digital SUTs. In that regard, countries are encouraged to compile the relevant results on the basis of more granular information that may be available at the country level, as this is expected to lead to more accurate results.

2.3. Overview of the template

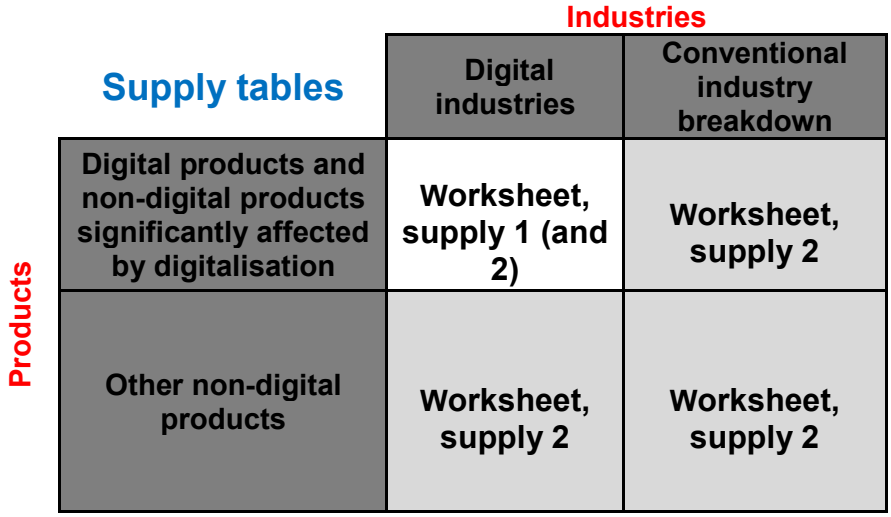
The template outlining the Digital SUTs contains four worksheets: two for the supply side, one for the use side, and a separate metadata template.

The first worksheet labelled ‘Supply 1’ focuses on the industries and products most affected by digitalisation, with an aggregation of all other industries (Column 11, shaded green) and products (non-digital products, Row 19, shaded green) in a single column or row. In this sense it is a simplified version of ‘Supply 2’, which includes the same aggregations as in Supply 1, but also requests breakdowns of all other industries and products included in conventional SUTs (with additional breakdowns by whether the transaction was digitally ordered or not).

The individual industries listed in Supply 1 are described in detail below (see section 3.3). The individual products listed in Supply 1 are limited to ICT goods and digital services, and those products that are significantly affected by digitalisation (see section 3.2). Higher-level aggregations of various product groups are included in Supply 1 to facilitate compilation. One particularly important aggregation concerns the breakdown of total supply by whether transactions were digitally or non-digitally ordered, which provides the basis for a simple measure of the size of overall e-commerce transactions. Figure 2.1 presents a schematic overview of information requested in Supply 1 and Supply 2.

In an ideal scenario, countries would be able to provide a full breakdown of information requested in Supply 2 but it is recognised that for many countries this may not be currently feasible, not least given the impact on the burden of compilation. Supply 1 is an attempt to streamline that burden through a focus on the core measures typically requested by users. For example, the transactional breakdown of non-digital products by non-digital industries is considered of lower priority for compilation.

Figure 2.1. Split of products and industries represented in Supply tables



One aspect of the 'nature' of transactions concerns those transactions that are digitally delivered.[4] Rather than including the type of delivery as an additional breakdown in the product rows of the Digital SUTs (which differentiate between types of digitally ordered transactions), a simple way of collecting this type of information is to include two additional columns in the supply table. These additional columns break down supply (for each of, total domestic output, imports, and total supply) into whether it was digitally delivered or not. This simple approach provides a means to deliver significant information on digitally delivered products (and indeed all of the information required for cross-border digital trade) without being overly arduous by extending this request to individual industries.

The third worksheet labelled 'Use' provides the same breakdown of industries, products and transactions included in Supply 2, thus providing a overview of intermediate and final use of digital products in the economy. A simplified Use worksheet (following the structure of Supply 1) is not provided, but it follows that the priority entries in the Use worksheet follow those rows and columns included in Supply 1. Like conventional SUTs, the worksheet also requests information on value added and the split of gross value added into compensation of employees, operating surplus, mixed income and taxes (less subsidies) on production.

The template also includes a fourth sheet, marked 'Metadata', to obtain more insights on the sources and methods used by countries to derive the relevant estimates provided in their Digital SUTs. In order to appropriately compare estimates between countries and to facilitate a more extensive discussion on best practices, countries are strongly encouraged to provide metadata on the compilation of the estimates for the new digital industries and products as well as the new transaction type breakdown. Obviously, other documentation such as papers and presentations are also very much welcomed.

[4] This is not only an important requirement for users but is a defining characteristic for digital trade. Digital trade includes all transactions that digitally ordered and/or digitally delivered.

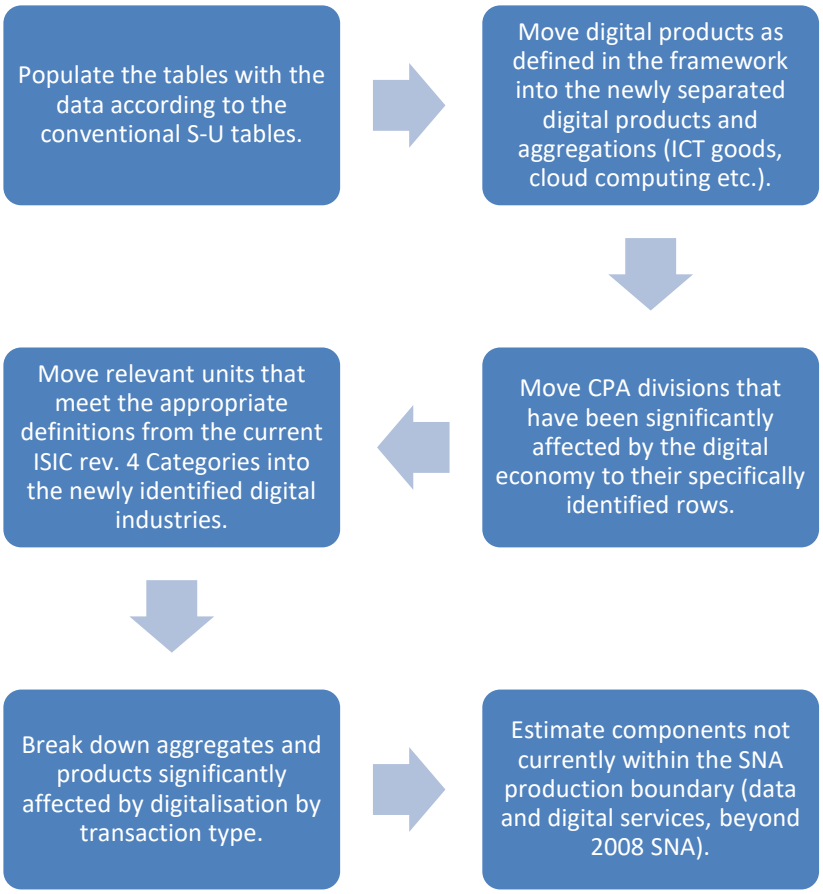
2.4. Overview of compilation

Like the compilation of all economic statistics, the compilation of the Digital SUTs will take different forms in different countries. Countries are encouraged to develop new data sources and/or compilation methodologies that more appropriately capture the digital products, transactions and industries than is currently done in the conventional SUTs. This may include additional breakdowns beyond those articulated in the template and framework.

In the immediate short term, countries are encouraged to populate the worksheets of the Digital SUTs as much as possible, which will initially involve reclassification of the activities and products currently recorded in their SUTs. Figure 2.2 outlines the main steps required for this purpose.

Once the worksheets have been populated with the data according to the conventional supply and use tables, estimates relating to digital products and digital industries should be reallocated to the newly defined products and industries. Subsequently, the results at the product level should be broken down on the basis of digitally ordered or not, across the rows, with similar breakdowns for digitally delivered or not as columns in the supply tables. At the end, countries are encorraged to compile estimates relating to the products currently outside the SNA production boundary.

Figure 2.2. Basic step-by-step approach to initially populate Digital S-U tables



3. Detailed definitions and measurement guidance for new classifications outlined in the framework

This section explains in more detail the definitions for the new transaction types, product categories and digital industries, as included in the Digital SUTs.

3.1. Transaction types

In the Digital SUTs, across the rows, transactions in goods and services are broken down into five types, as shown in Figure 3.1. The relevant breakdown is included for each product. Figure 3.1 presents an example for accommodation services. The transaction can either be (a) digitally ordered or (b) non-digitally ordered. In case it is digitally ordered, a further breakdown is made into whether it is (a_i) ordered directly from the counterparty, (a_ii) via a resident digital intermediary platform or (a_iii) via a non-resident intermediary platform.

Figure 3.1. Transaction types in Digital SUTs

Accommodation services		
A	Digitally ordered	
a_i	Direct from a counterparty	
a_ii	Via a resident digital intermediary platform	
a_iii	Via a non-resident digital intermediary platform	
B	Not Digitally ordered	

Regardless of the transaction type outlined above, the product can be delivered to the consumer digitally or non-digitally.[5] Unlike ordering, which is reflected as breakdowns of the product rows, the nature of the delivery is represented as breakdowns of the columns for total output, total exports, and total imports. Each of the transaction types are discussed in more detail below.

The breakdown of the nature of the transaction into rows (for digitally ordered) and columns (for digitally delivered) allows for a consistent and parsimonious link with outputs from the digital trade framework, as all four ordering and delivery possibilities are represented.[6] Furthermore, it negates the need for many additional rows, specifying the nature of delivery, for each of the different methods of ordering (see below).

Ideally, the transactional breakdown in Figure 3.1, including the additional breakdown of some columns on delivery, should be made for all products, but this may not be feasible in the short to medium term, and perhaps even longer term. Therefore, countries are asked to prioritise the split for aggregates, digital products, and key products whose ordering and delivery have been significantly affected by the digital transformation.

[5] An assumption is made that goods cannot be delivered digitally. This assumption including references to 3D printing. For further information; see, (OECD 2018; Ahmad and Ribarsky 2018).
[6] Digitally ordered – digitally delivered, digitally ordered – non-digitally delivered, non-digitally ordered – non-digitally delivered, non- digitally ordered – digitally delivered.

3.1.1. Digitally ordered

Transactions that are digitally ordered (i.e. transactions in goods and services that reflect e-commerce), are generally defined as follows:

> "An e-commerce transaction is the 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 goods or services are ordered by those methods, but the payment and ultimate delivery of the goods or services do not have to be conducted online. An e-commerce transaction can be between enterprises, households, individuals, governments, and other public or private organizations. To be included are orders made over the web, extranet or electronic data interchange. To be excluded are orders made by phone, fax or manually typed email."(OECD, 2011)

As e-commerce is an important and highly desired analytical indicator for assessing the impact of digitalisation, it is essential to obtain this information at least at the aggregate level of all products (total economy). In addition, as mentioned above, it would be highly desirable to have this information separately for digital products and the products that are significantly affected by digitalisation as well.[7]

Within the Digital SUTs, a further distinction of digitally ordered products differentiates between those that are directly ordered from the counterparty and those that are ordered via a digital intermediary platform.

3.1.2. Ordered directly from a counterparty

Transactions that are ordered directly from a counterparty include any digital transactions in products made directly with the producer or retailer (owner) of the product. Transactions via digital intermediary platforms (defined below) are treated separately as they take, in principle, no ownership of the product being intermediated and so their output is treated as fees and not margins (which is the case for retailers), requiring a different recording of flows. They are also treated separately because of the high interest in them.

3.1.3. Ordered via a resident or non-resident digital intermediary platform

This transaction type includes any good or service purchased through a digital intermediary platform (defined below), split between resident and non-resident platforms.

3.1.4. Not digitally ordered

The final transaction row represents orders made non-digitally. A transaction being included in this row does not, however, preclude electronic payment if the item was ordered physically or via other non-digital means, such as via the phone.

3.1.5. Digitally delivered

In addition to the above distinction of digitally ordered versus not digitally ordered, a distinction is made between digitally delivered versus non-digitally delivered, by breaking down some columns in the Supply Table. Digitally delivered is defined here as "all … transactions that are delivered remotely over ICT networks – i.e. over voice or data networks, including the internet, in an

[7] Products shaded orange and blue in the template.

electronically downloadable format" (OECD-WTO, Handbook on Digital Trade).[8] This definition is consistent with that used for defining digital trade and will include both the delivery of digital services, such as telecommunications, software and cloud computing, as well as the digital delivery of some non-digital services such as education and gambling.

3.2. Products

The Digital SUTs distinguishes four types of products, i.e. (i) digital products (inside the SNA production boundary), (ii) non-digital products significantly affected by digitalisation, (iii) other non-digital products and (iv) digital products (outside the SNA production boundary). Each of these categories and their underlying products are discussed in more detail below. Appendix 2 provides a concise overview of the proposed hierarchy of products.

Digital products inside the SNA production boundary – ICT goods and digital services

The following four categories represent what has been labelled as *ICT goods and digital services*. Within the template, each of these items (located at rows 25, 31, 37, 43 and shaded in blue) also includes a breakdown by type of transaction. If countries are not able to provide the details for each of the categories listed below, they are encouraged to provide an overall estimate for the sub-total of the four categories.

3.2.1. ICT goods

The category *ICT goods* consists of products that "must primarily be intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display" (UNSD, 2015). As such, it coincides with the alternative classification of Information and Communication Technology (ICT) products, as included in the Central Product Classification (CPC) 2.1 (UNSD, 2015). In this alternative classification, four types of ICT goods have been distinguished: (i) Computers and peripheral equipment; (ii) Communication equipment; (iii) Consumer electronic equipment; and (iv) Miscellaneous ICT components and goods. A detailed list of the products included in this category is provided in Appendix 3.

3.2.2. Priced digital services – except cloud computing services and digital intermediary services

The category *digital services* covers all services included in the alternative classification of ICT products as discussed above, with the exception of *digital intermediary services* and *cloud computing services*, which are defined separately below. It includes the following broad categories: (i) Manufacturing services for ICT equipment; (ii) Business and productivity software and licensing services; (iii) Information technology consultancy and services; (iv) Telecommunications services; (v) Leasing or rental services for ICT equipment; and (vi) Other ICT services. A detailed list of the products included in this category is provided in Appendix 3.

A service being delivered digitally does not automatically make that service a digital service. Some services such as publishing, gambling or education are increasingly being delivered digitally and they should be recorded as such (see section 3.1.5) in the tables. However, since these products are

[8] This is a variation on the definition used in the OECD-WTO Handbook on Measuring Digital Trade. The original is "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." While the amounts represented in the Digital SUTs will include cross border, it will also include deliveries made domestically.

not included within the list of ICT products discussed above, they remain in their initial product classification.

3.2.3. Priced cloud computing services

The OECD has defined cloud computing as "Computing services based on a set of computing resources that can be accessed in a flexible, elastic, on-demand way with low management effort" (OECD, 2014).

This product category includes the full suite of services related to cloud computing. These models include; the consumer simply accessing the provider's applications (Software as a Services, SaaS); the consumer deploying their own applications onto the providers infrastructure (Platform as a Service, PaaS); and the consumer taking control over operating systems, storage, and deployed applications (Infrastructure as a Service, IaaS).[9]

A Eurostat task force has advised on the current classification of the various cloud-computing products. This includes CPA 58.2 (Software publishing services) for SaaS; CPA 62.01 (Computer programming services) for PaaS and CPA 63.11.1 (Data processing, hosting, application services and other IT infrastructure provisioning services) for IaaS (Eurostat, 2018).

3.2.4. Priced digital intermediary services

There is no formal definition for priced digital intermediary services in the various international classifications. While components of intermediation services forms part of various products within CPC 2.1, they are specifically linked to an underlying product and need not necessarily be produced via digital means.[10] Therefore, for the purpose of Digital SUTs, the following definition of priced digital intermediary services is applied: the service of providing information on and successfully matching two independent parties to a transaction via a digital platform in return for an explicit fee. The output of these platforms typically consists of the fees paid by the producer and/or the consumer of the product being intermediated.[11]

Non-Digital products

Within the template, non-digital products are presented at the CPA division or section level. These products have been placed into one of two categories depending on how prevalent digital transactions are in the relevant markets. Transactional information is a priority for those products listed as significantly affected by digitalisation.

3.2.5. Non-Digital products – significantly affected by digitalisation.

Some non-digital products are significantly affected by digitalisation, as a consequence of which it is highly recommended to have a breakdown by type of transaction. Currently, ten such products have been distinguished, as follows:

- Land transport services and transport services via pipelines, CPA division 49.
- Accommodation services, CPA division 55.

[9] These descriptions were taken from the National Institute of Standards and Technology (NIST), available at https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf

[10] CPC 2.1 classification 612, 625, 85999, and 7222 for example.

[11] For more details on the recording of transactions via these platforms, see (OECD, 2018; Ahmad and Ribarsky, 2018).

- Food and Beverage serving services, CPA division 56.
- Motion picture, video and television programme production services, sound recording and music publishing, CPA division 59.
- Financial and insurance services, CPA section K
- Advertising and market research services, CPA division 73.
- Travel agency, tour operator and other reservation services, CPA division 79.
- Education services, CPA section P
- Gambling and betting services, CPA division 92.
- Publishing services, CPA division 58

Within the template, these products (rows 49 – 103) are shaded orange. If countries are not able to provide the details on the type of transactions for each of the products listed above, they are encouraged to provide an overall estimate for the aggregate of the ten products, if possible (rows 13 – 18).

The products included in this sub-group have been selected on the basis that the way that the associated services are delivered to consumers has been significantly, or soon will be, affected by the digital transformation – either because the services are digitally delivered or because the sector has been significantly affected by digital intermediation platforms. The composition of products in this category will likely change over time, reflecting the developing nature of the digital economy.

The selection of the above industries is not designed to capture those industries that are making significant use of digital inputs. Instead, by separating the intermediate use of (and the investments in) ICT goods and digital services from other intermediate inputs (and investments), the Digital SUTs, can show, over time, if an industry is using a greater proportion of digital products in its production.

3.2.6. Non-Digital products – other

With ten products identified as recommended for additional disaggregation based on the nature of the transaction, this leaves 85 products at the CPA division level for which provision of additional transactional detail is not currently a priority, due to the reduced role that these products play in the digital economy, at least up to now. However, as explained before, in order to obtain an overall measure of e-commerce, countries are asked to provide the breakdown for these other non-digital products at least at an aggregated level in worksheet 'Supply 1' (rows 19 – 24). Furthermore, if in a country, additional information is available for the other products and/or other products are significantly affected by digitalization, countries are invited to provide further details on the type of transaction in worksheet 'Supply 2'. Within the template, these product rows as well as the sub-aggregate of this category are shaded green[12].

Digital products outside of the SNA production boundary

The following three categories represent digital products that are currently outside the SNA production boundary. Within the template, these three products are shaded purple and covered by

[12] Estimates within some CPA categories will be reduced due to digital products being reclassified to digital categories making up the ICT goods and digital services sub-total. The CPA's most impacted include 26, Computer, electronic and optical products; 58, Publishing services; 61, Telecommunications services; 62, Computer programming, consultancy and related services and 63, Information services.

Rows 109, 115, and 121. Any estimates relating to these products are excluded from the various sub-totals or aggregates in the template.

3.2.7. Data (beyond 2008 SNA)

The category *data (beyond 2008 SNA)* concerns data that are available for 'free' and that are used in the production of goods and services. This may include information that is a by-product of the regular production process as well as information specifically harvested from consumers in return for providing them with a free or discounted service.

A paper summarising the current recording of data within the system of national accounts was discussed at the November 2018 meetings of the Informal Advisory Group and of the Advisory Expert Group (AEG) on National Accounts (Ahmad and Van de Ven, 2018)[13]. This paper includes some alternatives for the possible recording of data in the system of national accounts. While there appears to be general agreement that data constitutes a product that is used more and more in the process of production, there is far less consensus about which types of data should be recorded as assets, whether those assets are produced or non-produced, and how to value data.

In this regard, the OECD is also currently working on a taxonomy that will define data by a range of characteristics, such as completeness, tradability, method of collection etc.; see OECD (2019). It is expected that this will also feed into the delineation and valuation of data as included in the Digital SUTs, likely giving rise to a further breakdown of this category into different types of data in the future.

As there is currently no harmonized approach to delineate and value data (beyond 2008 SNA), countries are encouraged to not only provide the methodology used in constructing the results for this specific category, but to also provide further information on the conceptual basis used for these estimates.

3.2.8. Digital services (beyond 2008 SNA), provided by enterprises

The product category *digital services (beyond 2008 SNA), provided by enterprises* relates to "free" services as provided by enterprises that enable a greater level of utility. This can include, but is not limited to, the easy gathering of information via internet, connecting with others via social media, or being entertained for free by digital means. While usually "consumed" by the household sector, these services can also be used in the production process. Due to the non-monetary nature of the service, it is currently outside the SNA production boundary.

There is, as of yet, no agreed methodology for the estimation of these types of digital services, although several papers have attempted to come up with possible solutions. Monetary values could be estimated e.g. by using data on advertising revenues generated by the provider of the services, by looking at consumers' willingness to pay for the service (Brynjolsson, 2018), by calculating the cost of production in the same way as government expenditure (Coyle, 2018) or through proxies and market sources (Ahmad, Ribarsky, Reinsdorff, 2017). Furthermore, there is still discussion on how exactly to record the related transactions (Nakamura, 2016) and complications that can also arise around potential double counting (Ahmad and Schreyer, 2016). Due to the variety of estimation methodologies and options for recording, it is strongly encouraged that compilers provide further information on the calculation and recording of their estimates.

[13] A further paper on data was presented at the AEG meeting; see Li et al (2018). More information can also be found in IMF (2019).

3.2.9. Digital services (beyond 2008 SNA), provided by communities

The final category of products currently outside of the SNA production boundary is *digital services (beyond 2008 SNA), provided by communities.* It includes the creation of any free digital assets by communities, including the free services that can be derived from these assets. These services are different from *digital services (beyond 2008 SNA) provided by enterprises*, as they have not been produced by a single entity but are the result of a collective effort. Similarly, any resulting asset is not owned by a single (commercial) entity. These products are developed by a range of independent producers and available to all for no monetary cost. They are consumed both as final consumption as well as by businesses as an input to production.

The way of recording the production and the use of (the services derived from) the relevant assets, along with the accounting for other digital products outside of the SNA production boundary, does not fit conveniently within current SNA concepts and assumptions. In Van de Ven (2018), for example, it is proposed to record *Digital services (beyond 2008 SNA), provided by communities* as being produced by the NPISH sector, despite the fact that they clearly serve more than just the households sector. Furthermore, the use of the services produced by these NPIs would need to be matched with some form of transfer in kind, which currently is also restricted to the households sector.

3.3. Digital industries

In the Digital SUTs, seven "digital industries" have been separately distinguished. In the template, the new industries (including their aggregation and subcategories) are covered in columns 1 to 10, and shaded in blue. They are described in more detail below. A decision tree is included in Appendix 1 to assist with the categorisation of units to be allocated to one of the seven industries.

The industries have been separated out in order to quantify specific aspects of digital activity currently unidentifiable within the existing industry allocation of supply use tables. It is possible that some units may meet the definitions of one or more of the new digital industries. In this circumstance, the unit should be placed in the digital industry with a more specialised purpose.[14]

A key driver behind the development of this identification of digital industries within the Digital SUTs is international comparability. If statistical agencies have the data available and deem the work relevant for their country, they are obviously free to break down any specific ISIC industry or new digital industries into additional subsets suitable for their policy needs.[15]

3.3.1. Digitally enabling industries

For the purpose of Digital SUTs, digitally enabling industries are defined as industries engaging in production that is primarily "intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display" (UNSD, 2008). As such, they coincide with the alternative classification that makes up the 'Information and Communication Technologies' (ICT) sector as defined in International Standard Industrial Classification, Revision

[14] Digital industries with specialised purposes include *Digital intermediary platforms charging a fee*, *Data and advertising driven digital platforms*, *Firms dependent on intermediary platforms*, *E-Tailers*, and *Digital only firms providing financial and insurance services*. Units not classified to one of these specialised categories but meeting the definition of *Digitally enabling industries* should be classified there. Units should only be placed in *Other producers only operating digitally*, if they are exclusively digital and not meeting any other digital industry definition.

[15] While initially estimates will be aggregated back to the level in the template, this raises the prospect that as the digital economy continues to evolve an industry breakdown that is compiled by several countries may become a new international standard.

4. (ISIC rev. 4.); (UNSD, 2008). This sector includes the following ISIC categories: 261, 262, 263, 264, 268, 4651, 4652, 5820, 61, 62, 631 and 951. A full list of the ICT industries is provided in Appendix 3.

3.3.2. Digital intermediary platforms charging a fee

A concise definition of digital intermediary platforms currently used by the OECD is as follows:

> "An online platform is a digital service that facilitates interactions between two or more distinct but interdependent sets of users (whether firms or individuals) who interact through the service via the Internet." (OECD, 2019b)

For the purpose of the Digital SUTs, this category only includes those units that meet this definition while also receiving an explicit payment from either the producer or consumer for facilitating the intermediation.

This definition goes beyond the well-known matching platforms servicing the so-called sharing or collaborative economy. It also includes auction sites, resource sharing platforms and other online brokering services. If the platform is not receiving an explicit payment when a transaction has taken place and is solely providing information (therefore gaining revenue by advertising or selling data), it should be allocated to the category *data and advertising driven digital platforms*.

It is important not to include any platforms that are not sufficiently at arm's length from the producer. If the platform is not truly independent and is only offering products from one producer, then this does not meet the definition of an intermediary platform. Instead, the producer is engaging in e-commerce by using an additional avenue for selling its products. The sales made through this producer-developed platform would contribute to goods and services that are digitally ordered directly from the counterparty, rather than being attributed to an intermediary platform.

Although units classified in the category *digital intermediary platforms charging a fee* can be involved in intermediating a wide range of products, the actual activities carried out by the platforms within this classification are usually quite specific and similar. It may cover intermediary platforms as currently included in ISIC rev. 4, Category 4799 "Other retail sales not in stores, stalls or markets", which includes "retail sales by non-store commission agents". This is essentially what intermediate platforms are, i.e. an independent agent that receives commission for facilitating a transaction. A number of intermediary platforms may also be captured in ISIC rev. 4 Category 4791 "Retail sale via mail order houses or via Internet" or category 7990 "Other reservation service and related activities". These latter two classifications include internet retail auctions and the provision of exchange and reservation services for which one can assume that they are also gaining fees for facilitating the auction, exchange or reservation from one of the parties at arms' length being matched.

An important consensus has emerged regarding the treatment of transactions via digital intermediary platforms. A broad agreement has been reached that requires for any transaction recorded via an intermediary platform under a product row, a subsequent transaction of *priced digital intermediary services,* produced by the digital intermediary platform and consumed by the producer will also be recorded.[16]

[16] For more information on this treatment of transactions involving digital intermediary platforms charging a fee, especially cross border transactions; see OECD (2017) and OECD-WTO (Forthcoming)

3.3.3. Data and advertising driven digital platforms

The category *Data and advertising driven digital platforms* includes all units operating exclusively online that predominately generate revenue via selling data or advertising space. This is likely to include social media platforms, search engines, knowledge sharing platforms as well as providers of free phone applications. The majority of these units will be producing the newly created product category of *digital services (beyond 2008 SNA), provided by enterprises*.

According to the current standards for compiling national accounts, it is very unlikely that these units will record any output that feeds into final consumption of households, be they resident or non-resident. Rather, their products, such as advertising, market research or data, are likely to be consumed as intermediate consumption, including by government units.

This category would also include websites and platforms that receive revenue for directing visitors to a third party website. While the platform does receive a fee, this 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*. Rather, it would be considered remuneration in connection to advertising done on behalf of the third party.

A final point should be made regarding the "exclusively digital" as used in definitions and explanations. This means that all facets of the business should be done digitally. This does not mean that the business cannot have a physical location, but that they only interact with consumers via digital means.

3.3.4. Firms dependent on intermediary platforms

Within the Digital SUTs, the classification of *firms dependent on intermediary platforms* includes units for which the majority of demand for their goods and/or services comes via (an) intermediary platform(s). Apart from this determining criterion, they may display a variety of characteristics. Not only do they produce a wide assortment of goods and services, they can also range from large international corporations (hotel chains) to small independent contractors (delivery couriers for food orders).

It is important that, in line with the definition, this industry is limited to those units whose predominant access to consumers to generate revenue is via one or more independent digital intermediary platforms. Units that use platforms as a secondary channel, i.e. generate less than 50% of their demand via intermediary platforms, should remain in their respective ISIC rev. 4 category where the rows representing the different transactional nature can provide some insight into the impact of digitalisation.

Ideally, estimates for this industry would be split between those that are incorporated (Column 6) and unincorporated (Column 7). This would provide clarity between large-scale producers who leverage the platform's popularity to gain additional business, and those firms that have started and continue to exist only because the platform gives them access to a market they otherwise would not be able to reach. Like other dis-aggregations in the table, the latter split is aspirational; the initial focus should remain on populating the estimates for this digital industry as a whole. Furthermore, the products that are being transacted by this industry will likely provide some insight into the type of business.

3.3.5. E-Tailers

The category of *E-Tailers* includes retailers and wholesalers engaged in purchasing and reselling goods or services who receive a majority of their orders digitally. It excludes producers who sell

and deliver their products digitally, which should be classified as *other producers only operating digitally* (see Section 3.3.7). Retailers who are exclusively dealing online are most probably included in ISIC rev. 4 Category 4791 *"Retail sale via mail order houses or via Internet"*.

While retailers and wholesalers who are generating less than 50% of their demand digitally will remain in their respective ISIC rev. 4 category, estimates of their different transaction types will still contribute to the total e-commerce estimate for non-digital industries. In this regard, one also has to be aware that changes in transaction mode may lead to reclassification of entities over time. In that regard, it may be useful to keep records of the relevant units, including their output and value added, that are being re-allocated in the periods for which Digital SUTs are being compiled.

3.3.6. Digital only firms providing financial and insurance services

The category *digital only firms providing financial and insurance services* has proved difficult in deciding where to exactly draw the line separating digital units from non-digital units. It is widely acknowledged that for almost all units providing financial and insurance services as well as those units providing support to these services, the majority of their transactions with consumers are now digital. Rather than simply shifting the entire division into the digital industry, it has been decided that this digital industry would only contain those units that are operating exclusively digitally, with no interaction with consumers physically.

There are certainly firms within ISIC rev. 4 Division K "Financial and insurance activities" that are entirely digital. Often these have been created as subsidiaries of established businesses in order to capitalize on efficiencies generated by digitalisation. This different service model, often in exchange for slightly reduced prices, has expanded to various financial services along with insurance services and pension funding.

3.3.7. Other producers only operating digitally

The *other producers only operating digitally* category consists of all units operating exclusively digitally that have not been placed in one of the previous industries. It likely includes businesses that produce their own services for sale, but operate exclusively digitally, i.e. the products are not only digitally ordered, but they are also digitally delivered. This category would include firms providing digital content on a subscriptions basis as well as online gaming and streaming services. Some discretion will be required regarding which units are and are not included. If the producers are not 100% digital, but the vast majority of their business meets the defined characteristics, then they should still be included.

Producers only operating digitally are not confined to enterprises that produce solely digital services. As described in section 3.2.2 the fact that the service is delivered digitally does not automatically define it as a digital service. Therefore, units that meet the criteria of other producers only operating digitally could currently be classified in a range of different industries.

As stated in ISIC rev. 4, "Units that sell goods and supply services exclusively through the internet are coming into existence [but as they are] classified to the industry of their principal activity, production units engaged in e-commerce will therefore be found in any industry". However, since the category under consideration here only consists of units that sell products which are digitally ordered and delivered, the category will show less variety in the services produced (and the industries where they are classified in the standard supply and use tables), as compared to the statement in ISIC rev. 4. Nevertheless, quite a number of products may still be represented in this industry, including e.g. health, gambling and education. Producers of digital services, as defined in these tables, are likely classified to one of the ISIC categories outlined in the definition of digitally

enabling industries and should remain in that classification regardless of if they are only operating digitally or not.

For compilation purposes, it may not be practical to go through each unit and determine if they are operating on an exclusively digital basis. As in other cases, when trying to delineate digital products and industries, it may prove to be more practical, certainly when compiling estimates for the first time, to target the large publically known examples as a proxy for the entire digital industry.

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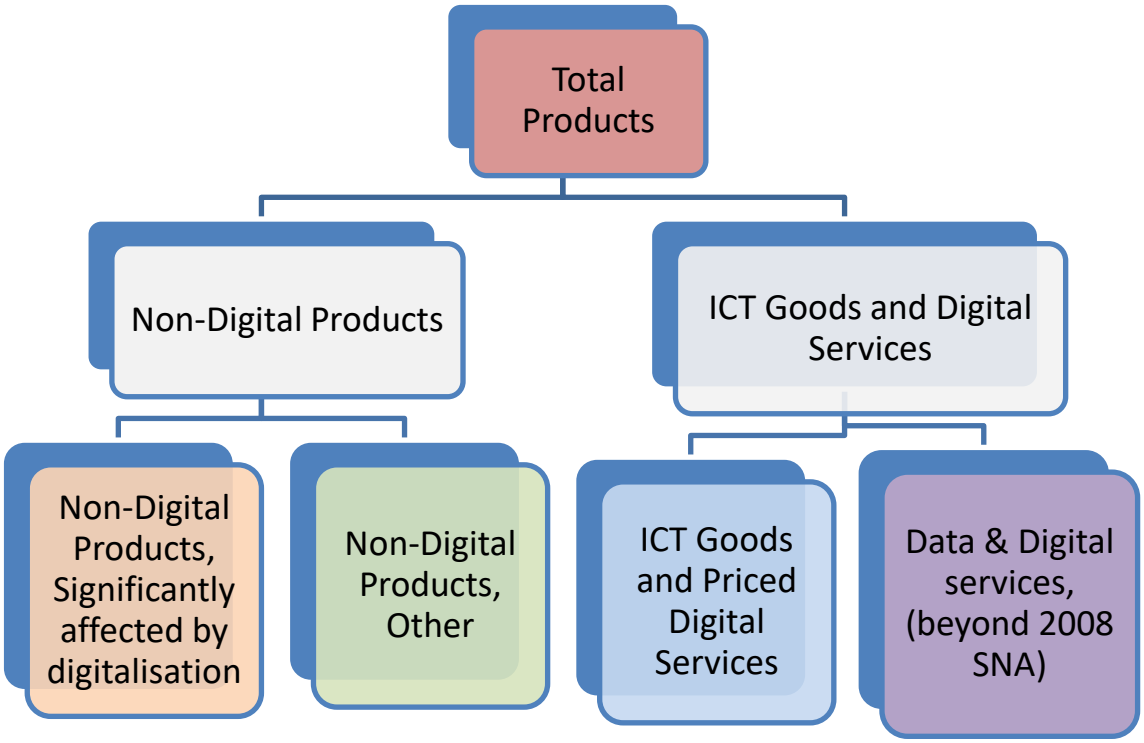
Appendix 1 – Digital industry decision tree

Figure 3.2. Digital industry decision tree

Appendix 2 – Product sub-totals.

Figure 3.3. Product Hierarchy

Colours in box correspond to shading used in tables.



Priority for breaking down product row by nature of transaction
High Priority: *Total Products, ICT Goods and Priced Digital Services, Non-Digital products significantly affected by digitalisation.*
Medium Priority*: Data & Digital Services, (beyond 2008 SNA).*
Low Priority: *Non-Digital products, other.*

Appendix 3 – ICT, as included in ISIC rev. 4. and CPC v. 2.1.

Information and Communication Technologies (ICT), as defined in the International Standard Industrial Classification, Revision 4

ISIC Sub-division	Industry discription
ICT manufacturing industries	
2610	Manufacture of electronic components and boards
2620	Manufacture of computers and peripheral equipment
2630	Manufacture of communication equipment
2640	Manufacture of communication equipment
2680	Manufacture of magnetic and optical media
ICT trade industries	
4651	Wholesale of computers, computer peripheral equipment and software
4652	Wholesale of electronic and telecommunications equipment and parts
ICT services industries	
5820	Software publishing
6110	Wired telecommunications activities
6120	Wireless telecommunications activities
6130	Satellite telecommunications activities
6190	Other telecommunications activities
62	Computer programming, consultancy and related activities
6201	Computer programming activities
6202	Computer consultancy and computer facilities management activities
6209	Other information technology and computer service activities
631	Data processing, hosting and related activities; web portals
6311	Data processing, hosting and related activities
6312	Web portals
951	Repair of computers and communication equipment
9511	Repair of computers and peripheral equipment
9512	Repair of communication equipment

Information and Communication Technologies (ICT), as defined in Central Product Classification (CPC), Version 2.1

CPC Ver.2.1 subclass	Product description (CPC subclass title)
Computers and peripheral equipment	
45142	Point-of-sale terminals, ATMs and similar machines
45220	Portable automatic data processing machines weighing not more than 10 kg, such as laptops, notebooks and sub-notebooks
45230	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
45240	Automatic data processing machines presented in the form of systems
45250	Other automatic data processing machines whether or not containing in the same housing one or two of the following types of units: storage units, input units, output units
45261	Input peripherals (keyboard, joystick, mouse etc.)
45262	Scanners (except combination of printer, scanner, copier and/or fax)
45263	Inkjet printers used with data processing machines
45264	Laser printers used with data processing machines
45265	Other printers used with data processing machines
45266	Units performing two or more of the following functions: printing, scanning, copying, faxing
45269	Other input or output peripheral devices
45271	Fixed media storage units
45272	Removable media storage units
45289	Other units of automatic data processing machines
45290	Parts and accessories of computing machines
47315	Monitors and projectors, principally used in an automatic data processing system
47550	Solid-state non-volatile storage devices
Communication equipment	
46921	Burglar or fire alarms and similar apparatus
47211	Transmission apparatus incorporating reception apparatus
47212	Transmission apparatus not incorporating reception apparatus
47213	Television cameras
47221	Line telephone sets with cordless handsets
47222	Telephones for cellular networks or for other wireless networks
47223	Other telephone sets and apparatus for transmission or reception of voice, images or other data, including apparatus for communication in a wired or wireless network (such as a local or wide area network)
47401	Parts for the goods of subclasses 47221 to 47223
Consumer electronic equipment	
38581	Video game consoles
47214	Video camera recorders

47215	Digital cameras
47311	Radio broadcast receivers (except of a kind used in motor vehicles), whether or not combined with sound recording or reproducing apparatus or a clock
47312	Radio broadcast receivers not capable of operating without an external source of power, of a kind used in motor vehicles
47313	Television receivers, whether or not combined with radio-broadcast receivers or sound or video recording or reproducing apparatus
47314	Monitors and projectors, not incorporating television reception apparatus and not principally used in an automatic data processing system
47321	Sound recording or reproducing apparatus
47323	Video recording or reproducing apparatus
47330	Microphones and stands therefor; loudspeakers; headphones, earphones and combined microphone/speaker sets; audio-frequency electric amplifiers; electric sound amplifier sets
47402	Parts for the goods of subclasses 47321, 47323 and 47330 Miscellaneous ICT components and goods
Miscellaneous ICT components and goods	
45281	Sound, video, network and similar cards for automatic data processing class Product description (CPC subclass title)
47140	Thermionic, cold cathode or photo-cathode valves and tubes (including cathode ray tubes)
47150	Diodes, transistors and similar semi-conductor devices; photosensitive semi-conductor devices; light emitting diodes; mounted piezo-electric crystals
47160	Electronic integrated circuits
47173	Parts for the goods of subclasses 47140 to 47160
47403	Parts for the goods of subclasses 47211 to 47213, 47311 to 47315 and 48220
47530	Magnetic media, not recorded, except cards with a magnetic stripe
47540	Optical media, not recorded
47590	Other recording media, including matrices and masters for the production of disks
47910	Cards with a magnetic stripe
47920	“Smart cards”
48315	Liquid crystal devices n.e.c.; lasers, except laser diodes; other optical appliances and instruments n.e.c.
48354	Parts and accessories for the goods of subclass 48315
Manufacturing services for ICT equipment	
88741	Electronic component and board manufacturing services
88742	Computer and peripheral equipment manufacturing services
88743	Communication equipment manufacturing services
88744	Consumer electronics manufacturing services
88749	Magnetic and optical media manufacturing services
Business and productivity software and licensing services	
47811	Operating systems, packaged
47812	Network software, packaged
47813	Database management software, packaged
47814	Development tools and programming languages software, packaged
47821	General business productivity and home use applications, packaged

47829	Other application software, packaged
73311	Licensing services for the right to use computer software
83143	Software originals
84341	System software downloads
84342	Application software downloads
84392	On-line software
Information technology consultancy and services	
83117	Business process management services
83131	IT consulting services
83132	IT support services
83141	IT design and development services for applications
83142	IT design and development services for networks and systems
83151	Website hosting services
83152	Application service provisioning
83159	Other hosting and IT infrastructure provisioning services
83161	Network management services
83162	Computer systems management services
Telecommunications services	
84110	Carrier services
84120	Fixed telephony services
84131	Mobile voice services
84132	Mobile text services
84133	Mobile data services, except text services
84140	Private network services
84150	Data transmission services
84190	Other telecommunications services
84210	Internet backbone services
84221	Narrowband Internet access services
84222	Broadband Internet access services
84290	Other Internet telecommunications services Leasing or rental services for ICT equipment
Leasing or rental services for ICT equipment	
73124	Leasing or rental services concerning computers without operator
73125	Leasing or rental services concerning telecommunications equipment without operator
73210	Leasing or rental services concerning televisions, radios, video cassette recorders and related equipment and accessories Other ICT services
Other ICT services	
83325	Engineering services for telecommunications and broadcasting projects
87130	Maintenance and repair services of computers and peripheral equipment
87153	Maintenance and repair services of telecommunication equipment and apparatus
87331	Installation services of mainframe computers
87332	Installation services of personal computers and peripheral equipment
87340	Installation services of radio, television and communications equipment and apparatus

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Working Party on National Accounts

High priority indicators in the Digital Supply-Use Tables

[Subtitle]

This paper proposes several indicators from the digital Supply-Use Tables (Digital SUTs) that would be considered high priority. In addition it provides conceptual and practical information to assist with the compilation of these high priority indicators.

John Mitchell
John.mitchell@oecd.org

1. Introduction

The Informal Advisory Group on Measuring GDP in a Digitalised Economy (the advisory group) has developed a framework for Digital Supply-Use Tables (Digital SUTs)[1]. At the meeting of the advisory group on July 1-2, 2019, it has been proposed that, due to the ambitious nature of fully populating the Digital SUTs, and the various levels of data sources and resources available across, the OECD Secretariat would put forward a concrete proposal for a set of high priority indicators, for further consultation with the member countries.

The proposed list of high priority indicators includes the following:

1. Output, Gross Value Added (GVA) and its components, of digital industries.
2. Intermediate consumption of Digital Intermediary Services (DIS), Cloud Computing services (CCS) and total ICT goods and digital services.
3. Expenditures split by nature of the transaction.

The indicators put forward here are more or less similar to those discussed at the meeting of the advisory group on July 1 – 2, 2019. While they are considered the immediate priorities, countries are still encouraged to work towards a more complete population of the Digital SUTs. Agreeing on a number of high priority indicators will help however in co-ordinating the initial results that can be derived from the Digital SUTs, thereby maximising its use as an internationally comparable framework. The Digital SUTs as such remain a roadmap for further internationally co-ordinated development in the future.

Each of the following three chapters will cover a group of high priority indicators in more detail. This includes some more information on the definition, including their link to the Digital SUTs template. Furthermore, some basic information regarding the compilation methodology is provided. The latter includes references and links to available existing work that may be of use. These references and links are merely examples of what is publically available and are not to be considered as an exhaustive list.

Data sources for the compilation of some of the indicators may not yet be fully in line with standard quality considerations. Until data source availability catches up, the compilation of the Digital SUTs and related indicators will require a larger amount of assumptions, modelling etc. than normal. In this respect, it should also be noted that data sources, and therefore methodologies, may differ across countries. Notwithstanding these concerns, countries are encouraged to compile estimates, if necessary on a provisional and experimental basis.

Finally, this paper does not include full details on (additional) concepts and definitions within the Digital SUTs framework. Therefore, this paper should be referenced in

[1] OECD, "Guidelines for supply-use tables for the Digital Economy", (2019). Subsequently distributed to members of the OECD Working Party on National Accounts. The extended paper and corresponding template are available at https://community.oecd.org/docs/DOC-155415

collaboration with the previously distributed Guidelines for digital supply-use tables. These guidelines contain more extensive definitions and concepts behind some of the terminology and classifications used in this note.

2. Output, Gross Value Added (GVA) and its components, of digital industries.

► *Further information on the content*

This group of indicators relates to the following seven "digital industries": *digitally enabling industries, digital intermediary platforms charging a fee, data and advertising driven digital platforms, firms dependent on intermediary platforms, e-tailers, digital only firms providing financial and insurance services,* and *other producers only operating digitally*.[2] If possible, the provision of subtotals for each of the seven industries is encouraged. Output and value added should preferably be values at basic prices.

► *Link to the template*

In the templates of the Digital SUTs, columns 1 – 9 represent the digital industries. Output at basic prices is included in row 1 of the supply table. Gross Value Added and its components are included in rows 601 – 610 of the use table.

► *Compilation*

Outputs for some digital industries will be easier to derive due to their close alignment to existing classifications. Two digital industries, that are likely to have a presence in many countries and are clearly articulated in existing classifications, are *digitally enabling industries* and *e-tailers*. More detailed information on these two industries is provided separately below, followed by the other digital industries for which the compilation may require more manual interventions.

Estimates for the respective digital industries could be derived by delineating certain organisations based on their characteristics or classification; an example of this is the proposal for the *digitally enabling industries*. It is possible that if compiled this way, output of these industries will include secondary activities, which may not have a direct relationship with the digital economy. Alternatively, industry estimates may be compiled starting from information on the various digital goods and services produced, this has been the initial starting point for various work already completed by statistical offices; see some of the links to studies provided below.

Digitally Enabling Industries

Within the Digital SUTs framework, the *digitally enabling industries* are aligned with the Information and Communication Technologies' (ICT) sector as defined in International Standard Industrial Classification, Revision 4. (ISIC rev. 4.); (UNSD, 2008). This sector includes the following ISIC categories: 261, 262, 263, 264, 268, 4651, 4652, 5820, 61, 62, 631 and 951; a detailed list is provided in the appendix.

[2] A brief definition and examples for each industry is provided in the appendix

While some units within these ISIC groups and sub-groups may also meet other digital industry definitions, and therefore require reclassification, in the interim, the indicators related to the digitally enabling industries can be calculated by aggregating the output of units that fall within these ISIC categories.

This delineation using the ICT sector classification is already occurring in many countries, including European countries. In the ICT publication attached at the conclusion of this chapter, Eurostat are using the same ISIC/NACE categories mentioned previously to make up the ICT sector.

E-Tailers

The category of *e-tailers* includes retailers and wholesalers engaged in purchasing and reselling goods or services who receive a majority of their orders digitally. It excludes units that produce and sell their products digitally, which should be classified as other producers only operating digitally.

Retailers who are exclusively dealing online are most probably included in ISIC rev. 4 Category 4791 "Retail sale via mail order houses or via Internet". However, this classification may not include units that begun as a physical shop but have subsequently moved digital, and now generate a majority of their orders digitally. To generate numbers for *e-tailers* who are not classified in category 4791, countries may consider using the various online retail sales indexes or e-commerce indicators that already exist to assist in modelling estimates. Various examples of these existing publications are provided at the conclusion of the section. By delineating the output from units that generate higher sales from e-commerce, compared to physical sales, and those already in the online only segment of the register would enable their estimates to be aggregated and used to complete the various outputs of the *e-tailers* industry.

Other Digital Industries

The remaining digital industries are likely more difficult to identify as they are not aligned with a specific ISIC group or class. It is possible that some digital industries, such as *digital intermediary platforms* or *data and advertising driven digital platforms* will have only a limited domestic presence, with the output of non-resident firms being imported into the economy. Initially it may be most effective to identify the larger units that meet the definition of these other digital industries in order to manually delineate and aggregate their output and value added.

Links

The following links contains work that deviates from the definitions and classifications used in the Digital SUTs framework. They are provided merely as examples of existing work that share similar compilation methods or if undertaken in a country could assist with the estimation of various Digital SUTs indicators.

- Eurostat publication displaying the ICT sector as a percentage of total value added. Available here.

- Publication from Statistics Canada that presents their estimate of the Digital Economy based on the output and value added from selected products delineated as “digital”. Available here.
- Publication from the Bureau of Economic Analysis that presents their estimate of the Digital Economy based on the output and value added from selected products delineated as “digital”. Available here.
- Publication from Australian Bureau of Statistics that presents their estimate of the Digital Economy based on the output and value added from selected products delineated as “digital”. Available here.
- The United States Census Bureau produces a regular E-Commerce publication. Data is sourced from the retail firms using the same sample as the one for the retail sales publication. Available here.
- The ABS publishes a separate online sales component as part of their monthly retail sales publication. Available here.
- Statistics Netherlands publishes a separate online sales estimate along with their standard retail turnover publication. Available here.

3. Intermediate consumption of Digital Intermediary Services (DIS), Cloud Computing services (CCS) and total ICT goods and digital services.

► ***Further information on the content***

There are three indicators related to the intermediate consumption by business that are considered high priority; the use of total information, communication and technological (ICT) goods and Digital Services, as well as information on the use of two specific digital services, cloud computing services (CCS), and digital intermediary services (DIS).

Cloud computing services (CCS) is defined as "Computing services based on a set of computing resources that can be accessed in a flexible, elastic, on-demand way with low management effort" (OECD, 2014). Due to the proliferation in the use of cloud computing, there is a strong user demand to identify supply and demand of this type of services, and aggregate them into one category of product within the digital SUTs.

From a policy perspective, it would be highly relevant to know more about the shift between own investments in ICT-products towards the intermediate consumption of CCS. For this reason, it is proposed to include indicators on the increasing use of CCS by industries. As a start, one could think of trying to arrive at an estimate of total intermediate consumption, which subsequently could be broken down by industry.

In the guidelines accompanying the Digital SUTs, digital intermediary services (DIS) are defined as "the service of providing information on and successfully matching two independent parties to a transaction via a digital platform in return for an explicit fee." The value of these services is based on the explicit monetary amount that digital intermediary platforms (DIPs) will charge the producer (or occasionally the consumer) for facilitating the transaction. Within the Digital SUTs, this service has been classified to a new product: digital intermediary services, and is equal to the output produced by the DIPs.[3]

All DIS are to be recorded as intermediate consumption of the producers of the underlying services, whether or not the intermediation fee is actually charged to the producer. For some services, part of the intermediation fee may be implicitly charged to the final consumer of the underlying service, but here too it is assumed that the producer pays the full amount of intermediation fees, while the full costs paid by the consumer are recorded as payments to the producer for the underlying services provided. Only in relatively exceptional cases, payments of intermediation fees, which are explicitly charged apart from the price paid for the underlying services, one may observe final consumption of intermediation fees.

From a user perspective, having estimates on the intermediate consumption of DIS would be highly relevant. The disruptive impact of this type of activity by the changes in the demand for goods and services is occurring in every country. However, depending on the level of domestic production of these products actually taking place in a respective country's economy, monitoring the value of output and value added of enterprises providing DIS may also be quite relevant. Furthermore, it is considered important to monitor changes in

[3] The framework assumes that DIS is produced by DIPs only and that DIPs are not producing any product except for DIS.

consumer behaviour, from more traditional ways of consumption to purchases of goods and services via newly established intermediary platform, such as Uber and Airbnb. This latter will be discussed in section four.

While total intermediate consumption of ICT goods and digital services in the economy is of interest, the major benefit of this indicator is if the aggregations are split by as many industries as possible. By generating a time series of this output, the Digital SUTs could provide insight into the varied but increasing use of digitalisation in the production process.

► *Link to the template*

In the Digital SUTs, intermediate consumption of the listed digital products are recorded in the use worksheet in the following rows; total ICT goods and digital services in Row 7, digital intermediate services in Row 37 and cloud computing services in row 43. All three categories could conceivably be used as intermediate consumption by every industry; however, it is clear that the consumption of the different products may differ between industries. The primary objective of the high priority indicator is to arrive at an aggregate estimate of intermediate consumption for each of the categories (column 129). If available, more details could be provided by industry, especially the ones that are affected to a significant degree, with estimates for specific industries to be placed in the relevant rows in columns 12-128.

► *Compilation*

The aggregation of total ICT goods and digital services aligns with products listed as Information, Communications and Technological products in the CPC 2.1.[4] These products could be separated from the existing CPA categories within the conventional use tables and then aggregated to form estimates of intermediate consumption of total ICT goods and digital services.

Both DIS and CCS do not exist explicitly in the CPC or CPA, in order to identify the amounts of DIS and CCS being used (and produced), additional data sources may be required either based on revenue estimates from producers or via expenditure by users. Producers of DIS are aggregated together regardless of the underlying product that they are intermediating. Within the Digital SUTs framework, there is no delineation between the various digital intermediation platforms (DIPs), as they are all considered to be producing the same intermediation product, DIS.

Estimates of DIS may be modelled, often based on estimates of overall expenditure via the platform. While the cost of the service fee charged by the platforms varies, with some platforms charging a flat fee, and others charging a percentage of the amount spent, an average percentage could be estimated based on popular platforms. Statistics Netherlands and others have undertaken a similar approach (provided at the conclusion of the chapter) in their estimation of accommodation services.

To compile estimates of CCS, countries may choose to undergo case studies or “deep dives” of producers to try to determine total domestic supply and use this as initial estimate of total

[4] A full list is provided in the appendix

businesses expenditure on CCS.[5] Alternatively, or as a supplement to the previous exercise, the intermediate consumption of CCS may be approximated via the application of ratios to existing estimates of the intermediate consumption of certain CPA categories that include elements of CCS.[6]

Links

The following links contains work that deviates from the definitions and classifications used in the Digital SUTs framework. They are provided merely as examples of existing work that share similar compilation methods or if undertaken in a country could assist with the estimation of various Digital SUTs indicators.

- A paper from Statistics Netherlands that models the use of Airbnb within the Netherlands. Available here.
- A paper from Stats New Zealand that models the use of accommodation services booked online within New Zealand. Available here.

[5] Imports of CCS would also have to be taken into consideration.

[6] A Eurostat task force has advised on the current classification of the various cloud-computing products. This includes CPA 58.2 (Software publishing services) for Software as a Services - SaaS; CPA 62.01 (Computer programming services) for Platform as a Service - PaaS and CPA 63.11.1 (Data processing, hosting, application services and other IT infrastructure provisioning services) for Infrastructure as a Service- IaaS (Eurostat, 2018).

4. Expenditures split by nature of the transaction.

► ***Further information on the content***

In the formal publications released up to now by NSOs that referenced the digital economy, estimates were mainly limited to output and (components of) value added for digital industries. However, indicators on expenditures broken down by nature of the transaction are also considered highly relevant for monitoring the impact of the digital economy. To monitor these developments, the following indicators are proposed:

- total household final consumption expenditure (HFCE) digitally ordered;
- total imports digitally ordered; and
- total exports digitally ordered.

Initially the priority for the above indicators will be digitally ordering as this is seen as more achievable in the short term; however, information on the level of above indicators that were digitally delivered is also highly sought after.

In addition to the above aggregate indicators, it is proposed to also seek indicators on the digital disruption occurring in HFCE of specific products explicitly highlighted in the framework.

These highlighted products are; Land transport services and transport services via pipelines (CPA division 49), accommodation services (CPA division 55), food and Beverage serving services (CPA division 56), motion picture, video and television programme production services, sound recording and music publishing (CPA division 59), financial and insurance services (CPA section K), advertising and market research services, (CPA division 73), travel agency, tour operator and other reservation services (CPA division 79), education services (CPA section P), gambling and betting services (CPA division 92), publishing services (CPA division 58).

Depending on the available data and level of consumption of specific products, countries would provide a transactional breakdown of as many of the highlighted products as possible. This transactional breakdown could include estimates of consumption of the product that was:

- digitally ordered;
- digitally ordered-direct from a counterparty;
- digitally ordered-via a resident digital intermediary platform;
- digitally ordered-via a non-resident digital intermediary platform;
- not digitally ordered;
- digitally delivered.

By focusing on this transactional split for only a small percentage of the overall products would allow policy makers to gage how the take up of digital ordering and delivery for certain products, (which is often the most obvious manifestation of the digital economy for the public) compares internationally.

► *Link to the template*

Estimates of HFCE and exports are recorded on the use worksheet in columns 130 (HFCE) and column 140 (Exports). The digitally ordered amount of these indicators is recorded in row 2 with further split depending if it was direct with the counterparty (row 3) or via a digital platform (row 4 and 5). Estimates of imports are located in column 13 of the supply table with the transactional splits located on the same rows.

Estimates of household consumption of the highlighted products identified as significantly impacted by digital disruption are also located in column 130 of the use worksheet. Within this column, total household consumption of the highlighted products at the CPA level, are represented on rows 49, 55, 61… 103, with the corresponding transaction nature represented in the immediate five rows below (50-54, 56-60…104-108).

► *Compilation*

The most accurate way of sourcing this information would be to ask businesses direct regarding how they source their sales and deliver their products. This information however, is likely not available in currently used administrative or survey data. Consumer surveys however, that detail the level of expenditure and the frequency that consumers purchase online or utilise platforms are becoming more prolific. There may also be specific research projects to capture, for example, parts of digital trade. Some available studies are provided in the links below.

Links

The following links contains work that deviates from the definitions and classifications used in the Digital SUTs framework. They are provided merely as examples of existing work that share similar compilation methods or if undertaken in a country could assist with the estimation of various Digital SUTs indicators.

- A publication from Statistics Canada showing results from a household survey on the use of digital platforms in Canada. Available here.
- A paper from the Deutsche Bundesbank that estimates consumption of specific digital services in Germany using a range of publically available sources. Available here.
- A Statistics Sweden database that details the amount and type of products purchased online. Available here.
- Publication from Statistics Netherlands on travel and holidays that includes questions regarding digital use for purchasing. Available here.
- A Statistics Sweden database that details the amount and characteristics of those booking transport services online. Available here.
- The initial draft chapters from the forthcoming OECD-WTO “Handbook on measuring digital trade”. Available here.

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Appendix 1

Information and Communication Technologies (ICT), as defined in the International Standard Industrial Classification, Revision 4

ISIC Sub-division	Industry discription
ICT manufacturing industries	
2610	Manufacture of electronic components and boards
2620	Manufacture of computers and peripheral equipment
2630	Manufacture of communication equipment
2640	Manufacture of communication equipment
2680	Manufacture of magnetic and optical media
ICT trade industries	
4651	Wholesale of computers, computer peripheral equipment and software
4652	Wholesale of electronic and telecommunications equipment and parts
ICT services industries	
5820	Software publishing
6110	Wired telecommunications activities
6120	Wireless telecommunications activities
6130	Satellite telecommunications activities
6190	Other telecommunications activities
62	Computer programming, consultancy and related activities
6201	Computer programming activities
6202	Computer consultancy and computer facilities management activities
6209	Other information technology and computer service activities
631	Data processing, hosting and related activities; web portals
6311	Data processing, hosting and related activities
6312	Web portals
951	Repair of computers and communication equipment
9511	Repair of computers and peripheral equipment
9512	Repair of communication equipment

Appendix 2

Information and Communication Technologies (ICT), as defined in Central Product Classification (CPC), Version 2.1

CPC Ver.2.1 subclass	Product description (CPC subclass title)
	Computers and peripheral equipment
45142	Point-of-sale terminals, ATMs and similar machines
45220	Portable automatic data processing machines weighing not more than 10 kg, such as laptops, notebooks and sub-notebooks
45230	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
45240	Automatic data processing machines presented in the form of systems
45250	Other automatic data processing machines whether or not containing in the same housing one or two of the following types of units: storage units, input units, output units
45261	Input peripherals (keyboard, joystick, mouse etc.)
45262	Scanners (except combination of printer, scanner, copier and/or fax)
45263	Inkjet printers used with data processing machines
45264	Laser printers used with data processing machines
45265	Other printers used with data processing machines
45266	Units performing two or more of the following functions: printing, scanning, copying, faxing
45269	Other input or output peripheral devices
45271	Fixed media storage units
45272	Removable media storage units
45289	Other units of automatic data processing machines
45290	Parts and accessories of computing machines
47315	Monitors and projectors, principally used in an automatic data processing system
47550	Solid-state non-volatile storage devices
	Communication equipment
46921	Burglar or fire alarms and similar apparatus
47211	Transmission apparatus incorporating reception apparatus
47212	Transmission apparatus not incorporating reception apparatus
47213	Television cameras
47221	Line telephone sets with cordless handsets
47222	Telephones for cellular networks or for other wireless networks
47223	Other telephone sets and apparatus for transmission or reception of voice, images or other data, including apparatus for communication in a wired or wireless network (such as a local or wide area network)
47401	Parts for the goods of subclasses 47221 to 47223
	Consumer electronic equipment
38581	Video game consoles
47214	Video camera recorders

47215	Digital cameras
47311	Radio broadcast receivers (except of a kind used in motor vehicles), whether or not combined with sound recording or reproducing apparatus or a clock
47312	Radio broadcast receivers not capable of operating without an external source of power, of a kind used in motor vehicles
47313	Television receivers, whether or not combined with radio-broadcast receivers or sound or video recording or reproducing apparatus
47314	Monitors and projectors, not incorporating television reception apparatus and not principally used in an automatic data processing system
47321	Sound recording or reproducing apparatus
47323	Video recording or reproducing apparatus
47330	Microphones and stands therefor; loudspeakers; headphones, earphones and combined microphone/speaker sets; audio-frequency electric amplifiers; electric sound amplifier sets
47402	Parts for the goods of subclasses 47321, 47323 and 47330 Miscellaneous ICT components and goods
Miscellaneous ICT components and goods	
45281	Sound, video, network and similar cards for automatic data processing class Product description (CPC subclass title)
47140	Thermionic, cold cathode or photo-cathode valves and tubes (including cathode ray tubes)
47150	Diodes, transistors and similar semi-conductor devices; photosensitive semi-conductor devices; light emitting diodes; mounted piezo-electric crystals
47160	Electronic integrated circuits
47173	Parts for the goods of subclasses 47140 to 47160
47403	Parts for the goods of subclasses 47211 to 47213, 47311 to 47315 and 48220
47530	Magnetic media, not recorded, except cards with a magnetic stripe
47540	Optical media, not recorded
47590	Other recording media, including matrices and masters for the production of disks
47910	Cards with a magnetic stripe
47920	“Smart cards”
48315	Liquid crystal devices n.e.c.; lasers, except laser diodes; other optical appliances and instruments n.e.c.
48354	Parts and accessories for the goods of subclass 48315
Manufacturing services for ICT equipment	
88741	Electronic component and board manufacturing services
88742	Computer and peripheral equipment manufacturing services
88743	Communication equipment manufacturing services
88744	Consumer electronics manufacturing services
88749	Magnetic and optical media manufacturing services
Business and productivity software and licensing services	
47811	Operating systems, packaged
47812	Network software, packaged
47813	Database management software, packaged
47814	Development tools and programming languages software, packaged
47821	General business productivity and home use applications, packaged

47829	Other application software, packaged
73311	Licensing services for the right to use computer software
83143	Software originals
84341	System software downloads
84342	Application software downloads
84392	On-line software
Information technology consultancy and services	
83117	Business process management services
83131	IT consulting services
83132	IT support services
83141	IT design and development services for applications
83142	IT design and development services for networks and systems
83151	Website hosting services
83152	Application service provisioning
83159	Other hosting and IT infrastructure provisioning services
83161	Network management services
83162	Computer systems management services
Telecommunications services	
84110	Carrier services
84120	Fixed telephony services
84131	Mobile voice services
84132	Mobile text services
84133	Mobile data services, except text services
84140	Private network services
84150	Data transmission services
84190	Other telecommunications services
84210	Internet backbone services
84221	Narrowband Internet access services
84222	Broadband Internet access services
84290	Other Internet telecommunications services Leasing or rental services for ICT equipment
Leasing or rental services for ICT equipment	
73124	Leasing or rental services concerning computers without operator
73125	Leasing or rental services concerning telecommunications equipment without operator
73210	Leasing or rental services concerning televisions, radios, video cassette recorders and related equipment and accessories Other ICT services
Other ICT services	
83325	Engineering services for telecommunications and broadcasting projects
87130	Maintenance and repair services of computers and peripheral equipment
87153	Maintenance and repair services of telecommunication equipment and apparatus
87331	Installation services of mainframe computers
87332	Installation services of personal computers and peripheral equipment
87340	Installation services of radio, television and communications equipment and apparatus

Appendix 3

Digital Industries
Digitally enabling industries
Simple definition: Businesses engaging in production that enables the function of information processing and communication by electronic means.
Includes: Internet service providers, telecommunications companies, providers and developers of software, Computer manufacturers, and website developers.
Excludes: Free and priced digital media providers, social media providers, digital platforms directly or intermediately providing goods and services not included in the defined ICT sector list for ISIC Rev.4.
Digital intermediary platforms charging a fee
Simple definition: Business that receive an explicit payment for facilitating a transaction between two or more distinct but interdependent sets of users.
Includes: Food delivery companies, travel booking portals, platforms facilitating online auction or marketplaces that assume no ownership of stock.
Excludes: Digital platforms that sell their own goods or services, platforms that do not receive an explicit monetary fee from either the producer or consumer.
Data and advertising driven digital platforms
Simple definition: Businesses that are operating exclusively online that predominately generate revenue via selling data or advertising space (
Includes: Search engines, social media platforms, developers of zero-priced phone applications and information sharing platforms.
Excludes: Business that sell goods or service (excluding data or advertising space) for a monetary price, subscription based services providers, priced phone applications and information sharing platforms.
Firms dependent on intermediary platforms
Simple definition: Businesses that always or a significant majority of the time transact with consumers via an independently owner third party digital platform.

Includes: Independent service providers who source work from digital platforms, business who sell via a third party digital platform.
Excludes: Business who sell predominately digitally but do so via their own website/digital platform.
E-tailers
Simple definition: Retail and wholesale businesses engaged in purchasing and reselling goods or services who receive a majority of their orders digitally.
Includes: Businesses receiving orders digitally that sell their own inventory and/or have set contracts with producers and suppliers.
Excludes: Businesses that carry no ownership of the purchased good or service, businesses who contribute no additional value added to the consumed good or service.
Digital only firms providing financial and insurance services
Simple definition: Businesses providing financial and insurance services that are operating exclusively digitally, with no interaction with consumers physically.
Includes: Online only banks and other financial service providers, online only payment system providers.
Excludes: Banks and other financial service providers that include consumer-facing locations, platforms solely acting as intermediaries between lender and borrower (i.e. crowd funding websites).
Other producers only operating digitally
Simple definition: Businesses that produce their own services for sale, but operate exclusively digitally
Includes: Priced digital media providers, subscription based service providers (assuming the service is delivered digitally)
Excludes: Business who do not deliver their good or service digitally regardless of how they receive orders.