

# A ROADMAP TOWARD A COMMON FRAMEWORK FOR MEASURING THE DIGITAL ECONOMY

---

*Report for the G20 Digital  
Economy Task Force*

SAUDI ARABIA, 2020

This document was prepared by the Organisation for Economic Co-operation and Development (OECD) Directorate for Science, Technology and Innovation (STI) and Statistics and Data Directorate (SDD), as an input for the discussions in the G20 Digital Economy Task Force in 2020, under the auspices of the G20 Saudi Arabia Presidency in 2020. It benefits from input from the European Commission, ITU, ILO, IMF, UNCTAD, and UNSD as well as from DETF participants. The opinions expressed and arguments employed herein do not necessarily represent the official views of the member countries of the OECD or the G20.

**Acknowledgements:**

This report was drafted by Louise Hatem, Daniel Ker, and John Mitchell of the OECD, under the direction of Dirk Pilat, Deputy Director for Science, Technology, and Innovation. Contributions were gratefully received from collaborating International Organisations: Antonio Amores, Ales Capek, Magdalena Kaminska, Balazs Zorenyi, and Silvia Viceconte, European Commission; Martin Schaaper and Daniel Vertesy, ITU; Olga Strietska-Ilina, ILO; Marshall Reinsdorf, IMF; Torbjorn Fredriksson, Pilar Fajarnes, and Scarlett Fondeur Gil, UNCTAD; and Ilaria Di Matteo, UNSD.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Cover image: Jason Leung on Unsplash.

© OECD 2020

The use of this work, whether digital or print, is governed by the Terms and Conditions to be found at <http://www.oecd.org/termsandconditions>.

## Table of contents

Executive summary	5
Preface	7
1. The “digital measurement ecosystem”	7
2. Advancing measurement of the Digital Economy	9
Chapter 1 - Measuring the Digital Economy: digitalisation in G20 economies	11
1. Introduction	11
2. Major trends in the Digital Economy	12
2.1. The Internet is critical in times of crisis	12
2.2. Gaps in technology and Internet usage remain	13
2.3. Managing increasing digital threats	14
2.4. Data at the centre	15
2.5. Digital technology development is particularly concentrated in certain G20 countries	16
3. Indicators for measuring key aspects of the Digital Economy	16
3.1. Infrastructure	17
3.2. Empowering Society	23
3.3. Innovation and technology adoption	27
4. Indicators toward a G20 common framework for measuring the Digital Economy	32
References	33
Chapter 2 – Measuring the Digital Economy: definitions and key measurement challenges	34
1. Measuring the Digital Economy: toward a definition of the Digital Economy	34
2. Defining the Digital Economy	35
2.1. Bottom-up definitions	36
2.2. Top-down definitions	36
2.3. Flexible definition	37
2.4. Summary of responses to a survey the use of definitions and measures of the Digital Economy in G20 countries	38
2.5. Toward a G20 definition of the Digital Economy	39
2.6. Implications of the definition variation for estimates of the size of the Digital Economy	46
3. International definitions and classifications related to the Digital Economy	47
3.2. Additional definitions of concepts related to the Digital Economy	50
3.3. Definitions in the framework for Digital Supply-Use Tables and Handbook on Measuring Digital Trade	51
4. Measuring data and data flows	52
4.1. The measurement challenge	52
4.2. Factors influencing the classification and valuation of data	53
4.3. Factors influencing the valuation of data	54
4.4. Summary of responses to a survey on the use of definitions and measures of the Digital Economy in G20 countries – data flows	56
5. Measuring digital services and platforms	56
5.1. Free or paid for: why are certain digital services explicitly recorded in national accounts and others are not?	57
5.2. Classifying the monetary flows of online platforms	57
5.3. Online platforms providing zero-priced digital services	59
5.4. Summary of responses to a survey on the use of definitions and measures of the Digital Economy in G20 countries – digital services and platforms	60

6. The Digital Economy and the system of national accounts	60
6.1. The need to reflect the digital transformation in economic statistics	60
6.2. Digital Supply and Use Tables	61
6.3. Summary of responses to a survey on the use of definitions and measures of the Digital Economy in G20 countries – digitalisation in economic statistics	62
6.4. Make-up of the Digital Supply-Use Tables	62
6.5. Advantages of the Digital Supply-Use Tables	64
6.6. Outputs of the Digital Supply-Use Tables	64
6.7. High Priority Indicators	64
6.8. A Digital Economy Satellite Account	65
6.9. Ongoing compilation challenges and future work for digital Supply-Use Tables	65
6.10. Measuring the Digital Economy and the Digital Supply-Use Tables	66
7. Concluding remarks	66
References	68
<b>Chapter 3 - Measuring the Digital Economy: Jobs, Skills, and Growth</b>	<b>71</b>
1. Introduction	71
2. Jobs in the Digital economy	74
2.1. Indicators on the number of jobs in the Digital Economy	76
2.2. Indicators on ICT-intensive jobs	78
2.3. Indicators on the dynamics of job creation related to the Digital Economy	80
2.4. Proposed indicators for monitoring purposes	82
2.5. Further key areas for development	82
3. Skills in the Digital Economy	83
3.1. Indicators on individuals' ICT and complementary skills	85
3.2. Indicators on digital technologies at work	87
3.3. Indicators on the digital skills pipeline	89
3.4. Indicators on NSE and ICT graduates	91
3.5. Proposed indicators for monitoring purposes	93
3.6. Further key indicators for development	93
4. Growth and the Digital economy	95
4.1. Indicators on value added in the Digital Economy	97
4.2. Indicators on investment and productivity in the Digital Economy	99
4.3. Indicators on international trade related to the Digital Economy	101
4.4. Proposed indicators for monitoring purposes	103
4.5. Further key indicators for development	103
5. Survey of definitions and measures of the Digital Economy in G20 countries	104
6. G20 indicators on jobs, skills, and growth in the Digital Economy	105
6.1. Implementation steps	107
References	110
Appendix A	112
<b>Chapter 4 - A Roadmap toward a Common Framework for Measuring the Digital Economy</b>	<b>113</b>
1. Introduction	113
2. Conceptual framework	114
3. A Roadmap toward a Common Framework for Measuring the Digital Economy	117
3.1. Definitions and concepts:	117
3.2. Indicators	118
3.3. Data and methodology	118
3.4. Dissemination of indicators	119
3.5. Institutional arrangements and capabilities	119
4. Recommendations	119
References	122

## Executive summary

This report builds upon previous G20 and other relevant work to develop *A Roadmap toward a Common Framework on Measuring the Digital Economy*, including a proposed common agreed definition on the Digital Economy and a set of existing indicators for measuring the Jobs, Skills, and Growth in the Digital Economy. It complements previous work and proposes a clear step forward for Digital Economy measurement.

**Chapter 1** provides over-arching context for the report. After providing an overview of key trends currently shaping the scale and development of the Digital Economy in G20 countries, it showcases a range of indicators, updated from the 2018 G20 Toolkit for Measuring the Digital Economy as well as complementing these with select additional indicators to give new insights and perspectives. This is one illustration of how *A roadmap toward a common framework for measuring the Digital Economy* builds on previous work by the DETF as well as initiatives by International Organisations.

Themes of *Infrastructure*, *Empowering Society*, and *Innovation and Technology Adoption* are explored through 17 key indicators. By reviewing data sources and measurement methods, as well as remaining gaps and challenges, chapter 1 lays the foundations for chapter 2, which builds upon these components to develop a G20 definition of the Digital Economy, and chapter 3, which goes a step further by setting out G20 indicators on *Jobs, Skills and Growth in the Digital Economy*. These themes are also measurement pillars within the *G20 Common Framework for Measuring the Digital Economy* set out in chapter 4; the indicators in chapter 1 give an initial indication of indicators that could be selected through future work.

**Chapter 2** sets out to establish actionable definitions of the Digital Economy and useful related concepts, prerequisite for any economic measurement framework. Definitional differences can and already do result in large differences in the estimates of the size of the Digital Economy. Moreover, agreement on defining the Digital Economy as well as the tiers within it is important given the implications it has on the scope of indicators chosen to measure the Digital Economy – both those agreed to in the Roadmap, outlined in chapter 4 and those to be developed in the future.

As such, progressing towards a consensual and actionable definition of the Digital Economy is the main objective of this chapter. The following comprehensive definition of the Digital Economy is proposed:

***The Digital Economy incorporates 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.***

The Digital Economy has broader societal impacts and therefore, for policy purposes, extends beyond the activity formally recorded in economic statistics. To address this, the overarching policy definition proposed above is combined with a tiered definitional framework to not only assist with accurate measurement and comparability of the digital economy by statistical offices but to also allow for the incorporation of digitalised interactions not currently recorded as economic activity. This comprehensive definition, including the various tiers underpinning it (see below), will provide G20 members with a consistent and consensual framework to guide policymaking.

The tiers underpinning the proposed definition are the following:

- **The Core measure** of the Digital Economy only includes economic activity from producers of Digital content, ICT goods and services.
- **The Narrow measure** includes the core sector as well as economic activity derived from firms that are reliant on digital inputs.
- **The Broad measure** includes the first two measures as well as economic activity from firms significantly enhanced by the use of digital inputs.
- The final measure, **the Digital society** extends further than the Digital Economy incorporating digitalised interactions and activities excluded from the GDP production boundary, i.e. zero priced digital services.
- An additional, an alternative measure covers all **economic activity that is digitally ordered and/or digitally delivered**. It should be considered as an alternative perspective of the Digital Economy, delineating economic activity based on the nature of transactions rather than the firms' output or production methods as this measure focuses on ordering or delivery methods, regardless of the final product or how it is produced.

In order to combine flexibility and precision for measurement purposes, the comprehensive definition and its tiers find a middle way between a bottom-up approach and a top-down/trend-based approach. Most of the measures outlined in the tiers are commensurate with already existing international definitions or proposals.

As with most definitions of the Digital Economy there remains some subjectivity or “fuzziness” in the proposed delineation between firms that may be reliant on digital inputs compared to those that are significantly enhanced.

Importantly, the alternative measure, delineated by the nature of the transaction, provides not only a different perspective, but also the opportunity to split economic activity below firm level by detailing how much output and value added were ordered and/or delivered digitally rather than assigning the entire firm's economic activity to a specific tier based on the production process.

The tiered structure is not the panacea for measuring the Digital Economy but it does offer greater clarity, on both a measurement and policy perspective, especially in relation to indicators for the Digital Economy – both those agreed to in this roadmap and outlined in chapter 4 as well as those developed in the future.

The digital transformation is ongoing and there are important additional phenomena on which international efforts are being focussed to improve measurement. These include:

- Measures for firms with business models based on providing free digital services, with no explicit charge to the consumer for the service provided. These firms have broken up the traditional direct transactional nature of providing goods and services on an unprecedented scale.
- Appropriate valuation methods for data as well as suitable categorisation within the various macro-economic classifications. A key requirement for accurate measurement of the Digital Economy is an agreement on how to recognise and record data as a separate standalone product used in production.

Digital Economy satellite accounts begin with the completion of Digital Supply and Use tables (Digital SUTs). These tables take on additional importance, as operationalisation of the proposed tiered definitions will necessitate a statistical framework that generates outputs consistent with the different definitions; the Digital SUTs is such a framework.

**Chapter 3** presents available indicators on *Jobs, Skills, and Growth in the Digital Economy*. Many of these were already set out in the *G20 Toolkit for Measuring the Digital Economy* but are complemented with additional indicators. These are set out as double pages in which key findings and links to economic theory are highlighted. Relevant definitions are set out as well as the underlying measurement approaches used.

This underpins the main purpose of the chapter - to identify a set of G20 indicators on *Jobs, Skills, and Growth in the Digital Economy* for adoption and production across G20 economies and beyond. These are presented in Table 1 below. This is undertaken in the context of the relevant measurement pillar within the *G20 Common Framework for Measuring the Digital Economy*, set out in Chapter 4.

In selecting key indicators for inclusion in the G20 set, various factors were considered. *The G20 indicators on Jobs, Skills, and Growth in the Digital Economy* aim to (1) collectively address the various key facets of this aspect of the Digital Economy and (2) reflect cross-cutting factors such as gender differences in the extent of engagement in the Digital Economy and its impacts, while also (3) using established definitions, classifications, and sources, and (4) being available with sufficient frequency and country coverage to enable benchmarking and monitoring. These indicators also seek to complement indicators used to monitor the United Nations 2030 Sustainable Development Goals (SDGs).

Finally, many of these indicators seek to operationalise the tiered G20 definition of the Digital Economy set out in chapter 2. The "Information Industries" align well with the "core" tier, while "digital intensive sectors" provide one means of operationalising the "broad" tier for measurement purposes.

**Chapter 4** provides practical steps to advance *Toward a G20 Common Framework for Measuring the Digital Economy*. Key elements are the widespread use of the G20 definition of the Digital Economy (set out in chapter 2) and the regular production of key indicators on jobs, skills, and growth (presented in chapter 3) across countries. In doing so, the chapter attempts to account for countries' different capacities in terms of data infrastructure and statistical resources, while setting out clear, actionable recommendations for policy makers and national statistical offices (NSOs) to implement.

The *Roadmap Toward a Common Framework for Measuring the Digital Economy* organises the proposed steps across five areas of work: 1) Definitions 2) Indicators 3) Methodology and data collection 4) Dissemination 5) Institutional capabilities.

After presenting the Framework that is envisaged for development in the medium to long-term, the chapter proposes key implementation steps for the parts of the Framework on which the DETF has worked in 2020. These are distributed between the main actors involved: G20 countries, the DETF and IOs. Other actors such as civil society and the private actor are nonetheless included.

## Preface

Widespread phenomena, including ever-increasing *digitisation* (conversion of information into digital form) and ever-greater *digitalisation* (applications of digital technologies) are serving to reinforce and expand what is commonly referred to as the “Digital Economy”. Realising the opportunities and addressing the challenges of the Digital Economy requires strengthened international and multi-stakeholder dialogue on measurement. This has been explicitly recognised by the G20, which, following the creation of the Digital Economy Task Force (DETF) in 2016 and the elaboration of the 2017 Roadmap for Digitalisation: Policies for a Digital Future. In 2018, the Argentine G20 Presidency worked with International Organisations led by the OECD, to publish a *G20 Toolkit for Measuring the Digital Economy (G20, 2018)*. This “*G20 Toolkit*” is designed to motivate the development of a stronger evidence base for analysis and policymaking across key dimensions including digital infrastructure, ICT-enabled innovation, and the use of digital technologies in society, as well as the role of the Digital Economy in driving jobs and growth. This provided background for a negotiated G20 Ministerial Declaration and Annex<sup>1</sup>.

This report builds upon this and other relevant work to develop *A Roadmap toward a Common Framework on Measuring the Digital Economy*, including a proposed common agreed definition on the Digital Economy and agreed set of existing indicators for measuring the Jobs, Skills, and Growth in the Digital Economy. As such, it complements previous work and proposes a clear step forward for Digital Economy measurement.

**Chapter 1** sets out key trends shaping the ongoing development of the Digital Economy as well as updating and complementing a range of the indicators set out in the *G20 Toolkit* to provide a foundation for the discussion that follows and to illustrate the existence of definitions, methodologies, and indicators on key aspects of the Digital Economy. However, there is currently no internationally agreed definition of the Digital Economy overall, and this has been identified as one important barrier to meaningful and comparable measurement.

**Chapter 2** examines definitions put forward by government, business, academic, and International Organisation sources to identify commonalities and differences. From these, an over-arching definition of the Digital Economy is proposed for discussion and agreement by the DETF. Chapter 2 also looks at the definitions available for key facets of the Digital Economy which are necessary to complement and operationalise the over-arching definition for measurement purposes. It also looks at several areas where international effort is being focussed on developing definitions and measures needed to more fully understand key elements of the Digital Economy.

**Chapter 3** also seeks to advance measurement in a complementary way, by looking in detail at indicators on Jobs, Skills, and Growth in the Digital Economy and proposing a core set of indicators for discussion and agreement by the DETF with a view to their wider development and production across G20 economies. These indicators focus on key ways in which the Digital Economy is impacting economic performance and the lives of G20 citizens. Furthermore, wider adoption of these indicators will entail the broader cultivation of underlying sources, which could also provide a foundation for improving indicators in other areas, such as those set out in the *G20 Toolkit* (and Chapter 1) themes “Infrastructure”, “Empowering Society”, and “Innovation and Technology Adoption”.

**Chapter 4** then situates these within a broader measurement framework accompanied with *A roadmap toward a Common Framework for Measuring the Digital Economy*.

As an input to this publication, the Saudi Arabia G20 Presidency coordinated a short survey of DETF participating countries to investigate the existence and use of definitions and measures for the Digital Economy and other key facets thereof. We extend our thanks to all for the responses received, which are summarised in this report.

Finally, the indicators showcased in this report can and should contribute to monitoring progress towards the 2030 Sustainable Development Goals (SDGs) set out by the United Nations within G20 countries and beyond. Indicators on the accessibility of ICT network infrastructure and digital skills are particularly relevant.

This preface sets out, at a broader level, key features of the international “ecosystem” through which data on the digital transformation are gathered, compiled, and transmitted for inclusion in international databases and suites of indicators. This provides a background on the foundations underpinning many of the sources and measures discussed. It also serves to highlight key contributions and developments from the various International Organisations working to better measure and understand the Digital Economy, all of which have collaborated with the OECD in producing this report on behalf of the Saudi Arabia G20 Presidency.

## 1. The international “digital measurement ecosystem”

A wide range of approaches and indicators has been developed to cover various aspects of the Digital Economy. As early as 2004, a **Partnership on Measuring ICT for Development**, was launched to improve the availability

<sup>1</sup> <http://www.g20.utoronto.ca/2018-08-24-digital.html#annex3>

and quality of ICT data, particularly in developing countries. The Partnership mainly established a core list of 50 ICT indicators to serve as a common basis for internationally comparable statistics. All the International Organisations mentioned below are active members of the Partnership.

Among G20-led initiatives in the field, the “*G20 Toolkit for Measuring the Digital Economy*”, was developed and endorsed under the auspices of the Argentinian Presidency in 2018. It showcased the data available for G20 countries through 36 key indicators across the areas of Infrastructure; Empowering Society; Innovation and Technology Adoption; and Jobs and Growth. Many of these for the basis for **section 2** of this chapter.

A wide range of other products from Intergovernmental and International Organisations also showcase indicators related to the Digital Economy including:

- The **European Commission** has developed the **Digital Economy and Society Index (DESI)** (<https://ec.europa.eu/digital-single-market/en/desi>), which is based off a multidimensional framework that compiles and monitors indicators of digital performance across some key aspects of the European information society (Telecom sector, Broadband, Mobile, Internet usage, Internet services, eGovernment, eCommerce, eBusiness, ICT Skills, Research and Development). Countries’ performances in each dimension are then summarised in a composite index of EU Member States’ digital competitiveness. The International DESI (I-DESI) extends the geographical coverage, using a simplified index to assess the performance of both individual EU countries and the EU as a whole in comparison to other advanced economies (Australia, Brazil, Canada, Chile, China, Iceland, Israel, Japan, South Korea, Mexico, New Zealand, Norway, Russia, Serbia, Switzerland, Turkey and the United States). In October 2019<sup>2</sup>, the EU and the Association of Southeast Asian Nations (ASEAN) launched a cooperation to develop the basis for an ASEAN digital benchmarking index, modelled on the DESI index and its methodology. This was mainly done through joint training sessions, workshops and experience sharing between the two institutions.
- The **ITU Measuring digital development: facts and figures** series (<https://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspx>) presents a variety of indicators to give an overview of the state of digital development across its 196 member countries. ITU is currently developing a composite index that will replace the ICT Development Index (IDI). The new index will show policy makers how digital transformations impact on their ability to meet the Sustainable Development Goals (SDGs)”.
- The **OECD Going Digital Toolkit** (<https://www.oecd.org/going-digital-toolkit>) operationalises the Going Digital integrated policy framework by providing indicators and policy information to help policymakers implement coherent policies to address the challenges of the digital transformation and fully realise its opportunities. Users can compare countries across 33 core indicators and a range of complementary indicators and explore the underlying data interactively to gain new insights. The Going Digital Toolkit covers OECD and accession countries, as well as the BRICS economies, with plans to being additional countries on-board. This draws on a range of underlying sources and databases produced by the OECD and others.
- **UNCTAD** maintains a portal of **Information economy indicators** (<https://unctadstat.unctad.org/wds/reportfolders/reportFolders.aspx>) focussed on ICT trade and ICT use



预览已结束，完整报告链接和二维码如下：

[https://www.yunbaogao.cn/report/index/report?reportId=5\\_22772](https://www.yunbaogao.cn/report/index/report?reportId=5_22772)

