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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.

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1. Introduction

1. 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.

2. 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.

3. 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.

4. 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.

5. 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

[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.

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

6. 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 0, 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

7. 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

8. 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).

[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.

- 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).
- 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).

9. 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.

10. 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

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

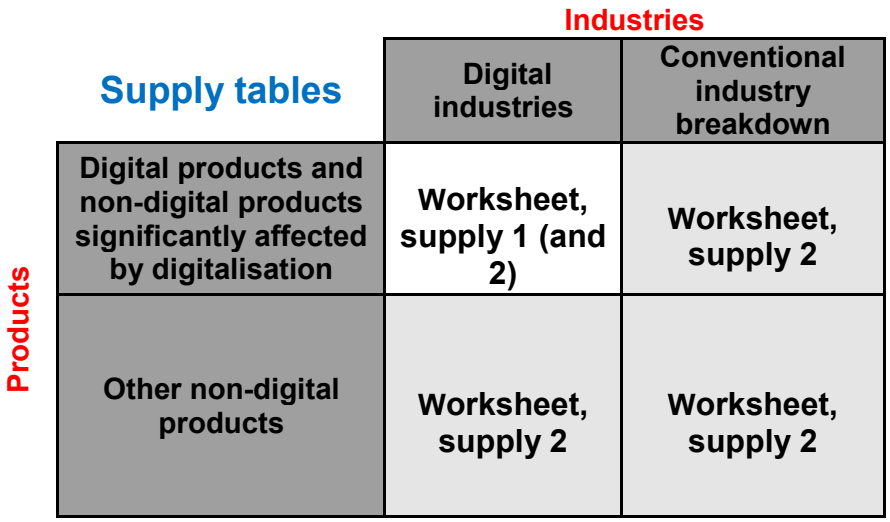
12. The first worksheet labelled ‘Supply 1’ focuses on the industries and products most affected by digitalisation, with an aggregation of all other industries (Column 11, shaded green) and products (non-digital products, Row 19, shaded green) in a single column or row. In this sense it is a simplified 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).

[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.

13. 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.

14. 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



15. 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.

[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.

16. The third worksheet labelled 'Use' provides the same breakdown of industries, products and transactions included in Supply 2, thus providing an 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.

17. 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.

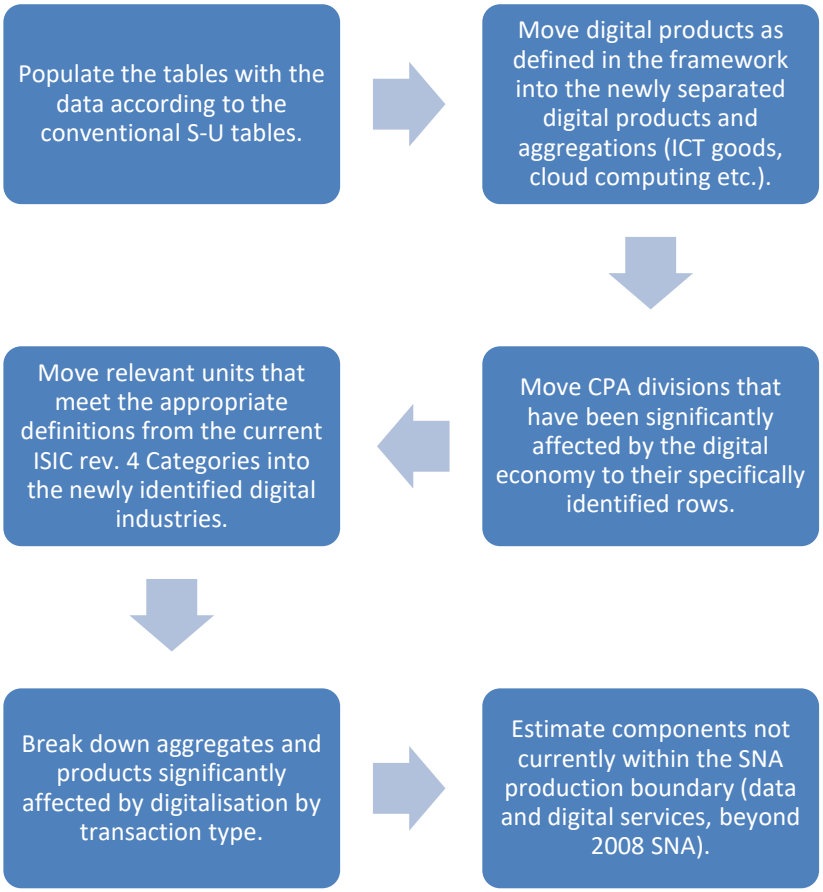
2.4. Overview of compilation

18. 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.

19. 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.

20. 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 encouraged 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

21. 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

22. 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	

23. 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.

24. 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).

25. 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

26. 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)

27. 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]

28. 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

29. 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

30. 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

31. 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

32. 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 electronically downloadable format" (OECD-WTO,

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

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

33. 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

34. 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

35. 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

36. 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.

[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.

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

3.2.3. Priced cloud computing services

38. 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).

39. 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]

40. 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

41. 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

42. 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.

[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).

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

43. 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.
- 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

44. 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).

45. 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.

46. 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

47. 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

48. 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 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)

49. 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.

50. A paper summarizing 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.

51. 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.

52. 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

53. 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

[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.

[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).

production process. Due to the non-monetary nature of the service, it is currently outside the SNA production boundary.

54. 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.

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

55. 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.

56. 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

57. 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.

58. 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]

59. 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

60. 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 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

61. 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)

62. 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.

63. 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*.

64. 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.

[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.

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.

65. 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.

66. 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]

3.3.3. Data and advertising driven digital platforms

67. 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*.

68. 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.

69. 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.

70. 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

[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).

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

71. 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).

72. 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.

73. 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

74. 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".*

75. 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

76. 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.

77. 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

78. 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.

79. 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.

80. 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.

81. 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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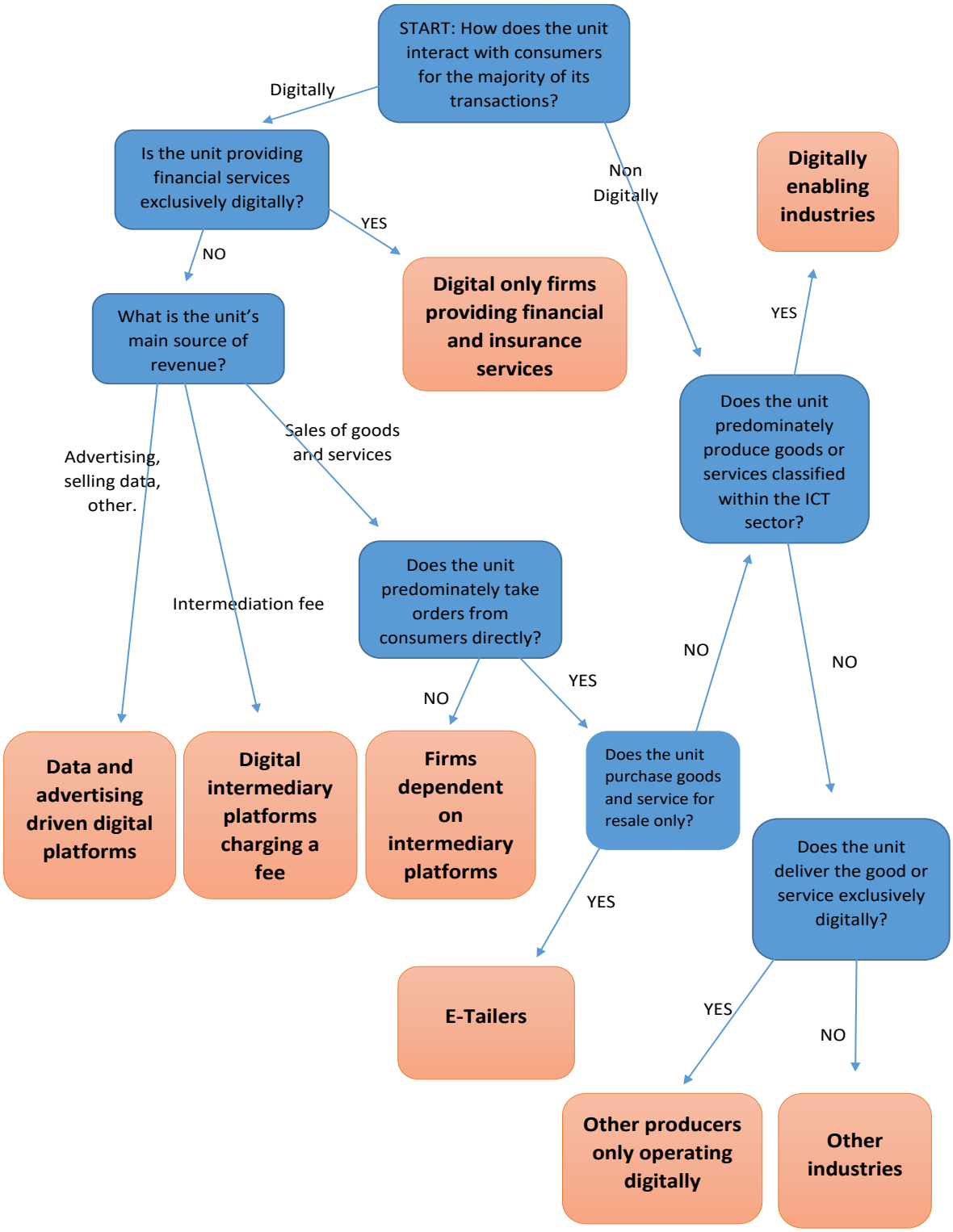
Appendix 1 – Digital industry decision tree

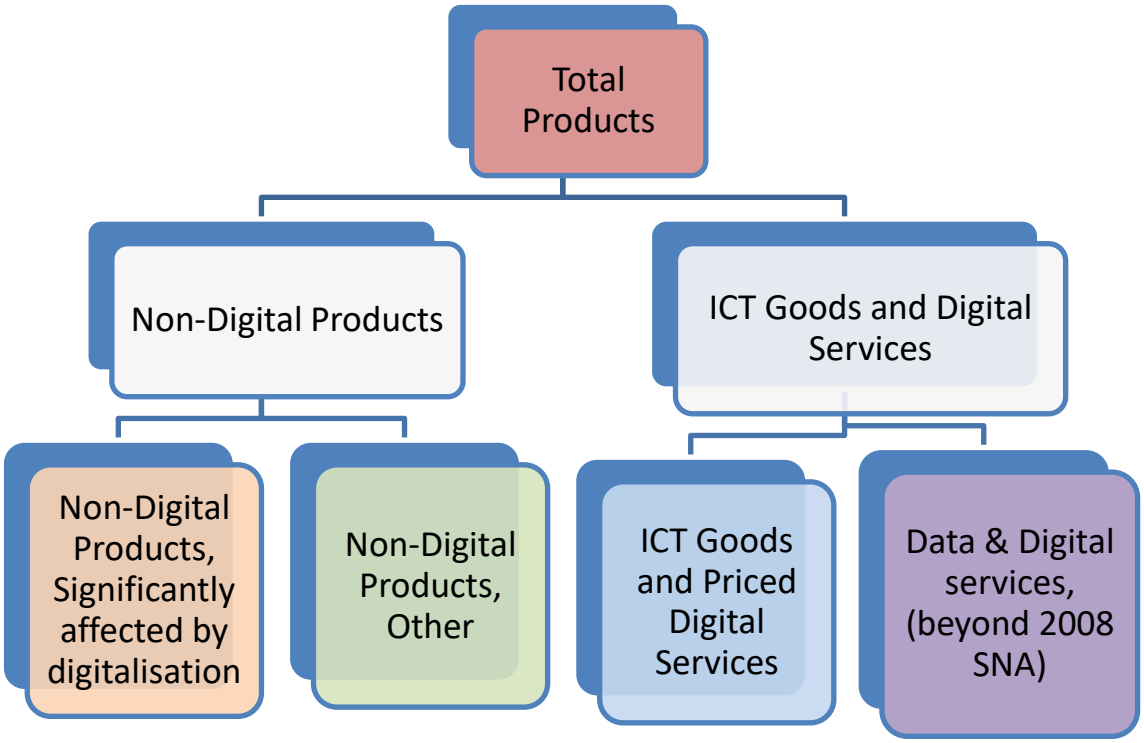
Figure 3.2. Digital industry decision tree



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