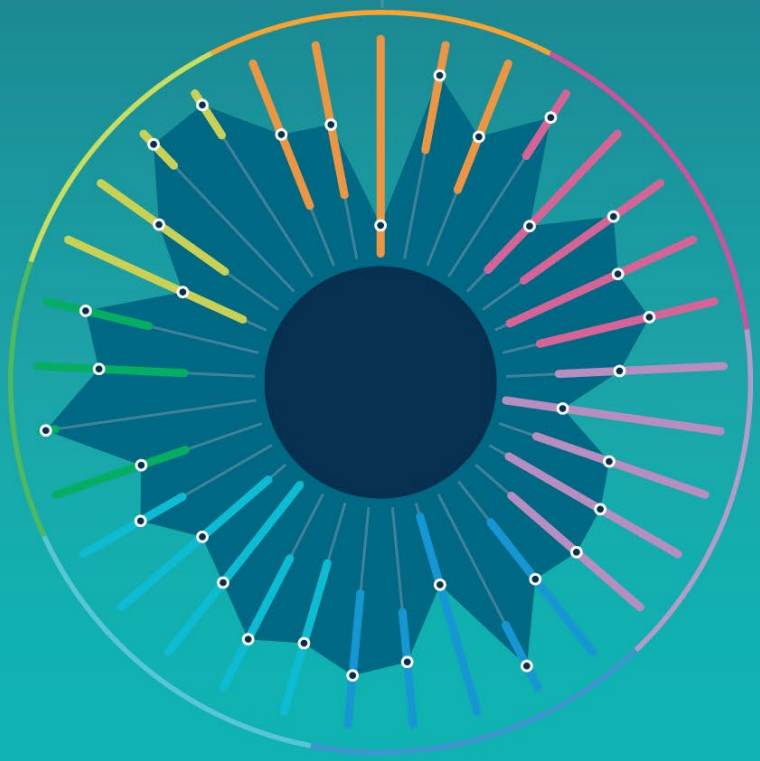
OECD GOING DIGITAL TOOLKIT

MEASUREMENT NOTE

Digital supply-use tables: A step toward making digital transformation more visible in economic statistics



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going digital

This Toolkit note was written by John Mitchell. It was reviewed by the OECD Working Party on National Accounts (WPNA) on 29 October 2020. The note was prepared for publication by the OECD Secretariat.

This Toolkit note is a contribution to the OECD Going Digital project, which aims to provide policy makers with the tools they need to help their economies and societies thrive in an increasingly digital and data-driven world.

For more information, visit *www.oecd.org/going-digital*.

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Digital supply-use tables: A step toward making digital transformation more visible in economic statistics

Digital transformation of the economy has increased so quickly that some say economic statistics have failed to keep up. While on balance the current statistical standard used by countries to compile gross domestic product – the 2008 System of National Accounts – can reflect the changing nature of the digital age, some have questioned whether this is enough. Digital supply-use tables (digital SUTs) may provide, at least partly, a solution to this challenge. By disaggregating established indicators in the national accounts, information is generated for research and policy purposes that provides better insights on how digital transformation affects the economy, while still remaining consistent with SNA principles. This Going Digital Toolkit note identifies the measurement difficulties brought about by the digitalisation of the economy, and explains how digital SUTs are designed to help address them. Examples of relevant work that has been undertaken by OECD member countries and could contribute to the compilation of the digital SUTs are showcased.

Recent years have seen a remarkable rise in the ubiquity of digital technologies and data in the economy and society. Through the use of digital tools, firms are radically altering production processes and accessing new markets. Simultaneously, digital technologies and large amounts of data have improved information asymmetries and provided consumers access to a larger variety of goods and services than ever before (OECD, 2019[1]). Additionally, digital technologies and data have given both producers and consumers the ability to exercise greater control over the characteristics of the transactions in which they engage.

These longer-term trends accelerated over the course of 2020 as the onset of the COVID-19 pandemic resulted in even greater use of digital technologies to enable both professional and leisure activities (OECD, 2020[2]). However, despite the omnipresent nature of the digital transformation in our professional and personal lives, it is not nearly as identifiable in various established statistics used to measure the economy. The absence of specific information on such key developments within the economy continues to create confusion about what is (and what is not) being included and who is (or who is not) benefiting from these changes.

Box 1. What is digital transformation?

Digitisation is the conversion of analogue data and processes into a machine-readable format. Digitalisation is the use of digital technologies and data as well as interconnection that results in new or changes to existing activities. Digital transformation refers to the economic and societal effects of digitisation and digitalisation.

Source: (OECD, 2019[1]).

This confusion has, at times, been interpreted as evidence of possible mismeasurement, creating disagreement on whether some digital aspects of the economy are, in fact, missing from macro-economic statistics rather than only being difficult to identify. Papers have argued that under the current definitions and measures, the effects of digitalisation are resulting in understated levels and growth of economic activity, and may therefore be one of the reasons for the observed productivity slowdown (Coyle, 2017[3]; Coyle, 2018[4]). Meanwhile, other research has shown that the productivity slowdown cannot be explained simply by mismeasurement of economic growth (Ahmad and Schreyer, 2016[5]; Ahmad, Ribarsky and Reinsdorf, 2017[6]).

Even if digitalisation does not cause any mismeasurement, the lack of widely available and internationally comparable indicators related to the value of e-commerce sales, the value added of digital intermediary firms, or the

increasing expenditure by firms on adapting to and leveraging digitalisation restricts the amount of information and therefore evidence available to policy makers. Overall, the lack of statistics explicitly identifying digital activity within the national accounts framework causes two important issues: 1) the perception of mismeasurement casts unwanted doubt on accuracy, and 2) the lack of visibility restricts interpretability, and therefore the usefulness, of the national accounts for policy making.

What is the best way to make the digital transformation visible in economic statistics?

While many countries have undertaken some form of measurement of the impacts of digitalisation on the economy, this has often consisted of measuring household and business uptake of digital technologies and activities. This can be done relatively easily by undertaking surveys of specific digital information and communication technology (ICT), or by including additional questions in established business or household surveys. Examples of the resulting indicators which allow for international comparisons can be found on the OECD Going Digital Toolkit[1].

While the uptake and intensity of digital activities in our daily lives and work is of interest, these metrics do not produce a monetary estimate of the level of production associated with digitalisation or quantify any efficiency gains observed due to changing production processes. This lack of a direct link to the value of production associated with digital activity or productivity gains from using digital technologies results in the information being less useful in monitoring and analysing the impact of digitalisation on traditional macroeconomic indicators such as those included within the national accounts.

The lack of explicit indicators related to digitalisation in economic statistics has become more obvious and, as such, there has been growing encouragement for the broader statistical community to address this issue. An example of this is the work undertaken in the G20 Digital Economy Task Force (DETF) under the Argentinian Presidency, recommending that countries should "… work towards improving the measurement of the digital economy in existing macroeconomic frameworks, e.g. by developing satellite national accounts" (G20 DETF, 2018[7]). A similar recommendation was made in *Measuring the Digital Transformation; A Roadmap for the Future* (OECD, 2019[1]), which stressed the importance of "understanding the economic impacts of the digital transformation…by making the digital transformation visible in economic statistics" (Box 2).

[1] https://oecd.org/going-digital-toolkit.

Box 2. The Going Digital Measurement Roadmap

The Going Digital Measurement Roadmap was developed in 2019 as part of the OECD Going Digital project. It identifies nine actions that, if prioritised and implemented, would substantially advance the capacity of countries to monitor digital transformation and its impacts:

1. Make the digital economy visible in economic statistics,
2. Understand the economic impacts of digital transformation,
3. Encourage measurement of the digital transformation's impacts on social goals and people's well-being,
4. Design new and interdisciplinary approaches to data collection,
5. Monitor technologies underpinning the digital transformation, notably the Internet of Things, artificial intelligence and blockchain,
6. Improve the measurement of data and data flows,
7. Define and measure skills needs for the digital transformation,
8. Measure trust in online environments, and
9. Establish an impact assessment framework for digital government.

OECD Members endorsed the roadmap in 2019, and the OECD continues to work with countries and partner organisations to realise this ambitious agenda. For more information on the roadmap and on-going implementation efforts, visit the Going Digital Toolkit (*https://oecd.org/going-digital-toolkit*).

***Source**:* (OECD, 2019[1]).

Digital supply-use tables

As countries have tried to not only show the impact of the digitalisation, but also do it in a way that is consistent with the national accounts or other economic indicators, a pertinent question has arisen time and time again: What economic activity should be considered part of the "digital economy"? Digital supply-use tables (digital SUTs) provide one solution that does not rely on or promote any single definition or indicator as being representative of the digital economy.

Box 3. Defining the "digital economy"

An often-raised question when it comes to measuring digitalisation of the economy is how to define the "digital economy". Unfortunately, despite many attempts by academics, international organisations and national statistical offices, there is currently no single, generally accepted definition of its scope. Even GDP, which is generally agreed to reflect the parameters of the modern economy, still raises questions about what is to be included and excluded, seventy years after its creation (Coyle, 2014[9]). Nonetheless, it is still a useful exercise to discuss briefly the various perspectives towards a definition of the digital economy, and why digital SUTs, which do not advocate a particular definition of the digital economy, offer a practical way forward.

Proponents of specific digital economy definitions usually favour one of two approaches. The first considers the digital economy as limited to a finite set of economic activities that produce specific ICT goods and digitally delivered services. The second approach includes the narrow definition in the first approach in addition to economic activities enabled by ICT goods and services.

From a measurement point of view, it is arguably more conceivable to derive a picture of the digital economy by aggregating certain digital products or industries. Such an approach builds upon the definition and delineation of the ICT sector in the International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4 (UNSD, 2008[18]) and the Complimentary Class of ICT products in the Central Product Classification (UNSD, 2015[14]). These classifications are now widely adopted. From a policy point of view, however, they are often considered too narrow, and while growth in these newly delineated sectors has usually been higher than broader economic growth, it is likely that the output of these "narrow" interpretations of the digital economy understates the overall impact of digitalisation on the economy.

A recent attempt to merge these two approaches together was the definition advanced in the 2020 G20 Digital Economy Task Force Ministerial Declaration. It defined the digital economy as "all economic activity reliant on, or significantly enhanced by the use of digital inputs, including digital technologies, digital infrastructure, digital services, and data; it refers to all producers and consumers, including government, that are utilising these digital inputs in their economic activities" (G20 DETF, 2020[13]). Importantly, a tiered definitional framework delineating the impacts of digitalisation on the economy accompanied this broad definition. These tiers, which are consistent with outputs from digital SUTs, separate firms into those that produce ICT goods and services, those that are reliant on these digital inputs, and those firms that are significantly enhanced by the use of digital inputs (OECD, 2020[12]).

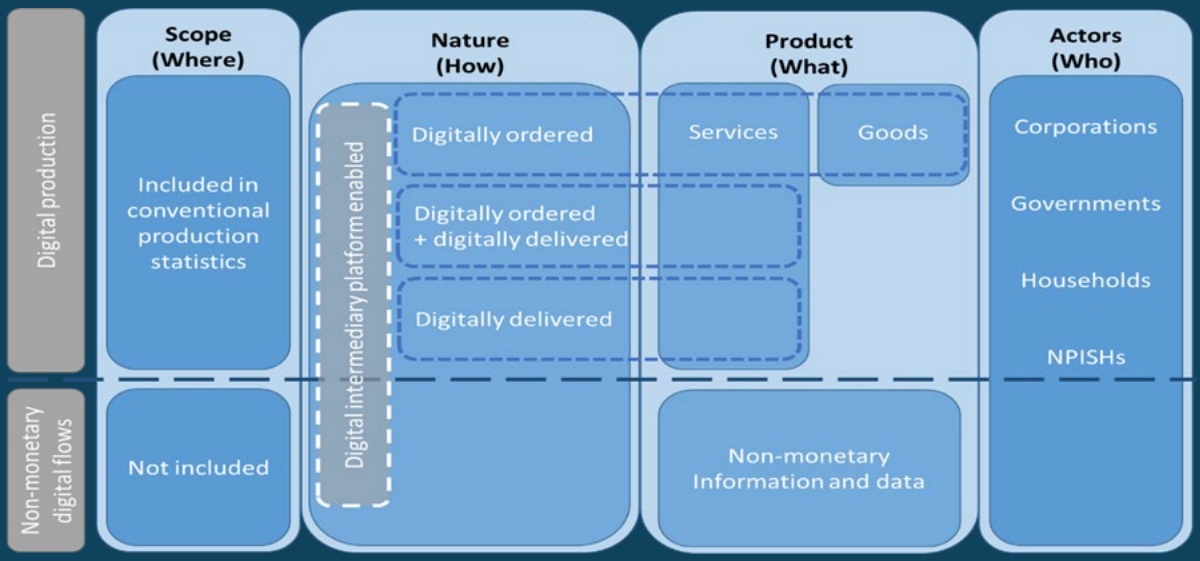
This framework provides countries with some flexibility on the choice of scope; in doing so, it shows that increasing the visibility of digital transactions, and the

products and actors involved in them, is a more achievable outcome in the short-term than an internationally agreed and statistically implementable definition.

An alternative approach to delineating digital activities from the wider economy is to consider the digital intensity of activities and so identify digital-intensive sectors. Based on seven different metrics, Calvino et al. (2018[15]) propose a taxonomy of sectors by digital intensity. Various indicators such as firms' investments in ICT hardware and software, the (type of) human capital and skills needed for production, and the way companies approach markets and interact with clients and suppliers are used to classify industries into "high", "medium-high", "medium-low" and "low" digital intensity. While this approach results in all firms within an industry being classified in the same digital intensity grouping regardless of their specific level of digitalisation, the approach has the benefit of being able to be compiled using widely available industry aggregates and so is easily operationalised.

This rather complex question of how best to define the digital economy prompted early discussions on digital SUTs as a way to circumvent the issue of what should be included, or excluded, and rather to focus on a better understanding of *how digitalisation impacts the economic transactions being measured*. Therefore, digital SUTs not only focus on the various products and actors associated with digitalisation, but importantly they also try to identify the nature of the transactions between the actors (Figure 1). A fundamental principle of the framework is to delineate transactions based on whether or not they are digitally ordered and/or digitally delivered.

Figure 1. Conceptual framework for digital supply-use tables



Note: NPISHs is defined as non-profit institutions serving households.
Source: (OECD, 2020[12]).

Variations of this conceptual framework and its operationalisation into a supply-use framework have been presented and discussed in various fora,[2] including a final proposal put forward to the OECD Informal Advisory Group on Measuring GDP in a Digitalised Economy[3] (OECD, 2019[8]). This work has helped advance agreement on the basic specifications of the framework and also to define the specific product and industry re-classifications needed in a digital supply-use framework in order to make digitalisation more visible in the system of national accounts. The framework and associated supply-use tables have been designed with the explicit purpose of maintaining a balance between producing statistics that are relevant to policy makers and feasibility for statistical compilers.

An overview of the digital supply-use tables

The various perspectives outlined in Figure 1 are incorporated as additional rows and columns into the standard supply-use framework compiled and disseminated by a majority of OECD countries. These standard supply-use tables are a collection of matrices that record the production (supply) of all goods and services in the economy and how those products are allocated (used) for either intermediate or final use. The using industry or sector is identified, including use outside the country (i.e. exports). The additional details specified in the digital SUT framework include the following:

- Seven additional industry columns, intended to regroup firms from existing industry classifications into new "digital industries". While one digital industry comprises the established ICT sector (in its role as enabling digital transformation), the additional digital industries include firms that are distinguished based on how they utilise digital technologies within their business models (rather than their type of activity). These digital industries such as: 1) digital intermediary platforms explicitly charging a fee, 2) data and advertising driven platforms, and 3) e-tailers include firms with business models entirely

2 Over the course of 2019, papers and presentations based around this framework have been presented to: the Advisory Expert Group (AEG) on National Accounts; the General Conference of the International Association for Research in Income and Wealth (IARIW); the conference of the Economic Statistics Centre of Excellence (ESCoE); the UNECE/OECD/Eurostat Group of Experts on National Accounts; the OECD Working Party on National Accounts; and the OECD Working Party on Measurement and Analysis of the Digital Economy.

3 At the 2016 meeting of the Committee on Statistics and Statistical Policy (CSSP), a proposal was put forward to create an Informal Advisory Group on Measuring GDP in a Digitalised Economy. The CSSP expressed strong support, endorsed the work on GDP and the digitalised economy, and agreed to the proposals. They took note that this work would be taken up and followed by the Working Party on National Accounts (WPNA). The original proposal is available at the following link: *https://one.oecd.org/document/STD/CSSP(2016)16/en/pdf*.

reliant on digital technologies and data. A full list of the seven industries, including their definitions and examples, is provided in Box 4.

- An aggregation of product rows related to ICT goods and services. While this will provide information on the final use of ICT products, including the level of household consumption, investment and exports, an indication of the use of these products as intermediate consumption by firms can provide a simple indicator of the speed of adoption and the level of importance of ICT goods and services in the business' productive processes.
- Additional product rows that explicitly delineate cloud computing services and digital intermediary services. These two specific product groupings, two high-profile examples of digitalisation in action, have generated significant changes in business investment and production and therefore warrant explicit recording.
- Additional, more detailed rows under each product group, to delineate transactions that are digitally ordered (or not); with digitally-ordered transactions further broken down into those ordered directly from the counterparty; ordered via a resident digital intermediary platform; or ordered via a non-resident platform. The latter split not only provides information on the economic importance of e-commerce, but also about the importance of digital intermediaries for the production and consumption of certain products and industries.
- Two additional columns have also been included to delineate the *nature* of the delivery of the service as either digitally delivered or not-digitally delivered, which is consistent with the classifications used for digital trade. Digital trade, as outlined in the *OECD-WTO-IMF Handbook on Measuring Digital Trade*, is "all trade that is digitally ordered and/or digitally delivered" (OECD-WTO-IMF, 2019[19]).
- Additional rows representing the production and consumption of data and digital services that are currently outside the System of National Accounts (SNA) production boundary, but are considered important in order to arrive at a more complete picture of the impact of digitalisation on the economy.[4]

When populated, these additional details will allow for the compilation of a suite of indicators providing information to address various important questions posed by policy makers, without relying on a definition of the digital economy. Examples of these indicators include (OECD, 2019[9]):

[4] The SNA research agenda includes research into the recording of data and "free" digital services, including whether or not these should affect the production and asset boundaries of the system of national accounts.

- **Value added generated by digital industries** - both those enabling digitalisation through digital technology and services and those using enabling technologies.
- **Household consumption via e-commerce** - at both the aggregate level and for specific products heavily impacted by digitalisation such as entertainment products.
- The level of **ICT goods and services used** as final consumption by households and intermediate consumption by firms.
- **Demand for cloud computing services** and **digital intermediary services** by firms, broken down by industry.
- **Digital trade in products**, consistent with the definitions in the *OECD-WTO-IMF Handbook on Measuring Digital Trade* (OECD-WTO-IMF, 2019[19]).

Box 4. Digital industries and products included in the digital supply-use tables

Digital industries

Digitally enabling industries

Simple definition: Digitally enabling industries include 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.
It 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.
Examples: Amazon Web Services, BSNL, Dell, Indosat, Ooredoo, Orange, Verizon.

Digital intermediary platforms charging a fee

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).
It 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.
Examples: Airbnb, Booking.com, Deliveroo, Didi, Mercado Libre, OLA, Trivago, Uber.

Data and advertising driven digital platforms

Simple definition: Businesses that are operating exclusively online that predominately generate revenue via selling data or advertising space.

It 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.
Examples: Citymapper, Facebook, Google, Tik Tok, Twitch, Youku.

Firms dependent on intermediary platforms

Simple definition: Businesses that always or a significant majority of the time transact with consumers via an independently owner third party digital platform.
It 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.
Examples: Bicycle couriers, Ghost kitchens, Uber drivers.

E-tailers

Simple definition: Retail and wholesale businesses engaged in purchasing and reselling goods or services who receive a majority of their orders digitally.
It 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.
Examples: ISOS, JD.com, Sarenza, Yesstyle, Zalando.

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.
It 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, Directline, Fidor bank, Open bank, Paypal, Seven bank, Transferwise.

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: Bet365, The Independent newspaper, Netflix, Showmax, Spotify, Starz Play.

Digital products

ICT Goods

Simple definition: 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".

It includes; 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: 1) computers and peripheral equipment; 2) communication equipment; 3) consumer electronic equipment; and 4) miscellaneous ICT components and goods.
Examples: Computer hardware, communication equipment, routers.

ICT services – except cloud computing services and digital intermediary services

Simple definition: ICT 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; Services that contribute to the alternative classification of ICT products, as included in the CPC 2.1. In this alternative classification, six types of ICT products have been distinguished as ICT services: 1) manufacturing services for ICT equipment; 2) business and productivity software and licensing services; 3) Information technology consultancy and services; 4) telecommunications services; 5) leasing or rental services for ICT equipment; and 6) other ICT services
Examples: Provision of telecommunication networks, software development and engineering.

Priced cloud computing services

Simple definition: The OECD has defined cloud computing as follows: *"Computing services based on a set of computing resources that can be accessed in a flexible, elastic, on-demand way with low management effort."*
It 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).
Examples: AWS, Oracle, Azure, Alibaba cloud.

Priced digital intermediary services

Simple definition: 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.
It includes; 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.
Examples: The margin collected by UBER, Airbnb, Trivago, etc. represent the provision of this product.

The benefits of using digital supply-use tables to monitor digital activity

A significant advantage of measuring the effects of digitalisation on the economy using the established boundaries of the SNA is that the framework is already applied uniformly across the OECD, with the vast majority of OECD countries already producing estimates of GDP through supply-use tables - the starting point for compiling digital SUTs. The SNA is an established international statistical standard with a long history of being used for cross-country comparisons. As pointed out by Ahmad and Schreyer (2016[5]), the SNA framework, as it stands under SNA08, is generally able to capture the changes in production chains brought on by digitalisation and therefore any value added should already be included, either explicitly or implicitly, within the established supply-use framework.

With this in mind, the role of digital SUTs is to break down the relevant rows and columns in order to make digital activities more identifiable, with no need to define and build up a brand new output. While countries have had some initial challenges generating the additional breakdowns requested in the digital SUTs, mainly due to the structure of underlying data sources, conventional supply-use tables, which are the starting point, are commonly available. This allows preliminary estimates to be generated relatively easily, with more detailed estimates to follow as additional data become available.

Furthermore, by starting with the overall estimate of GDP, which incorporates the entire economy, digital SUTs provide additional context on how digitalisation is affecting the overall economy. Users have quite rightly looked for a derivative of GDP to be used as a metric for the size and growth of digital aspects of the economy. Estimates of the output, value added, or compensation of employees arising from digital industries, such as digital intermediary platforms or e-tailers (firms selling entirely via e-commerce), are examples of indicators available directly from the digital SUTs which are already well understood economic concepts. The widespread practice of referring to an industry (or sector) or product as "a share of GDP" is testament to the widespread usage of GDP as an indicator. Therefore, indicators which include a reference to GDP provide important context aiding their usability and interpretability beyond indicators relying on simple monetary values or proportions.

Finally, the pre-eminent benefit of digital SUTs, considering their experimental nature, is the lack of prescriptiveness of the framework. As outlined earlier, there is a multitude of different views on what the "digital economy" does or does not include. In the absence of one indicator that represents all economic aspects of digital transformation, digital SUTs can provide estimates to suit a wide range of user needs. Those who prefer a more narrow perspective can focus on the value added of the digitally enabling industry or overall output of

ICT goods and services. Conversely, users that favour a broader scope can take indicators related to the level of digital ordering and delivery, or the level of ICT goods and digital services used in production as an indication of how digital technologies are enabling economic activities as a whole.

Box 5. Digital economy satellite accounts

Moving from digital SUTs to a broader satellite account

It is important to remember that while digital supply-use tables are a useful statistical output by themselves, an additional advantage of these tables is that they are the very foundation for the compilation of a digital economy satellite account (DESA). Satellite accounts are a fundamental component of the SNA, allowing slight alterations to the standard production and asset boundaries used in the "core accounts". In the case of the DESA, to "make apparent and to describe in more depth aspects that are hidden in the accounts of the central framework" §2.166 (UN, 2010[17]).

Satellite accounts focussing on areas such as tourism, culture, or the environment are already commonly produced. Furthermore, satellite accounts on intangibles such as software and research & development formed the basis for measures later incorporated in the main SNA. A DESA would provide the opportunity to combine core national accounting concepts from the digital SUTs with estimates for phenomena that are not currently included within the central SNA framework. Examples of these might include labour or occupation indicators for digital industries, the value of "free" digital services provided in exchange for personal information, the value of data assets held by firms, or the amount of time consumers spend using digital platforms. A DESA would thus provide a better overall picture of how digitalisation is affecting broader societal developments, in addition to and combined with a more economically oriented perspective provided by digital SUTs.

Challenges in compiling digital supply-use tables

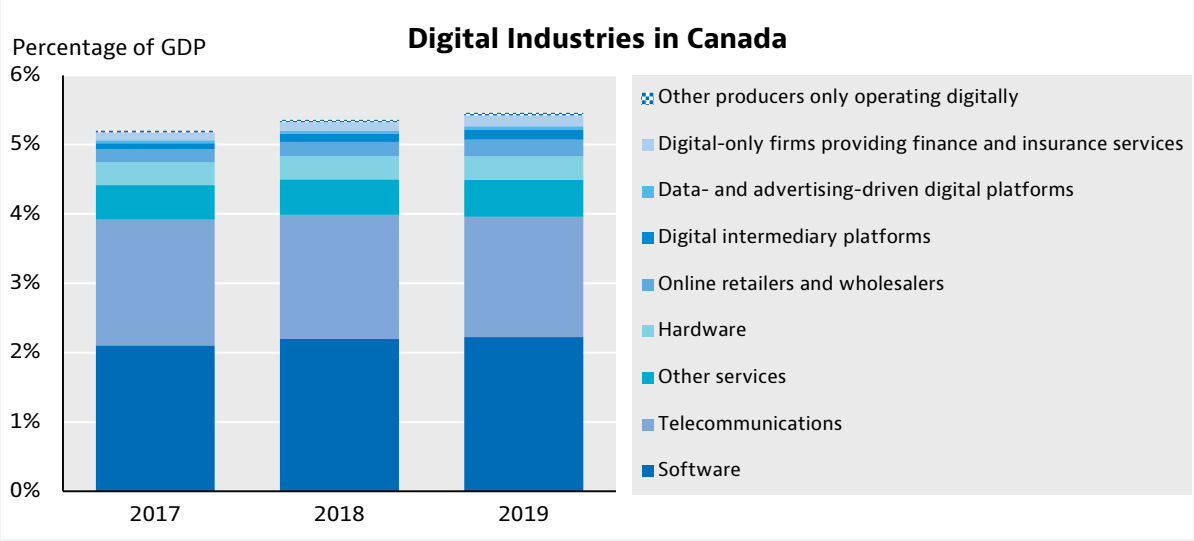
Despite broad support for the digital SUT framework, there are considerable hurdles for national statistical offices to compile digital SUTs. The most common is the limited availability of the source data required to populate various cells within the tables. Most methods used in compiling supply-use tables start from business surveys or administrative data that do not currently lend themselves to providing additional information on the nature of transactions. Furthermore, statistical business registers often lack the required level of detail to distinguish units that are fundamentally leveraging digital technologies, such as platforms providing digital intermediary services, or the firms that are reliant on digital technologies, and to separate them from the broader ISIC-based standard industry classification.

That said, it is important to recognise that none of these challenges are conceptually unsolvable, and that the majority of national statistical offices are able to address these concerns if equipped with the necessary resources. A clear example of this is the set of digital SUTs published by Statistics Canada (Statistics Canada, 2021[10]). In this initial release, Statistics Canada revealed interesting insights into digital activity such as estimates of total value of production that was digitally ordered and digitally delivered, as well as the gross value added of several "digital industries" (Box 6).

Box 6. Canada's digital SUTs

Canada's digital SUTs provided interesting insights into the digitalisation of Canada's economy. For instance, the gross value added of digital intermediary platforms was estimated to have grown by 37.3% in 2018 and 34.1% in 2019, although it still made up less than 0.2% of total GDP. While the work is still considered experimental, it reveals what is possible by utilising the data sources currently available.

Figure 2. Digital industries in Canada
% of GDP



Source: Statistics Canada (2021[10]).

Table 1. Digital industries in Canada

GDP

	2017	2018	2019
	CAD millions	CAD millions	CAD millions
Total, all industries	**1,991,534**	**2,079,869**	**2,157,352**
Total digital industries	103,298	111,384	117,788
Information and communications technology			
Hardware	6,536	7,012	7,243
Software	41,891	45,726	48,013
Telecommunications	36,166	37,175	37,460
Other services	9,912	10,669	11,511
Digital intermediary platforms	1,728	2,374	3,183
Data- and advertising-driven digital platforms	835	846	979
Online retailers and wholesalers	3,748	4,248	5,187
Digital-only firms providing finance and insurance services	2,340	2,752	3,392
Other producers only operating digitally	448	582	821

Source: (Statistics Canada, 2021[10]).

Overall, it is useful to look upon the compilation of digital SUTs as a continually evolving process in which countries can complete elements of the tables as source data become available. Countries are therefore encouraged to complete what they can, as soon as they can, with the idea of continually sharing emerging practices. In this way, digital SUTs can act as a roadmap, providing clear targets for countries to aim for when dealing with the challenges of making digital transformation more visible in economic statistics. These targets also provide a shared frame of reference when developing data sources that can be made cross-country comparable.

At first glance, the sheer size of digital SUTs are an additional compilation challenge. When considered in isolation, one may get the impression that a huge amount of additional information is required. However, this results from using the standard supply-use tables, which themselves are already quite large, as the starting point. The first step in the process is therefore to focus on specific "high priority indicators" (OECD, 2019[9]). These indicators have been chosen based on their importance to the policy debate as well as the feasibility for countries to compile them in the shorter-term. The high priority indicators include:

- Output, gross value added, and its components of digital industries;
- Intermediate consumption of digital intermediary services (DIS), cloud computing services, and total ICT goods and digital services; and

- Expenditures split by nature of the transaction, including estimates of digital trade.

While the work is still in its infancy, with countries still developing data sources and methodologies, the list of efforts in the Annex shows that many countries already have some statistics that can be used to populate elements of the digital SUTs now. As countries are compiling these outputs for the first time, this work will benefit from ongoing exchange of experiences and the sharing of more detailed guidance on compilation best practice once developed.

Annex. A selection of initiatives to improve the visibility of digital activities in economic statistics, including digital SUTs

Experimental estimates based on the digital SUT framework

Canadian digital supply-use tables, 2017 to 2019

Responsible entity: Statistics Canada

Description: The Canadian digital SUTs present enhanced details on digitally enabling infrastructure and the supply and uses of digital products, and digitally ordered and delivered goods and services. The figures are based on the OECD digital SUT framework.

Read more: *https://www150.statcan.gc.ca/n1/daily-quotidien/210420/dq210420a-eng.htm*.

Measuring the overall value added of digitalisation, calculated using selected digital products

Defining and measuring the Digital Economy, United States

Responsible entity: Bureau of Economic Analysis (BEA)

Description: This paper describes the work to develop estimates aimed towards the construction of a new digital economy satellite account. These estimates are the first step to a comprehensive measure of the contribution of the digital economy to gross domestic product.

Read more: *https://www.bea.gov/system/files/papers/WP2018-4.pdf*.

Measuring digital economic activities in Canada

Responsible entity: Statistics Canada

Description: This paper presents Statistics Canada's working definition of the digital economy as well as initial estimates on output, value added and jobs associated with the relevant activities.

Read more: *https://www150.statcan.gc.ca/n1/en/pub/13-605-x/2019001/article/00002-eng.pdf?st=7ni5lxtM*.

Measuring digital activities in the Australian economy

Organisation: Australian Bureau of Statistics (ABS)

Description: The ABS has applied the BEA approach to estimate digital activity in Australia using selected separately identifiable digital products from the ABS supply-use tables. The preliminary estimates provide insights into digital activities through a national accounts lens.

Read more: *https://www.abs.gov.au/websitedbs/D3310114.nsf/home/ABS+Chief+Economist+-+Measuring+Digital+Activities+in+the+Australian+Economy*.

Measuring the use of digital platforms

Results from the digital economy survey, Canada

Responsible entity: Statistics Canada

Description: The digital economy survey developed by Statistics Canada explores the activities of Canadians (18 years and older) in how they utilised digital platforms from July 2017 to June 2018.

Read more: *https://www150.statcan.gc.ca/n1/en/pub/11-627-m/11-627-m2018028-eng.pdf?st=OekfrOix*.

The use of digital platforms, the Netherlands

Responsible entity: Statistics Netherlands (CBS)

Description: Estimates of their use of online platforms to order or exchange goods or services by the Dutch population aged 12 years and over.

Read more: *https://www.cbs.nl/en-gb/news/2020/14/nearly-3-in-5-dutch-people-used-online-platforms-in-2019*.

Outputs related to e-commerce

Internet sales as a percentage of total retail sales, United Kingdom

Responsible entity: Office of National Statistics (ONS)

Description: This quarterly publication displays estimates of Internet sales as a proportion of overall retail sales. The data is collected using the same sample as total retail sales.

Read more: *https://www.ons.gov.uk/businessindustryandtrade/retailindustry/timeseries/j4mc/drsi*.

Goods and services bought/ordered via the Internet, Sweden

Responsible entity: Statistics Sweden

Description: Estimates of the Internet purchases by 16-85 year olds of household goods, electronic equipment, telecommunication services, holiday accommodation, travel arrangements, tickets for events, films or music, books, magazines, newspapers, video or computer games, computer software, and insurance policies.

Read more: *http://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__LE__LE0108__LE0108G/LE0108T23*.

Retail trade, online sales, Australia

Responsible entity: Australian Bureau of Statistics (ABS)

Description: An estimate of online sales has been included in the Retail Trade survey since the March quarter 2013. The data were previously published as an experimental series, as an Appendix to the Retail Trade publication. It was disaggregated by whether the retailer was "pure-play" (online only) or "multi-channel" (mix of online and physical stores).

Read more: *https://www.abs.gov.au/statistics/industry/retail-and-wholesale-trade/retail-trade-australia/latest-release#supplementary-covid-19-analysis-online-sales*.

Retail trade; turnover changes, Internet sales, Netherlands

Responsible entity: Statistics Netherlands (CBS)

Description: A survey that presents information about Internet purchases and can be broken down by different types of shops including those predominantly selling goods online and those predominantly selling goods through other sales channels (physical shops, markets, etc.). The survey used to measure turnover change for online sales covers retail trade companies with 10 or more employees; which represents 65-70% of total online sales.

Read more: *https://www.cbs.nl/en-gb/figures/detail/83867ENG*.

Gross value added of e-commerce, Mexico

Responsible entity: National Institute of Statistics and Geography (INEGI)

Description: This annual publication presents estimates of the percentage of total sales revenue made through electronic sales, by economic activity and as a share of GDP.

Read more: *https://www.inegi.org.mx/temas/vabcoel/default.html#Tabulados*.

Estimates related to digital intermediary platforms

Measurement challenges related to the sharing economy: The case of Airbnb

Responsible entity: Statistics Netherlands (CBS)

Description: The paper presents a methodology for the measuring the rental market created by the use of Airbnb. It includes suggestions on how to get the information needed and how to fit this information in the national accounts framework.

Read more: *http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=STD/CSSP/WPNA(2017)9&docLanguage=En*.

Accommodation and the sharing economy in New Zealand

Responsible entity: StatsNZ

Description: The paper outlines the data sources and the methods used to estimate the "accommodation-sharing" economy in New Zealand from 2013 to 2018. It is experimental in nature due to the assumptions required to calculate the estimates. The estimates were compiled as part of an attempt to understand the size of the digital economy and the impact of this activity on national accounts.

Read more: *https://www.stats.govt.nz/experimental/accommodation-and-the-sharing-economy-in-new-zealand*.

Estimates related to the value of data

The value of data in Canada: Experimental estimates

Responsible entity: Statistics Canada

Description: The paper extends, and to a certain extent tests, a statistical framework created in order to provide an estimate of the value of data used in production in Canada. It presents a preliminary set of statistical estimates of the amounts invested to produce Canadian data, databases and data science in recent years. The estimates are calculated from employment and wage information collected by the 5-yearly Census of Population and the monthly Labour Force Survey, combined with a number of important, but as yet largely untested, assumptions. The results indicate rapid growth in investment in data, databases and data science and a significant accumulation of these kinds of capital over time.

Read more: *https://www150.statcan.gc.ca/n1/en/pub/13-605-x/2019001/article/00009-eng.pdf?st=Wzd1A5d8*.

Estimates of imports/exports of digital products

Imports of digital services, New Zealand

Responsible entity: StatsNZ

Description: Since October 2016, the New Zealand tax office has applied goods and services tax (GST) on remote services imports. These services include: e-books, music, videos, and software downloads as well as general insurance, consulting, accounting, and legal services; webinars, distance learning, gambling services, website design, or publishing. As of the June 2020 quarter, StatsNZ are now using this tax data, in order to improve the estimate of remote services imports included in the goods and services and balance of payments releases. These estimates have been modelled back to the September 2014 quarter and will be included in the following series: telecommunications, computer, and information services; personal, cultural, and recreational services; other business services.

Read more: *https://www.stats.govt.nz/methods/international-trade-june-2020-quarter-data-sources-and-methods*.

Measuring digital trade, imports of digital services, Germany

Responsible entity: Deutsche Bundesbank and Destatis

Description: This presentation outlines the methodology used to derive initial estimates of digital imports of video on demand, music on demand, buying and using software, gambling, and cloud computing. While not published at such a fine level, these initial estimates were subsequently included in the aggregate estimates of import services within the balance of payments and the national accounts.

Read more: *https://community.oecd.org/docs/DOC-155556*.

Recording of cross-border transactions related to digitised products and services, Netherlands

Responsible entity: Statistics Netherlands (CBS)

Description: This experimental study, using national account concepts and definitions, looks into the export of so-called "digitised products" of the Dutch economy. The study is an explorative attempt to make transactions related to digitalisation more visible in existing statistics and to explore where data issues exist in existing statistics.

Read more: *https://www.cbs.nl/en-gb/background/2019/49/digital-crossboarding-transactions-*.

Additional work that would contribute to compilation of digital SUTs

Measuring the Internet economy in the Netherlands 2016-2018

Organisation: Statistics Netherlands (CBS)

Description: In 2016, Statistics Netherlands carried out a first study, which defined the Internet economy, developed a methodology to measure it, and produced statistics for the year 2015. This study repeats this work for multiple years, creating a time-series of data on the Internet economy, allowing for the analyses of trends, and providing a new angle for evaluating the big data approach.

Read more: *https://www.cbs.nl/en-gb/background/2020/19/measuring-the-internet-economy-with-big-data*.

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