

15th Meeting of the Advisory Expert Group on National Accounts, 6-8 April 2021, Remote Meeting

Agenda item: 7.2

Update on guidance note on increasing the visibility of digitalisation in the national account through the development of digital Supply-Use Tables.

The note provides a summary of the planned global consultation on the production of digital Supply-Use Tables (digital SUTs).

Testing on the guidance note has, to a certain extent, already commenced in an informal way. The conceptual aspect of the framework outlined has been socialised at several different fora over the course of 2019 and 2020. This will now be more formally supplemented with a questionnaire to NSO's seeking specific answers to their intentions regarding compiling estimates consistent with the digital SUT framework; these questions are listed in annex 1 of the document.

Increasing the visibility of the digital economy in National Accounts is an important task of the ongoing SNA update process. However, since the Digital SUTs are fundamentally aligned with the current SNA 2008, compilation of estimates by countries relating to this work will be encouraged even prior to any official update of the SNA. Due to this, the questionnaire will focus more on countries views on the usefulness of the digital SUTs as well as their intentions for implementation; this will help identifying the most appropriate way to include them in the revised SNA.

The current guidance note contains only limited practical guidance, however as noted, testing of the practical implementation has already been underway in an informal capacity for the past 12-18 month. Several countries have recently published estimates related to the digital economy and through interaction with the *Informal Advisory Group on measuring GDP in a digitalised economy*, the early work of these countries has not only been further refined to become more closely aligned with the digital SUTs but also more widely shared across the macro-economic statistical community. A list of this recent work, which is informally testing the practical implementation of the digital SUTs, is listed in Annex 2.

That is not too say that the practical challenges has all been overcome, rather, work on partially implementing the digital SUTs, focusing on the high priority indicators will continue over the next few years, for instance the next meeting of the *Informal Advisory Group* is planned for June 2021, where discussions on compilation best practice will continue. This initial testing of practical compilation has been further supported by Eurostat grants, which have been awarded to several countries. Finally, the IMF has instigated a project testing the suitability for developing countries to compile some of the high priority indicators outlined in the Digital SUTs

The AEG is requested to

- Approve the guidance note for global consultation in 2021
- Provide feedback on the planned conceptual and practical testing.

Annex one

Proposed questions regarding the usefulness of digital SUTs for increasing the visibility of digitalisation in the economy and countries intention to compile estimates consistent with the digital SUT framework, including partial implementation.

1. Do you intend to compile (in the next 3-5 years), or have you already compiled, outputs, partially or fully consistent with the digital SUTs framework in your country?

If YES:

- I. Do you plan to fully implement the digital SUT structure in this guidance note?
- II. Do you plan to implement only the high priority indicators outlined in the guidance note?
- III. If no, to the previous two question, what indicators do you plan on compiling?
- IV. For indicators you are planning to introduce, what time series length is possible?
- V. What difficulties have you faced in attempting to compile outputs consistent with the guidance note?

If NO:

- I. What are the reasons your country does not intend to produce outputs related to the digital SUTs?
 - a) Because there is a lack of demand from users, *if so, please detail feedback received from users.*
 - b) A lack of statistical resources to compile these outputs, *if so, please detail what kind of additional assistance would help you meet your development plan?*
 - c) Other, *please detail.*

2. Please share any other comment or information you may have

Annex two

Specific example of recent work that assist with practical testing of the digital SUTs, include:

- The BEA published updated estimates of the digital economy in the USA. This repeated the methodology previously used, but added additional years and included increased coverage of e-commerce and cloud computing. <https://www.bea.gov/system/files/2020-08/New-Digital-Economy-Estimates-August-2020.pdf> (25/8/2020)
- The ABS published updated estimates of digital activity in Australia, which repeated the methodology previously used but extended the time series with an additional year, based on the updated national account benchmarks (SUTS). <https://www.abs.gov.au/articles/digital-activity-australian-economy-2018-19> (29/01/2021)
- In December 2020, an estimate of Finland's digital economy was published. This was produced by ETLA Economic Research, an independent non-profit economic research institute, that provides economic and policy advice to Finland's government. The estimate combined both the existing methodology published by the BEA as well as including a component based on wages from the ICT occupations working in non-digital industries. This addition was seen to

represent the output derived from digital activity occurring in non-digital industries.
<https://www.etla.fi/wp-content/uploads/ETLA-Raportit-Reports-106.pdf> (01/12/2020)

- Statistics Canada has produced an experimental estimate of the full digital SUTs using ad hoc information from various survey and administrative data sources. These indicators are combined with conventional supply-Use tables using an optimization tool to populate various cells in the digital SUTs. This work is very preliminary and requires more micro data sources to improve the estimates for certain digital industries.
- At least 8 European countries are currently working on some form of digital SUTs, based on a consultation conducted by Eurostat. This includes several recipients of grants offered by Eurostat to assist in the production of the digital SUTs. As with previous correspondence, a lack of available source data remains the most significant challenge for most member states

Increasing the visibility of digitalisation in economic statistics through compilation of Digital Supply-Use Tables.

ISWGNA guidance note: April 2020

1. Introduction to the issue

Digitalisation has allowed firms to radically alter production processes and their access to markets using digital tools. At the same time, digitalisation has permitted consumers to access a larger variety of goods and services, while exercising greater control over the characteristics of the transaction. Despite digitalisation being overtly present in our professional and personal lives, it is not nearly as identifiable in the various indicators currently used to measure the economy. This absence of specific information on such a key trend within the economy continues to create confusion about what is (and is not) being included and who is (or is not) benefiting from these changes.

This confusion has, at times, been used as evidence of possible mismeasurement, creating disagreement on whether aspects of the digital economy are, in fact, missing from macro-economic statistics rather than being simply difficult to identify. Papers have argued that, as currently defined and measured, the effect of digitalisation is to understate levels and growth of economic activity, and may therefore be one of the reasons for the observed productivity slowdown (Coyle, 2017; 2018). While other research has shown that, the productivity slowdown cannot be explained simply by mismeasurement of economic growth brought on by digitalisation (Ahmad et al, 2017; Ahmad and Schreyer, 2016).

The overall debate on the measurement of digital activity has highlighted the significance and more importantly, the absence of statistics that explicitly reveal the benefits to consumer welfare or the role of digitalisation in the economy. To this end, international forums, such as the G20, in seeking a collaborative approach to policy making associated with digitalisation have recommended that members “Work towards improving the measurement of the digital economy in existing macroeconomic frameworks, e.g. by developing satellite national accounts.”(G20, 2018).

This guidance note sets out a framework for the production of digital supply and use tables (digital SUTs) which define a range of products and actors at the core of digitalisation in the economy. In doing so, the framework is capable of producing statistics on digital activity that can assist the development of appropriate policy as well as facilitate international comparison between countries. Additionally, it provides insight in how specific elements of the digital economy, which may have been considered to be missing or underrepresented within the national account aggregates, are accounted for. The guidance note does not define the digital economy and indeed the digital SUTs framework contained within it does not advocate a single measure of the digital economy to represent digitalisations impact.

This is deliberate, and reflects the fact that the framework is designed to meet a multitude of needs and demands, which cannot be met by any single measure.

Furthermore, this guidance note focuses predominately on measuring digitalisations effect on economic activity that is already within the System of National Account 2008 (SNA) production boundary. The provision of free digital services, the appropriate measurement of data and digitalised information within the production process are both important aspects of the digital economy. While the digital SUTs framework accommodates the inclusion of estimates related to these subjects (to achieve a digital economy satellite account), guidance regarding the appropriate conceptual treatment and practical measurement of them are covered in another SNA guidance notes.

2. Existing material

The existing material regarding measurement of the digital economy, does not come from the current SNA, in fact, the word digitalisation does not appear once in the 2008 SNA. Even the word digital only appears twice and this is in relation to digital cameras. This in itself is not surprising as not only was the significant infiltration of digitalisation in the production process in its infancy when it was written but the difficulty in measuring digitalisation is as much a practical issue as a conceptual one.

This absence of clarification in the SNA as well as in other international statistical classification has resulted in a large amount alternative material and subsequent confusion regarding what digitalisation in the economy might be and how it could, or should be represented in macro-economic statistics. An example of this confusion is the various definitions that exist for what exactly the digital economy is (Bukht and Heeks, 2017). While the exact wording may differ, as pointed out by Bukht and Heeks (2017), most definitions of the digital economy can be separated into two types. The first type of definition follows a *bottom-up* approach characterising specific industries or firms output or production processes as “digital” to decide whether they should be included in any estimate of digital economy. The second type of definition, by contrast, follows a *top-down* or *trend based* approach, first identifying a key trend driving digitalisation in the economy and then analysing the extent to which these are reflected in the real economy.

By nature, top-down definitions tend to be ill suited for economic measurement as they offer an open-ended concept, which seems to describe the “digitalised economy”. While providing information that can be useful for setting out policy debate, trend based or top-down definitions tend to lack detailed definitions or classifications which in turn creates ambiguity in outputs and inconsistency with existing macro-economic indicators, a fundamental pre-requisite for alignment with the SNA. As will be shown later in the guidance note, that is not to say that surveys and information on these types of trends are not useful for generating estimates that are aligned with SNA concepts.

Bottom-up definitions constitute a more actionable approach for national statistical offices (NSOs) as they may draw upon existing frameworks and definitions most notably the SNA. By delineating specific categories, sectors or production as digital, NSOs can leverage off existing outputs to create estimates akin to those desired by users. The concern with bottom up approaches is that by definition a product or industry is forced to be considered digital or not. This risks excluding economic activity that while fundamentally non-digital, is substantially enhanced or enabled by digitalisation.

A final concern regarding both types of approaches is setting the definitional bar too low. As suggested by the IMF (2018), if the digital economy encompasses all activities that simply used digital technology,

“the entire economy could soon be included in the concept” (IMF). Such a broad definition would risk significantly reducing the analysis possible and insights that can be gained.

Despite these definitional difficulties and lack of agreed classifications, demand for information on digitalisation has been building for some time and in response, statistical organisations have undertaken new work to try to capture the size and impact of digitalisation in the economy. The most basic approach for measuring digitalisation is by simply surveying households and business on their level of digital activity¹. By including additional questions on population or business surveys, for example, countries have been able to produce indicators on the use of sharing platforms or purchases made online². The outputs are examples of the top-down approach to measuring digital activity and while the level of digital saturation in our daily lives and work is of interest, this metric does not produce a monetary estimate of the level of production associated with digitalisation or quantify any efficiency gains observed due to the changing production process.

In an effort to estimate an amount of value added related to digitalisation, some countries have applied a bottom up approach and establishing certain products and the industries producing them as digital. By summing the production of these products and industries, countries were not only able to arrive at a total estimate of the “digital economy”, but did so while still remaining consistent with their existing (and SNA aligned) economic indicators. The result of this work showed the average growth rate of the “digital economy” as significantly higher than the respective growth rate of the total economy in each country (Barefoot et al, 2018; ABS, 2019a). This work has subsequently been updated to include a longer time series and incorporate slightly more digital products, however it still showed similar results in both the United States (BEA, 2020) and Australia (ABS, 2019b).

While these results identified a previously unknown estimate and were a significant step forward in attempts to measure the impact of digitalisation, this simplified piecemeal approach limited the ability to compare data internationally. In response to user demands as well as the initial work being undertaken by NSOs, the informal advisory group on measuring GDP in a digitalised economy (the advisory group) developed a statistical framework for improving the identification of digital activity in the economy; the digital SUTs (OECD, 2019).

These tables produce indicators on digital activity in the economy that are aligned with current macro-economic statistical standards. By breaking down the supply and use of these products by the nature of their transaction, the framework extends on previous work undertaken on the digital economy, by highlighting how digitalisation has affected the provision of traditional products as well as digital products. Furthermore, the framework includes definitions for new digital industries that allow for greater clarity on the actors involved in the new and developing value chains between producer and consumer. By classifying firms to these specific categories based on how they are leveraging the digitalisation occurring, estimates of production by defined “digital industries” can be produced.

¹ See Eurostat database on E-commerce activity, available at <https://ec.europa.eu/eurostat/web/digital-economy-and-society/data/database>

² See Statistics Canada, Digital economy survey available at <https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2018028-eng.htm#moreinfo> and CBS, Netherlands, ICT usage in households and by individuals, 2018 available at <https://www.cbs.nl/en-gb/news/2018/51/increase-in-online-shopping-among-older-generation>

3. Options considered

The different options on how to increase the visibility of digitalisation are intrinsically linked to how the digital economy is defined. Therefore, this section will discuss the different viewpoints of the digital economy as well as the attempts to measure them. This reflects the fact that the SNA in itself is not responsible for the absence of information on digital activity, and therefore initiatives to improve the visibility of digital transactions and actors is unlikely to require any fundamental changes to the SNA.³ Instead, the options considered in this note involve how best to define and identify the necessary transactions and actors involved in the digital economy, in order to generate macro-economic indicators that fulfil a policy need for countries as well as allow for international comparison, all while still aligning with the SNA.

These options range from a very narrow view of the digital economy as simply the output of digital goods and services, to a broad view, including all output from production that utilises these digital goods and services; alternatively, it could be viewed from the consumer side regarding digital ordering and delivery. The advantages and disadvantages of these various options are presented below as well as the proposed option of the digital SUTs, which allow for a variety of perspectives on the digital economy to be measured and disseminated.

A narrow definition based simply on characteristics of the product or the producer could be generated using the existing international information and communication technologies (ICT) classification. There is already established classifications for the ICT sector in both the international industry (UNSD, 2008) and product (UNSD, 2015) classifications that define ICT products and sectors as those “intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display”. This ICT sector is already very well-known across statistical organisations; many countries already publish estimates using this alternative aggregation. However, while these products and sectors make up an important part of the digital economy (and of the digital SUTs), they ignore industries, products and transactions that may not “fulfil or enable the function of information processing” but have been significantly impacted by digitalisation. Many traditional non-digital products such as land transport, food delivery service, education and gambling are now produced by firms, where digitalisation plays a fundamental role in their business.

From a consumer point of view, the digital economy may appear to include all goods and services that are consumed through digital means. This would include online streaming, social media, e-commerce and ordering or purchasing products on various B2C and C2C platforms. Such a viewpoint would lend itself to defining, and therefore measuring the digital economy based on the nature of the transaction, that is “the sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing of orders” (OECD, 2011). This e-commerce definition from the 2011, OECD, “measuring the information society”, has been used as a basis for many other digital definitions including digital trade, and digital ordering. Adopting such a definition would provide a clear point of delineation for statistical offices to separate transactions, and the accompanying output, as already defined in the SNA production boundary, into digital or not.

³ The exception to this is any movement in the production boundary to explicitly include various zero-cost digital services or data used in the production process, however since this issue is being discussed in a separate guidance note, for the purpose of this note it will not be directly addressed.

However, only measuring the digital economy from the perspective of the final transaction might result in elements of digitalisation going unaccounted for or producing some unintended results. Many ICT goods are sold in person; it seems somewhat confusing to not include the sale of computer software from various indicators related to digitalisation of the economy just because the transaction was made in person. Additionally many business are using digital services to produce a greater amount of their output, such an approach to measurement might understate the value to production that comes from digital technology and knowledge. The purchase of online advertising is once example where digitalisation is greatly affecting the real economy, and while the advertising itself is digital, the purchase of this service may not have been “conducted over computer networks by methods specifically designed for the purpose of receiving or placing of orders” and would therefore fall out of an estimate using this approach. Agriculture and mining are two further examples where production has become extremely digitalised even if the final transaction with the consumer has not.

A third option is to attempt to incorporate digitalisation effect on production into the published indicators by applying a broader trend based definition such as one previously presented by the European commission which deemed the digital economy as an “economy based on digital technologies” (EC, 2013). While this would succeed in bringing digitally produced economic output into the indicators published, realistically, very little, if any production is totally digital free, therefore an output based on this type of definition, with no additional disaggregation would likely incorporate a substantial amount of the economy, limiting the amount of new information it can provide. The impact of this type of trend based phenomena is hard to quantify in economic terms and is often best-measured using vehicles such as the ICT use survey where a binary response can be presented (i.e. is the business utilising ICT goods and digital services? Does the business have a presence online?).

The first two proposals are more feasible for national statistical offices but may struggle to meet various user requirements. A classification focused only at the product and/or the producer in a binary, digital or non-digital way would be unable to apportion services that are provided both digitally and non-digitally such as take-away food, gambling, education and accommodation to name just a few. Similarly, a classification that includes only products digitally ordered or received would be limited in the information it can provide on the digitalisations impact on production or the value added of specific industries fundamental to the digital economy. The third option, where measurement is determined on the use of digital products, would likely prove statistically unhelpful due to the proliferation of digitalisation across the economy.

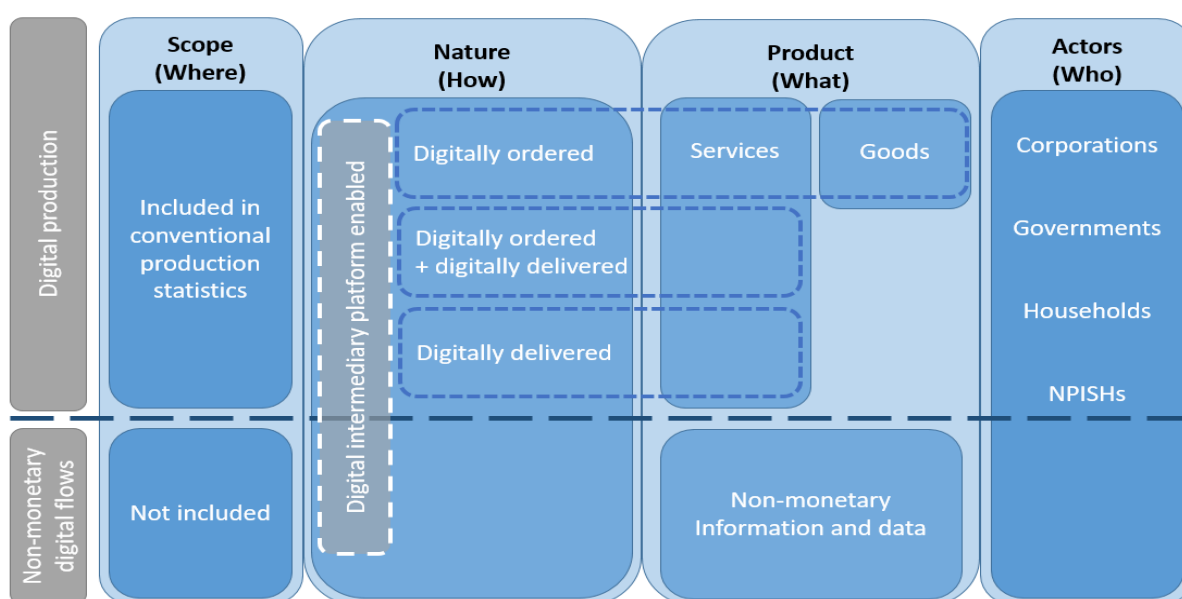
The difficulties faced by these first three options reflect their effort to try and contain the definition of the digital economy as a finite set of product/industries or expand it too much as being dependent on a trend or business characteristic. However, by approaching both the definition and the measurement of the digital economy in a less prescriptive manner, as is the case with the digital SUTs, a suite of indicators are produced, answering a range of policy questions and promoting international comparability.

A fourth option and one proposed in this guidance note is the generation of the digital supply and use tables. The tables break down the supply and use of products based on the nature of their transaction, (see figure 1) classifying digital production as production that is digital ordered, digitally delivered or both. This allows the tables to show how digitalisation has affected the provision of traditional products as well as digital products. Additionally, the tables have delineated specific “digital

industries” where firms are allocated based on how they are leveraging the digitalisation occurring, thereby allowing for estimates of value added by the different “digital industry” to be generated. Finally, by aggregating ICT goods and digital services, as well as separately identifying some products integral to the digital economy, makes for easier identification of industries, including conventional non-digital industries, which are increasing their use of these products in the production process.

By advocating for many different approaches to the measurement of digitalisation, the digital SUTs are able to address the policy questions created from the various definitions put forward by users of economic statistics, all while being consistent with establish statistical standards of the SNA.

Figure 1. Conceptual framework for measurement of digital economy



Source: OECD, adapted from OECD-WTO-IMF (2019)

4. Recommended approach – conceptual aspects

The recommended approach for improving the visibility of the digitalisation in economic statistics is to encourage countries to produce digital supply-use tables. The outputs from these tables will assist in identifying the actors and economic transactions related to digitalisation, providing additional economic indicators to guide forecasting and policy decisions. Although a fundamental principle of the framework is centre around whether goods and services are digitally ordered and/or digitally delivered, making this a primary output, the digital SUTs are also capable of producing additional indicators related to the use of digital product in production as well as value added of digital industries. This guidance note is not advocating for any specific output to be considered as the definitive measure of the digital economy. Rather it recommends the digital SUTs as the consistent approach for generating outputs able to meet the various definitions raised in the previous section.

Within the tables, firms are classified to specific industry categories based on characteristics related to the transactions nature or how they are leveraging digitalisation. This would allow for estimates of the value of output by specific “digital industries” defined within the framework. Additionally by separately identifying specific ICT goods and digital services while aggregating others, a measure of the digitalisation of production occurring across digital and conventional industries can be observed.

While the nature of the transaction will assist in classifying some existing firms from the conventional industry classifications, some industry and products will be aggregated regardless of the nature of their transactions. This recognises that many transactions, for example, purchases of digital enabling tools (such as computers) or outputs of digitally enabling industries are also essential components of the digital economy.

To allow these additional classifications to be represented, the conventional supply-Use tables have been modified. The modifications include:

- Five additional rows under each product (and aggregates of products), representing the nature of the transaction.
- Seven additional industry columns, representing the new “digital” industries.
- Four additional rows, representing digital product categories that fall within the SNA production boundary.
- Three additional rows, representing data and digital services currently outside the SNA production boundary.
- Additional columns next to household consumption, total output, imports and exports to separate supply and demand that was digitally delivered

By beginning with the conventional SUTs, the framework aligns itself with the broader conceptual classifications used in the SNA, hence why no change to the existing SNA text will be necessary. Furthermore, use of this framework also maintains a consistency between attempts to measure domestic production affected by digitalisation and the approach to measure digital trade where digital trade transactions are defined as those that are digitally ordered and/or delivered⁴ (OECD-WTO-IMF, 2019).

The majority of digital industries and products listed in the framework are not currently part of the any existing classification. Rather they are aggregates or components of already existing classifications.⁵ On an industry basis firms are classified to specific “digital industries” based on characteristics related to the transaction nature or how they are leveraging the digitalisation occurring. For example, due to digitalisation, the service provided by intermediary platforms, matching producers and consumer via an online platform, has significantly increased and for some products has become the primary way of generating demand. The current guidance in economic statistics places intermediary platforms matching producers with consumers in many different ISIC categories, aligned to the fundamental good or service that they are intermediating (Murphy, 2017). Within the digital SUTs, to better identify this shift in the value chain, all intermediary platforms are combined together to provide an aggregated estimate of the value added generated by this new industry.

⁴ The concept of breaking up products based on the method of transaction is consistent with those put forward to measure digital trade. This allows for a consistent treatment of digitalisation in both frameworks. For additional information on measurement of digital trade, refer to OECD-WTO Handbook on Measuring Digital Trade (OECD, 2020).

⁵ A more detailed explanation of the digital industries and products used in the digital SUTs is provided in the appendix.

Similarly, the product classifications are also aggregates or components of already existing international classifications. With the exception of two separately identified digital products, the digital SUTs aggregates all ICT goods and all digital services, providing a relatively straightforward indicator of the importance of digitalisation to the production process across industries⁶. The two separately identified products, reflect the fundamental aspect these products play in production and value chains of the new digital industries. It is therefore important to identify clearly the use of these products by firms. It should be noted at this point that the framework proposed is not restrictive or defined forever. Although outputs are suggested at a certain level to promote international comparability, the setup of the digital SUTs do not preclude countries, if deemed relevant to them, from producing breakdowns that are more detailed than provided in this note. In the same way if a majority of countries are producing estimates of a certain product fundamental to the digital economy in the same way that cloud computing services and digital intermediary services are currently, this separately identified product can also be added; Artificial intelligence, once more clearly defined, or block chain services are two examples of products related to digitalisation that may be separately identified in the future based on user demands.

Aspects of the digital economy that are currently outside the production boundary (such as zero priced digital services and data) are included in the digital SUTs, but in a delineated area outside of those aggregations consistent with the conventional SUTs. Countries are encouraged to complete these additional lines in the digital SUTs in order to form the basis of a digital economy satellite account (DESA). As already highlighted in the SNA, satellite accounts provide statistical organisations the opportunity to expand the production boundary or alter accounting conventions to include relevant transactions not currently captured.⁷ Additionally a satellite account can provide more detail on products and industries most impacted by digitalisation but unidentifiable in the current accounts (SNA para. 29.85). These options provided by a satellite account therefore makes the creation of a DESA the next logical next step in disseminating statistics on the digital economy. Further development of such an account may involve the inclusion of employment data within the delineated “digital industries”. Such a step would appear logical from a viewpoint of producing productivity statistics, while the level of employment within this step of the value chain would be much sort after from a policy perspective.

If some or all of the transactions currently outside the production boundary were explicitly moved inside the production boundary (as is addressed in another guidance note), the digital SUTs would require little alteration.

5. Recommended approach – practical aspects

The advisory group has discussed and supported the conceptual basis of the digital SUTs; however, work on the practical implementation of the tables is still in its infancy. The area of concern for most countries is a lack of available data sources to assist in delineating the nature of the transaction between producer and consumer. Additionally, there is also a lack of resources available to assist in

⁶ ICT goods and digital services are equal to the ICT classification covering ICT goods and services provided in CPC 2.1

⁷ Examples of changes to the production boundary might involve the inclusion of imputed transactions related to the consumption of zero – priced services or free assets. Certain transaction, treated one way in the core accounts might be manipulated in order to be viewed differently in a DESA, e.g. the households sector’s purchase of assets to be partially used in production.

identifying firms that meet the digital industry definitions outlined in the framework and moving their outputs from the conventional ISIC based categories to the new “digital industries”.

Currently, most information concerning the nature of the ordering and delivery of goods and services is usually available from the consumer side and is collected on an aggregate basis, without detailed information on products or methods. In order to provide a more detailed picture of digitalisation in the economy, data used for generating estimates of output, intermediate consumption and investment by firms will need to incorporate information outlining the nature of the transactions leading to this activity. This may include expanded survey forms, detailed industry investigations to provide foundational information or other methods.

Business registers will need to provide additional guidance on the characteristics of firms to assist in being able to delineate those that meet the definition of the digital industries. For most categories within the digital SUTs, classification is dependent on the primary output of the firm or the method it interacts with consumers. While this is considered relatively objective, and once delineated, outputs such as sales, wages, etc., associated with that classification can be easily aggregated, most business registers are primarily set up to separate firms based solely on their final output, resulting in human intervention being required.

The final concern expressed by countries regarding the practical implementation of the digital SUTs involves the overall size of the tables. Similar to the conventional supply-use tables, when fully complete the digital SUTs contain a significant amount of information. Due to the ambitious nature of fully populating the digital SUTs and the various levels of data sources and resources available, an initial list of high priority indicators were selected. These indicators would include 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 framework, including the high priority indicators and indeed the digital SUTs template 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. This would encourage countries when developing new outputs related to the digital economy, including the data sources that underpin them, to do so with a clear output in mind, one that would be the consistent internationally.

The majority of work in regards to the digital SUTs has, up to now, focused on confirming the concepts that underpin the framework, ensuring that the categories maintain a balance between producing outputs that are relevant to policy makers but still statistically attainable for compilers. The focus within the international statistical community now turns to sharing best practice compilation methods and models between countries. This work combined with the initial focus on specific indicators from the tables provides an opportunity for initial outputs to be compiled in the relative short term.

There is an expectation that in the initial compilation of the digital SUTs, the outputs would be considered experimental in nature and not considered of equivalent quality to the conventional macro-economic outputs used as a starting point. That said, like all new statistical endeavours the quality and frequency of their compilation would increase as these outputs became more mainstream

within the international community. This mainstreaming is already occurring, as the digital SUTs has already been included in the recent OECD report to the G20 Digital Economy Task Force. (OECD, 2020).

6. Changes required to the 2008 SNA and other statistical domains

The digital SUTs were deliberately designed to be as consistent as possible with the existing SNA; due to this, it is unlikely that any existing guidelines or language within the SNA would need to be altered. Instead, the classifications and definitions used in this framework are more likely to influence changes in the respective statistical classifications that sit alongside the SNA. An example of this would be the inclusion of products such as digital intermediary services and cloud computing services in the next revision of the product classification (CPC 2.1 or CPA).

As changes occur in these statistical classifications that sit alongside the SNA, the digital SUTs guidelines would be refined and updated to reflect not only these explicit changes in statistical administration but also to adapt to changes in the way that digitalisation effects the real world economy. Any changes made to the digital SUTs guidelines or the standards and classifications that underpin it would have to also be aligned with changes made for measuring digital trade as the framework for the measurement of digital trade has been done in conjunction with the digital SUTs and shares many concepts and definitions (OECD-WTO-IMF, 2019).

If desired, the SNA could be altered to provide clarity regarding the treatment of digital intermediary services either as a separate product or as a trade margin (requiring a change to the current definition to incorporate the reselling of a service). Furthermore, additional language that explains the concepts of the digital SUTs could be added to the SNA in either chapter 14 (*The supply and use table, and goods and services account*) or perhaps more appropriately within chapter 29 (*Satellite accounts and other extensions*). While recommended that the previous points be included in a statistical reference material not as foundational as the SNA; if included, these descriptions should be relatively broad and non-prescriptive, describing the concept of a DESA rather than specific guidelines. This would allow for the framework and template to be easily adapted in response to changes in this continually developing area.

Any subsequent changes to the SNA production boundary in relation to digitalisation, such as the incorporation of data or zero priced digital services as productive outputs would require only marginal changes to the digital SUTs guidelines and framework.

A final but important consideration in regards to the current SNA is that while the exact definition and therefore the size of the digital economy is debated, the output and value added generated by the transactions identified in the digital SUTs (within the current SNA production boundary) are already included within the current SUTs. Due to this, while explicitly identifying these may result in additional balancing between products and industries in the conventional SUTs, this work would have no impact on the overall aggregate level or growth rate of GDP.

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Appendix 1: Detailed summary of Digital Industries, transactions and products within Digital SUTs Framework.

Digital Industries	
Digitally enabling industries	<p>Simple definition: Digitally enabling industries includes businesses engaging in production that enables the function of information processing and communication by electronic means including transmission and display; explicitly it is those industries defined in the ICT sector list in ISIC Rev. 4.</p>
	<p>Includes; Internet service providers, telecommunications companies, providers and developers of software, Computer manufacturers, and website developers. While excluding 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.</p>
	<p>Examples: Orange, Verizon, BSNL, Dell, Amazon Web Services, Indosat Ooredoo</p>
Data and advertising driven digital platforms	<p>Simple definition: Businesses that are operating exclusively online that predominately generate revenue via selling data or advertising space.</p>
	<p>Includes; search engines, social media platforms, developers of zero-priced phone applications and information sharing platforms. While excluding; 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.</p>
	<p>Examples: Facebook, Tik Tok, Citymapper, Google, Twitch, Youku</p>
Digital intermediary platforms charging a fee	<p>Simple definition: Business that operate online interfaces that facilitate, for a fee, the direct interaction between multiple buyers and multiple sellers, without the platform taking economic ownership of the goods or services that are being sold (intermediated).</p>
	<p>Includes; food delivery companies, travel booking portals, platforms facilitating online auctions or marketplaces that assume no ownership of stock. While excluding; digital platforms that sell their own goods or services, platforms that do not receive an explicit monetary fee from either the producer or consumer.</p>
	<p>Examples: Uber, OLA, Deliveroo, Booking.com, Didi, Trivago, Mercado Libre.,</p>
Firms dependent on intermediary platforms	<p>Simple definition: Businesses that always or a significant majority of the time transact with consumers via an independently owner third party digital platform.</p>
	<p>Includes; independent service providers who source work from digital platforms, business who sell via a third party digital platform. While excluding; business who sell predominately digitally but do so via their own website/digital platform.</p>
	<p>Examples: Bicycle couriers, Ghost kitchens, Uber drivers</p>
E-tailers	<p>Simple definition: Retail and wholesale businesses engaged in purchasing and reselling goods or services who receive a majority of their orders digitally.</p>
	<p>Includes; businesses receiving orders digitally that sell their own inventory and/or have set contracts with producers and suppliers. While excluding; businesses that carry no ownership of the purchased good or service, businesses who contribute no additional value added to the consumed good or service.</p>
	<p>Examples: ISOS, JD.com, Zalando, Sarenza, Yesstyle</p>

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. While excluding; 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).
	Examples: Ally financial, Transferwise, Fidor bank, Open bank, Paypal, Directline, Seven bank
Other producers only operating digitally	Simple definition: Businesses that produce their own services for sale but operate exclusively digitally.
	It includes; priced digital media providers, subscription based service providers (assuming the service is delivered digitally) While excluding; business who do not deliver their good or service digitally regardless of how they receive orders.
	Examples: Spotify, Netflix, The Independent newspaper, Disney+, Bet365, Showmax, Starz Play
Digital Transactions	
Digitally ordered	<p>Transactions that are digitally ordered (i.e. transactions in goods and services that reflect e-commerce), are generally defined as follows:</p> <p><i>“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.”</i>⁸</p> <p>Digitally ordered products may be delivered digitally or non-digitally. Currently this additional breakdown of digitally delivered is not specifically requested in the template even though the concept of when a service is or is not digitally delivered is important⁹.</p>
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 of the product. Transactions via digital intermediary platforms (defined below) are not included here as they introduce a third, independent participant into the transaction.
Ordered via a resident or non-resident digital intermediary platform	Transactions ordered via a resident, or non-resident digital intermediary platform includes any good or service purchased through an independent digital intermediary platform. The transaction itself is similar to those made direct with the counterparty; the difference however, is who the transaction is made with. Platforms typically take no ownership of the product sold unlike a producer or retailer of a product; instead, they act only as a conduit between producer and consumer. Ideally, there is a further split between resident and non-

⁸ OECD, Guide to Measuring the Information Society, 2011. The OECD started to develop definitions and statistical guidelines for measuring e-commerce transactions in 1998. Those guidelines as well as the OECD definitions of the ICT sector and Content and Media sector, and model surveys of ICT use and e-commerce for the business and household sectors are periodically reviewed and revised to reflect policy needs.

⁹ The concept of a service being digitally delivered is also important for classifying firms to certain industries. For example, firms need to be receiving orders and delivering them digitally for them to be classified to the industry, other producers only operating digitally.

	resident platforms. Nowadays many producers facilitate ordering through online applications rather than the producer’s website. While still considered digitally ordered, due to the application being an extension of the producer, therefore not independent, it would be recorded as ordered directly from a counterparty.
Not digitally ordered	Transaction non-digitally ordered represents all other orders not previously classified, the majority of these will be physically in person A transaction being included in this category does not, however, preclude electronic payment if the item was ordered physically or via other non-digital means, such as via the phone. While the nature of the payment may improve efficiency, it does not fundamentally change the production process in the same way that a change to the ordering process does.
Digitally delivered	<p>The definition for digitally delivered is based on the same as that used for digitally delivered trade in the handbook on measuring digital trade, that is</p> <p><i>“transactions that are delivered remotely in an electronic format, using computer networks specifically designed for the purpose.”</i></p> <p>While the vast majority off digitally delivered services will also be digitally ordered, it is not a pre-requisite to be included in this classification. Mobile services, is one example where the service may be ordered in person, but subsequently delivered digitally.</p>
Digital Products	
ICT goods	The category ICT goods consists of products that <i>“must primarily be intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display”</i> ¹⁰ . As such, it coincides with goods that contribute to the alternative classification of ICT products, as included in the CPC 2.1. In this alternative classification, four types of ICT products have been distinguished as ICT goods: (i) Computers and peripheral equipment; (ii) Communication equipment; (iii) Consumer electronic equipment; and (iv) Miscellaneous ICT components and goods.
Priced Digital services – except cloud computing services and digital intermediary services	The category digital services covers all services included in the alternative classification for products of the ICT sector 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.
Priced Cloud computing services	<p>The OECD has defined cloud computing as follows:</p> <p><i>“Computing services based on a set of computing resources that can be accessed in a flexible, elastic, on-demand way with low management effort.”</i>¹¹</p> <p>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)¹².</p>

¹⁰ Central Product Classification (CPC) 2.1.

¹¹ OECD, Cloud Computing: The Concept, Impacts and the Role of Government Policy, 2014.

¹² 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>

<p>Priced Digital intermediary services</p>	<p>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. Therefore, for the purpose of digital SUTs, the following definition of priced digital intermediary services, taken from the handbook on measuring digital trade is applied:</p> <p>Online <u>fee-based</u> intermediation services that enable transactions between multiple buyers and multiple sellers, without the intermediation platform taking economic ownership of the goods or rendering services that are being sold (intermediated).</p>
<p>Data (beyond 2008 SNA)</p>	<p>The category data (beyond 2008 SNA) concerns data 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.</p> <p>While there appears agreement that data constitute an important input into the process of production, there is far less consensus about the extent to which, and at what value, data should be recorded in the SNA. A guidance note explicitly concerned with the measurement of data is currently under discussion.</p>
<p>Digital services (beyond 2008 SNA), provided by enterprises</p>	<p>The category digital services (beyond 2008 SNA), provided by enterprises relates to zero cost 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 zero cost using digital means. While usually “consumed” by the household sector, these services can also be used in the production process. Due to the zero cost nature of the service, this “consumption” is currently outside the SNA production boundary.</p> <p>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. These solutions include estimates based on advertising revenues generated by the provider of the services, a consumers’ willingness to pay for the service (Brynjolfsson et al, 2018), or by calculating the cost of production in the same way as government expenditure (Coyle, 2018).</p> <p>A guidance note explicitly concerned with the measurement of these type of free digital services is currently under discussion.</p>
<p>Digital services (beyond 2008 SNA), provided by communities</p>	<p>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.</p> <p>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, however due to the zero-cost nature of the service; this “consumption” is currently outside the SNA production boundary.</p> <p>A guidance note explicitly concerned with the measurement of these type of free digital assets and the services derived from them is currently under discussion.</p>