

G20 DIGITAL ECONOMY

A Digital Agenda for Development

Building on the consensus achieved under the Chinese and German Presidencies, and recognizing the priorities noted in the 2016 Blueprint on Innovative Growth, the 2017 Digital Economy Ministerial Declaration and the associated Annex on Roadmap for Digitalization, as well as the potential of the digital economy to support the 2030 Agenda for Sustainable Development, we, the G20 Ministers responsible for the digital economy, met in Salta on 23–24 August 2018 to discuss how to strengthen a digital agenda for development.

We recognize that governments, the private sector, academia, civil society, technical communities and relevant international organizations should maximize the benefits and address the challenges of the digital economy. A thriving digital economy relies on quality, affordable, secure, accessible and inclusive digital infrastructure, an environment that supports innovation, appropriate policy frameworks, the capacity of people and businesses to adapt to digital transformations, and the free flow of information, ideas and knowledge, while respecting applicable legal frameworks, and working to build consumer trust, privacy, data protection and intellectual property rights protection.

We note that, in order to advance human-centric policies, a fair, predictable, transparent and competitive business environment, and inclusive growth in the digital era, it is essential to continue our dialogue and work towards improving digital market access for consumers and businesses, particularly in developing countries, as well as our understanding of the market impact of emerging technologies and new business models, like online platforms.

We commit our efforts to promote policies and actions that catalyze digital transformations, and contribute to bridging all forms of digital divide, with special attention to the digital gender divide, and people living in remote areas. To this end, the G20 Argentine Presidency aims to promote the improvement of digital government and digital infrastructure, strengthen the digital skills of the workforce, deepen the analysis towards digital economy measurement, reflect about impactful strategies and steps to bridge the digital gender divide and to share experiences and lesson learned with regard to opportunities and challenges of embracing emerging technologies and boosting MSMEs & entrepreneurs in the digital era.

G20 Digital Government Principles

Information and communication technologies (ICT) are driving forces that lead the public and private sectors to thrive, offering better services to citizens and customers and achieving sustained growth. To continue to foster favorable conditions for the strengthening of the digital economy, we recognize that we need to increase our efforts to digitally transform our governments.

Following the 2017 G20 Digital Economy Ministerial Declaration, we emphasize that ICT plays a

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crucial role in modernizing and increasing efficiency and effectiveness in public administration. Acknowledging the Hangzhou outcome on the need to collectively leverage digital opportunities, we propose Annex 1 “G20 Digital Government Principles”, as a reference for G20 countries to promote an agile, innovative, integrated and data-driven public sector, enhancing the effectiveness and performance of the government, and making a crucial contribution for the development of the digital economy.

We recognize the progress made by G20 countries towards the development of Digital Government and we encourage them to continue working towards more open, efficient, accountable, transparent, user-friendly and inclusive governments, leveraging existing global communities, and sharing their experiences in order to reap the benefits of the knowledge gained.

Bridging the Digital Gender Divide - Delivering Impact

We welcome and encourage policies and initiatives to foster broad access to digitalization. Reaffirming our commitment to bridging the digital gender divide and building upon initiatives such as #eskills4girls and EQUALS, we emphasize that the integration of women in the digital economy supports stronger economic growth, inclusiveness and enhances well-being.

Given that women’s access to and use of digital technology lags behind that of men and that in many countries the digital gender divide remains large, we encourage G20 countries to take actions to bridge this gap as outlined in *Annex 2 “Bridging the Digital Gender Divide - Delivering Impact”* and to review and consider the OECD report “Bridging the Digital Gender Divide: Include, Upskill, Innovate”¹. These efforts include: raising awareness of the digital gender divide and the benefits that diversity offers; establishing goals aimed at reducing this divide; closing the gap in financing for women and enabling access to national, regional, and international markets; increasing women and girls’ participation in STEM and high-tech sectors, while addressing barriers that hinder the full participation of women in digital transformations; supporting women (including those in rural areas to make sure no woman is left behind) in developing digital skills to help promote access to quality jobs and integration into the labor market; supporting women’s entrepreneurship in digital businesses; addressing cyber-violence towards girls and women to promote a trusted online environment for them; and promoting the collection of sex-disaggregated data to monitor progress in these efforts.

By leveraging innovative tools and business models offered by the digital world, and by working within existing partnerships and frameworks, G20 countries have an extraordinary opportunity to implement policies and actions that accelerate the full integration of women into the digital economy.

Measurement of the Digital Economy

Following the Hangzhou 2016 outcome on the need to intensify efforts to measure the digital economy and its consequences to create supportive policy environments, in 2017 the G20 Digital Ministers Declaration called on all international bodies with expertise to further the digital economy

¹ OECD (2018) Bridging the Digital Gender Divide: Include, Upskill

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measurement agenda in an effort to provide important tools for enhancing the understanding of the contribution of the digital economy to the overall economy.

Reaffirming this commitment, the G20 Argentine Presidency, in collaboration with International Organizations (IOs)², produced a document, “*G20 Toolkit for Measuring the Digital Economy*”. The toolkit brings together different methodological approaches and indicators that may be used to monitor the digital transformation, and highlights critical gaps and challenges that G20 countries and IOs involved in digitalization measurement could consider for further work. *Annex 3* of this declaration includes a summary of this toolkit.

The G20 acknowledges that timely, standardized, and comparable measurement is fundamental to maintain an informed discussion about the advancement of the digital economy, assess the impact of new technologies on jobs, production and society in general, and guide policy making to improve technology access and adoption by individuals and businesses with consideration of the associated risks and benefits. In this respect, it recognizes the progress made by G20 countries and IOs to develop and disseminate core and standardized indicators, as well as their efforts to support statistical operations and capacity building in G20 members, particularly in developing countries. We highlight the need to expand existing methodological measurement frameworks to include new and relevant indicators that account for the growth in digitalization and its empowering impact on individuals and businesses, make statistical systems more flexible and responsive to the new and rapidly evolving aspects of the digital economy, and collect relevant statistics. Methodologies should be widely discussed taking into account the practices of G20 countries and monitoring progress in measurement, to the extent possible.

We encourage G20 members to continue their actions to i) develop comprehensive, high-quality data infrastructures for measuring the use and consequences of digital technologies, such as the Internet of things and big data, at the individual and business levels; (ii) actively participate in actions for the development and improvement of international measurement standards for the digital economy; (iii) work collaboratively to bridge existing measurement gaps in key dimensions such as capturing the creation of economic value in the digital economy, measuring data flows, the interface between trade and the digital economy, skills and education; including breakdowns by sex, age, business size, sector, and location where appropriate; iv) build capacity to improve data collection and dissemination, and research data quality; and v) explore more diverse sources of data and tools that could be used to improve digital economy measurement, allow 2a better use of available data, and enable the conversation between businesses, government and other actors from civil society to strengthen the evidence base and complement current statistics. To avoid fragmentation of statistical efforts, we encourage IOs, where appropriate, to consider examples of digital economy measurement efforts by G20 countries.

² The document “A G20 Toolkit for Measuring the Digital Economy” was produced by the Argentine G20 Presidency, under a steering group coordinated by the Argentine G20 Presidency and the Organisation for Economic Co-operation and Development (OECD), with the support of the International Telecommunication Union (ITU), the United Nations Conference on Trade and Development (UNCTAD), the European Union (EU), The World Bank Group (WBG), the International Monetary Fund (IMF), and the International Labour Organization (ILO).

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Accelerating Digital Infrastructure for Development

We emphasize that universal connectivity, by developing existing technologies and a new generation of digital infrastructure, is a necessary condition for the development of the digital economy, as well as a powerful enabler of inclusive growth and sustainable development. We support national, regional and international initiatives aiming at the promotion of investment in digital connectivity infrastructure, including 5G. We acknowledge the relevance of appropriate policy approaches that, while recognizing national circumstances, enhance accessibility, affordability, quality and security of connectivity and digital services, and increase access to digital economic growth. We also recognize that the promotion of sustainable deployment of digital infrastructure and the creation of incentives to innovate and invest in digital services are essential to bridge the digital divide. We encourage the G20 common goal of promoting universal and affordable access to the internet by all people by 2025.

To that end, we commit our efforts to prioritize connectivity of individuals, households, businesses, industries and the public sector, taking into particular consideration remote areas and vulnerable groups. The Argentine Presidency introduced *Annex 4 “Accelerating Digital Infrastructure for Development”* as a compilation of references to assist G20 members towards expanding digital infrastructure and extending coverage to underserved communities and individuals, through integrated strategies that align incentives, improve market competitiveness, stimulate investment, promote collaboration among public and private sectors and create trust in all stakeholders.

Emerging Digital Technologies

We encourage countries to enable individuals and businesses to benefit from digitalization and emerging technologies, such as 5G, Internet of Things (IoT), artificial intelligence (AI), distributed ledger technologies, by: i) considering appropriate policy approaches and flexible legal frameworks that create an environment that empowers entrepreneurs and fosters research, innovation and competition; ii) promoting the application of emerging digital technologies in manufacturing, agriculture and other vital areas; and iii) taking into account the challenges that these new technologies may pose in terms of privacy and security, among others, and the opportunities to improve quality of life and foster economic growth.

We face the challenge of capturing the benefits of digitalization to improve productivity that may lead to new business models including sharing economy, economic development, and the realization of broader opportunities for individuals and business. We highlight the importance of supporting entrepreneurs and MSMEs, noting that they employ a significant part of the labor force in G20 countries and that some have low levels of digitalization and research and innovation for new products and services.

G20 countries commit to share lessons from their extensive experience and enhance partnership and cooperation in the effective use of emerging digital technologies, in particular regarding adoption and its opportunities and challenges.

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Entrepreneurs & MSMEs in a digital context

Digitalization can lead to significant gains in productivity, and thus we restate that the digital economy is an increasingly important driver of inclusive economic growth and plays a significant role in accelerating the productivity growth of existing industries, opening up new markets and nurturing new industries, and contributing to global development and new job opportunities. We underscore the importance of promoting a business-friendly environment, and we propose that reaping these benefits requires understanding and addressing the challenges and opportunities faced by entrepreneurs and MSMEs in a digital context. In this regard, we encourage G20 members to i) promote whole-of-government and other stakeholder's initiatives in building entrepreneurial, digital and workers' skills - particularly trial and error learning to create entrepreneurial resilience and widespread digital literacy- in all educational fields from early childhood to adulthood, ii) strengthen the digital ecosystem for the development and scale-up and scale-up of entrepreneurs and MSMEs, by promoting welfare enhancing competition, access to markets that benefit consumers and strengthening coordination among local and regional stakeholders, iii) consider policies that encourage investment, innovation and confidence in the digital economy (including policy frameworks, reducing administrative barriers, creating tax and financial incentives, support for R&D, training, and technical assistance) in an inclusive manner, within a fair, transparent and predictable business environment and at the same time protecting the privacy and security of individuals and businesses.

The Future of Work

The Argentine Presidency defined "The Future of Work" as a priority to achieve fair and sustainable development for all. Recognizing the Annex paper "Digital skills in vocational education and training", released during the German Presidency, and acknowledging that the rapid transformations of the digital era require the development of high-quality-lifelong-learning system and joint efforts across sectors, the G20 DETF, together with the G20 Education and Employment Working Groups, organized the Workshop "Building opportunities for an inclusive future of work" and committed to facilitate transitions to and within the world of work. To address the issue of the digital divide, we call attention to the development of skills required by the digital economy to enable equal opportunities for all, with special attention to vulnerable and underrepresented groups. We also acknowledge the need to address the mismatch between the new skills required by the digital economy-and the existing skill set of many workers, with this as a particular challenge for developing and least developed countries.

Consumer Protection

We recognize the importance of supporting effective online consumer protection and empowerment in order to build trust and confidence in the digital environment. In that regard, we note the call by host and consumer movement representatives at the G20 Consumer Summit held in Buenos Aires in May 2018 for G20 countries to empower and protect vulnerable and disadvantaged consumers that, due to circumstances such as levels of income, age, sex or location, among others, may be at greater risk of harm and have fewer opportunities to enjoy the full benefits of digital technology. We

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also acknowledge the call by consumer movement representatives at the first G20 Consumer Summit, in Berlin, in March 2017 for G20 countries to support consumer protection efforts more broadly and increase attention to the issues of consumer digital education, awareness and empowerment. We commit our efforts to empower and protect children and young people in the digital age and support ongoing efforts to improve trust, security, data protection, privacy, and safety for children including with respect to connected products and services.

Way forward

Capitalizing on the interest expressed by G20 members to strengthen the exchange of information and experiences to support improving access, adoption, and effective use of digital technologies that allow us to learn from each other in a more agile way, the G20 Argentine Presidency has created the G20 Repository of Digital Policies, a platform that aims to support policymakers in the design and implementation of evidence-based digitalization policies and strategies, especially those related to skills for the future of work, entrepreneurs and MSMEs, digital inclusion, digital government, digital infrastructure, emerging technologies and innovative business models that could accelerate inclusive growth. G20 countries can contribute to developing this platform by sharing their flagship policy actions and programs.

We welcome the initiative of Japan, the next Presidency of the G20, to continue the work, on the basis of this declaration, on measurement of the Digital Economy, evolving digital governments, accelerating digital infrastructure for development and facilitating information sharing of experiences regarding digitalization, among other priorities including artificial intelligence and security in the use of ICT.

Recognizing the importance of the interface between trade and digital economy, we invite the G20 Digital Economy Task Force to continue its collaboration with the G20 Trade and Investment Working Group.

We emphasize the importance of consulting all interested parties and stakeholders in the process of identifying main challenges and exchanging ideas that inform the design of effective initiatives to contribute to strengthening our shared goal of development and inclusive growth. We recognize the role and contributions of the G20 engagement groups and other civil society groups in the G20 process. We thank International Organizations, including the IDB, ILO, IMF, ITU, OECD, UNCTAD, and WB, for contributing their expertise to the work of the G20 DETF and welcome their efforts to maximize the positive impact of the digital economy.

Annex paper 1 - G20 Digital Government Principles

Digital Government supports a thriving digital economy. During the German Presidency, G20 Leaders recognized that information and communication technology (ICT) plays a crucial role in modernizing and increasing public administration efficiency and effectiveness. Acknowledging the importance of an agile, innovative, and data-driven public sector to enhance the effectiveness and performance of government, outcomes for citizens, and their trust in public institutions, the members of the G20, supported by the OECD, have produced the following “*G20 Digital Government Principles*”. These principles aim to facilitate an inclusive and whole-of-government approach to the use of ICT and assist governments in reshaping their capacities and strategies, while respecting the applicable frameworks of different countries including with regards to privacy and data protection.

Services

Foster user-driven and inclusive approaches to Digital Government, beginning with user needs and designing services that meet those needs. Foster the use of data and digital technologies to facilitate user-driven approaches in the design of digital processes, products and services which are accessible, affordable, and accommodate the needs of all users across society. Encourage the adoption of ways to collect users’ feedback and promote the inclusion of citizens in the design of digital services wherever possible.

Data

Promote an open and data-driven culture in the public sector. Promote the use of data as a key strategic asset to improve foresight, service delivery, and projects’ and programs’ performance. Support the appropriate use, re-use and access to government data by the public, the private sector, and civil society to increase openness, transparency and accountability. Improve dataset quality and interoperability, and incentivize public understanding and engagement in policy making, service design and service delivery to foster innovation and encourage public value co-creation.

Security

Promote trust and security, as vital for harnessing the potential of digital government, by adopting a risk management approach for appropriate uptake of digital technologies to address security risks, data loss concerns, privacy, threats and vulnerabilities in the use of ICT. Adopt risk management models to identify, assess, monitor, mitigate and manage risks as well as promote resilience and security of systems. Foster the adoption of reliable identity and trust management approaches. Promote international cooperation in regard to this matter.

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Digital Skills

Strengthen the readiness of public servants, citizens and businesses for Digital Government.

Reduce the digital divide by taking steps to further increase the readiness of public servants, businesses, and citizens to interact digitally with each other by promoting digital skills, digital literacy and the availability of digital public services. Promote public-private partnerships when beneficial.

Standards

Foster the application of digital government standards developed using principles of openness, transparency and consensus.

Provide enabling frameworks for Digital Government to seize new opportunities by leveraging industry-and market-led standards, by using international standards and recognizing countries' different contexts, to provide governments fit-for-purpose solutions to achieve their digital government objectives.

Strategy

Prioritize and facilitate funding and implementation of digital government strategies.

Facilitate the formulation of business cases that identify expected economic, societal and policy benefits of implementing digital government strategies and a common methodology to monitor and/or report back, to enable communication on public investments, including government procurement, shared accountability across the public sector and improved project and program management.

Evolution

Establish a framework to commission digital technologies and services in ways that accommodate the fast-paced change in the digital environment.

Provide standards for the commission (design, build and buy) of digital technologies, ensuring processes are compatible with modern ways of developing and deploying digital technologies across the public sector. Apply these principles to end-to-end procurement and contracting in digital, data and technology products and services in support of digital government evolution.

Annex paper 2 - Bridging the Digital Gender Divide - Delivering Impact

Encouraging women's participation in the digital economy supports stronger economic growth and enhances well-being. Globally the digital gender divide remains a concern³, particularly in STEM (science, technology, engineering, and mathematics) career fields. To this end, under the Argentine Presidency, G20 countries shared information about policies⁴, actions, and national practices that help to bridge the digital gender divide. Many initiatives promoting equality between women and men are underway. The analysis of these policies, combined with the OECD report "Bridging the Digital Gender Divide: Include, Upskill, Innovate"⁵, reflect that gender-based digital exclusion is complex, requiring different interventions depending on the specific barriers to women's and girl's lack of access to, and use of, digital technology. The main obstacles identified are access, affordability, lack of education, skills and technological literacy, and inherent gender biases and socio-cultural norms.

Taking into consideration the insights from this analysis of policies and practices, and acknowledging that more needs to be done, we encourage **G20 countries to take action in the following areas:**

1. Increase awareness of the digital gender divide and address gender stereotypes that hinder the full participation of women in the digital economy.

- Consider the inclusion of **awareness programs to close the digital gender divide** in national digital strategies.
- Continue research and share key indicators, good practices, and recommendations on how to bridge the divide.
- Consider **analysis** to inform the development of policies and programs to ensure the impacts on women and girls are included.
- Identify **barriers** to access, connectivity, and digital skill acquisition to develop policies that address them.
- Foster **public-private collaboration** to tackle the digital gender divide.
- **Take appropriate steps to address societal biases and prejudices instilled from an early age**, at home and in educational institutions, including biases in education curricula and digital toys, products or tools.

2. Encourage gathering sex-disaggregated data to enable evidence-based interventions.

- Collect and analyze sex-disaggregated **data** to monitor key policy actions, identify priorities, track progress and promote the integration of a gender perspective into national strategies, policies, and budgets.

³ OECD (2018) Bridging the Digital Gender Divide: Include, Upskill, Innovate.

⁴ Policies compiled in an Annex will be available for G20 countries.

⁵ The OECD elaborated the report at the request of the Australian Government. This report was prepared as background material and presented to the G20 Presidency and subsequently at the DEFT meeting held in Buenos Aires, on July 31st and August 1st.

- **Prioritize the collection of data related to access, use, participation, skills, leadership positions and pay gaps in the ICT/ high-tech Sector.**
3. Promote **digital skills for women** to help ensure access and also help them return to the labor market to avoid losing valuable talent and economic and social potential.
- Empower women through promoting public and private sector investment in **digital skills**.
 - Foster women's awareness of the power of digital tools and enable them to acquire skills, such as design thinking for innovation, career guidance, and workplace skills, while promoting leadership development.
 - Foster **high-quality work and flexible work arrangements for everybody**, by taking advantage of digital tools, especially in digitally-intensive industries.
 - Promote **training in digital skills** acquisition for women re-entering the labor market after extended absences, e.g. maternity leave, caring responsibilities.
4. **Target women lagging in digital access and use.**
- Coordinate and target approaches at the **regional and local level**, in order to prioritize specific needs and opportunities **including women in rural areas**.
 - Consider the **use of e-commerce platforms by rural women entrepreneurs** to market their products.
 - Encourage digital literacy among rural women.
 - Foster **low-cost Internet service packages** for low-income people, especially for women.
5. **Support women's entrepreneurship in digital businesses**
- Support training in digital skills to strengthen the **financial inclusion** of women.
 - Promote training of women in enterprise management to cultivate their self-reliance and risk-and-opportunities-assessment abilities in the digital economy.
 - Remove barriers that may hinder women's access to finance, insurance, licensing and business support.
 - Promote **diversity** in digital entrepreneurship and within teams of researchers and inventors.
6. Encourage cooperation between the public and private sectors to strengthen **girls' interest and women's participation in the STEM and high-technology sectors**
- Increase **interest, participation, and promotion** of girls and women in STEM careers and digital-intensive sectors, especially women with disabilities, through **non-discriminatory practices** both in the labor market and the academic environment.
 - Boost **teachers' training** in digital skills and coding to meet the needs of future generations.
 - Address discrimination in **ICT/STEM jobs** at all levels.
 - Promote **awards and prizes** for the ICT/STEM sector in order to motivate young girls in these careers.
 - Promote **boot-camps** that foster programming skills for young girls.
 - Promote **scholarships** to support the participation of low-income women in ICT/STEM careers.
 - Promote **women's networks and associations** in high tech sectors to connect women, facilitate mentoring for young girls and graduates, and help them make the transition to the labor market.

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- Advocate **female role models** to inspire young women to study, start a business, and lead in high-technology sectors.
7. Address **cyber-violence** towards girls and women to facilitate their online participation.
- Encourage and support measures that identify, prevent, and counter the sexual and gender-based abuse, harassment and the threat of violence against women and girls in digital contexts.
 - Increase awareness of cyber violence threats and intimidation, and encourage measures to condemn such instances of cyber violence when they occur.
8. **Use digital tools that provide new opportunities to connect women to address the digital divide while ensuring quality jobs and a safer environment.**
- Facilitate policies to seize the potential “leapfrog” opportunities offered by the Internet, digital platforms and services, mobile phones, electronic payments, and wallets, thus enabling women to earn (additional) income, increase employment opportunities, and access knowledge and information.
 - Ensure that the participation of women in digital transformations goes hand in hand with job quality.
9. **Renew, coordinate and encourage participation in joint initiatives** among G20 countries and IOs to empower girls and women in the digital era.
- Learn from national and international efforts to better understand progress towards bridging the digital gender divide
 - Continue sharing policies and actions through initiatives such as #eskills4girls and EQUALS.
 - Coordinate among different initiatives to scale up, learn from successful - and unsuccessful - programs and build on lessons learned.

Annex paper 3 - Measurement of the Digital Economy

Following the 2017 Ministerial Declaration that encouraged countries to reflect the measurement of the digital economy in national statistics in a comprehensive way and review existing statistical frameworks, the Argentine G20 Presidency, in collaboration with a steering committee of international organizations (IOs) led by the Organisation for Economic Co-operation and Development (OECD)⁶, has produced a draft “*G20 Toolkit for Measuring the Digital Economy*”. The toolkit highlights methodological approaches and indicators used to monitor the digital economy, and key gaps and challenges regarding digital economy measurement for further study. This Annex comprises an abridged version of this Toolkit.

- **Objectives and scope**

The Toolkit aims to provide a first assessment that could serve to propose possible measurement approaches that support evidence-based policymaking, diagnoses the challenges and opportunities of the digital economy, identifies the issues that could be addressed by public policies, and serves as a potential guide for countries to implement standardized measurement activities.

- **Indicators and initiatives to measure the digital economy**

Rather than producing new content, the document brings together more than 30 key existing indicators and methodologies produced by major international organizations to monitor and assess the size and penetration of the digital economy, organized in four themes: i) **Infrastructure**, including access to mobile and fixed networks, the development of Next Generation Access (NGA) networks, the dynamics of household and business uptake; ii) **Empowering society**, including access to and use of digital technologies, people’s use of the internet, education, financial inclusion and interaction with government; iii) **Innovation and technology adoption**, including new digitally-enabled business models, the role of ICTs as an engine for innovation, and the adoption of ICTs and other emerging technologies by businesses; iv) **Jobs and Growth**, including indicators related to the labor market, employment creation, investment in ICTs, value-added, international trade, e-commerce, and productivity growth.

The toolkit also includes other studies, surveys, pilot initiatives, and various measurement efforts in G20 countries and international and regional organizations, to complement standard measures and potentially expand coverage to more countries or new areas within countries.

- **Gaps and challenges**

Acknowledging that data are far from being comprehensive, country coverage is limited, timeliness

⁶ The draft document “A G20 Toolkit for Measuring the Digital Economy” was produced by the G20 Argentine Presidency with the support of the International Telecommunication Union (ITU), the United Nations Conference on Trade and Development (UNCTAD), the European Union, The World Bank Group (WBG), the International Monetary Fund (IMF), and the International Labour Organization (ILO).

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is often an issue, and differences in data collection methodologies and approaches across countries persist, the toolkit identifies two types of gaps: methodological and availability.

Methodological gaps relate to what existing indicators measure, how they capture the digital economy and how to address issues such as the need to improve existing indicators, identification of new measures to be developed, or the review of data sources and collection methods.

- There are important difficulties in measuring **data flows**. G20 members may wish to explore ways to better utilize existing usable data sets.
- Although educational attainment and occupation indicators are available, there is a lack of widespread measurement of **skills, abilities and competencies** that would allow for cross-country comparison.
- Measures of the **use and benefits of emerging technologies**, such as artificial intelligence, internet of things, 3D printing, robotics, distributed ledgers or data science-based processes should be improved to capture their use in different industries and their impact on the change in aggregate and business-level value added.
- More emphasis should be placed on the development of methodologies to measure digitally-enabled trade and produce related indicators.
- The collection of **e-commerce statistics involves methodological challenges** such as differences in industry coverage, actors involved, and type of survey used to gather data across countries. Consistent and comparable data on the growth and adoption of e-commerce by both individuals and businesses in all industries is helpful in identifying barriers to trade.
- Existing indicators do not always allow for **sex and age breakdowns** to examine the use of new technologies, jobs, or potential biases in how society is affected by digitization.
- Existing indicators do not always reflect the socio-economic impact of the digital transformation. Having this type of indicators being developed could help to create targeted approaches to develop and implement digital technologies.
- The **use of more diverse sources of data** is another area where we see important challenges. The number of indicators produced jointly with the private sector and other actors of civil society is limited, and almost exclusively related to infrastructure. Interaction between businesses, government and actors from civil society to explore new sources of data, tools, and alternatives to exploit available data could have a positive impact on countries' measurement capacities.
- While **household and business surveys** are used in several G20 countries to measure the digital economy, the use of administrative records remains very limited.

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- Information on the extent of **regional disparities or dispersion within countries** is often absent from key standardized measures of household or business uptake of digital technologies. Although surveys generally collect regional codes, indicators are usually not tabulated by that dimension in international comparisons. Collaboration between international organizations and G20 countries to make regional data available, for example by advancing on methods to make microdata more accessible, should help to make progress on this front.
- Current indicators may not adequately reflect the transformation unleashed by digitalization and **the value added to national economies**, particularly in developing countries. We see a challenge to report on the rate of growth of digitalization across various indicators to highlight the impact of digitalization along its various dimensions.

Availability gaps are closely linked to effective implementation. Even in areas where international standards to guide statistical collection exist, countries may lack the capacities and resources to implement them systematically, disseminate the resulting information openly, or make efforts to ensure that data are comparable.

There is a clear **lack of coverage** in developing countries compared to developed countries due to differences in statistical capacity among countries, or user needs and priorities for statistical collection. Moreover, the timeliness of available data varies widely across countries for critical indicators.

- **Actions for improvement and forward agenda**

New and more flexible approaches could be developed to meet the specific priorities and resources of G20 countries. To make statistical systems more flexible and responsive to the new and rapidly evolving digital era, G20 members could: i) experiment with concepts and data gathering within existing measurement frameworks, ii) exploit the potential of existing survey and administrative data, iii) add questions to existing surveys, iv) periodically augment existing surveys with topic-specific modules, v) develop short turnaround surveys to meet specific needs, vi) define policy needs and, in cooperation with other stakeholders, set priorities for internationally comparable measurement; and vii) work with stakeholders, including international organizations, to harness the potential of big data for developing indicators to measure the digital economy.

The toolkit identifies actions that could inform the measurement agenda of G20 members in the next few years, considering the rapid pace of change in the digital economy:

1. Promote a comprehensive, high-quality data infrastructure and collection tools for measuring the adoption of digital technologies at the individual and business levels, together with its associated risks and benefits, including collecting data on key characteristics such as sex, age, skills and education, region, as well as business size, sector, and location, where appropriate.
2. Work towards improving the measurement of the digital economy in existing macroeconomic frameworks, e.g. by developing satellite national accounts.

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3. Foster more fluid communication and cooperation between international organizations and G20 countries to share national initiatives, adhere and disseminate international standards and best practices, improve comparability of indicators, and reduce differences in coverage and timeliness of the data, with greater emphasis on capacity building in developing countries where resources, both monetary and human, are scarce.
4. Encourage interactions among government, business and other actors of civil society to strengthen the evidence base and complement official statistics, improving the design of frameworks that facilitate and allow a better use of data in business-to-business (B2B), business-to-government (B2G) and government-to-businesses (G2B) contexts.
5. Enable the collaboration between the public and private sectors to plan and implement business surveys about innovation and the uptake of new digital technologies, including joint efforts to identify and anticipate the demand for skills and competencies.
6. Encourage development partners, in collaboration with international organizations, to assist less developed countries in the collection of relevant statistics needed to enable evidence-based policy making in this area.
7. Promote the use of interoperable tools and data formats that facilitate access to and sharing of public sector data, in an effort to drive innovation, and make government activities more open and transparent.

Annex paper 4 - Accelerating Digital Infrastructure for Development

Global and universal digital infrastructure connectivity requires close collaboration between public, private, and community stakeholders at local, national, and international levels. Recognizing connectivity for all people as a shared pursuit, the G20 Digital Economy Ministers aim to encourage further action to improve the design, implementation and evaluation of public policies for accelerating the deployment of digital infrastructure and extending coverage to underserved communities and individuals. These references to inform public policies across the globe and facilitate the adoption of policies that promote a suitable investment environment for deploying affordable, accessible, inclusive and secure infrastructure for development. Likewise, we aim to foster public-private collaboration, promote infrastructure sharing, maximize the efficient use of spectrum, and enable credit enhancement facilities. These policies can be tailored to individual countries' conditions, consistent with local laws and regulations.

1- Main areas to address before designing digital infrastructure policies

- **Despite significant efforts, substantial disparities remain in digital infrastructure access and the use and adoption of related services.** The ITU 2017 World Telecommunication Development Conference Buenos Aires Declaration⁷ acknowledged information and communication technologies (ICT) have the potential to drive progress on sustainable development, in the spirit of the 2030 Agenda. As digital services significantly depend on infrastructure for delivery, universal and global access to connectivity becomes a necessary condition for social inclusion and for the reduction of disparities in access and use between geographic areas, sex, age, levels of income, and specific needs.
- **Socioeconomic and geographic factors determine the profitability of private investments in digital infrastructure.** Quantity and consumption patterns of potential users influence capital expenditure and operating expenses for deploying, operating, and maintaining digital infrastructure.
- **Significant efforts must be made into researching and developing a new generation of digital infrastructure and business models to turn non-profitable areas into economically attractive markets.** Competitive environments and adequate institutional frameworks can incentivize exploration of new geographic markets to enable deployment of new generation technologies in underserved areas.

⁷https://www.itu.int/dms_pub/itu-d/md/14/wtdc17/c/D14-WTDC17-C-0117!!PDF-E.pdf

- **Exchanges and partnerships between sectors should be promoted to contribute to sustainable and integrated economic growth.** Public-private partnerships, and spaces for cooperation between governments, private sectors, international funding agencies and other stakeholders should be encouraged in order to promote investments not covered by private sector and contribute to poverty alleviation.

2- Aspects to consider in institutional and regulatory frameworks

- **Digital connectivity covers much more than just connectivity of people, as it extends to other end users in a variety of sectors.** Regulatory frameworks should enable digital infrastructure deployment and expand connectivity among individuals, public institutions, households, businesses, industries, and public spaces.
- **Evaluation methodologies must consider the rapid increase of traffic, changing consumption patterns and rising number of connected devices.** As the number of devices sending and receiving data has dramatically increased and is expected to rise faster in upcoming years, institutions developing demand estimation methodologies should capture a broader range of factors of unpredictable evolution, such as technology developments and network effects.
- **Integration of digital services enabled by cutting-edge digital infrastructure requires coordinated efforts across sectors.** Deploying digital infrastructure requires close coordination between institutions and other stakeholders, as it critically informs the design of future developments.
- **Global cooperation can foster joint planning of international digital infrastructure connectivity projects.** As digital infrastructure value chains include a wide variety of assets ranging from global networks and international gateways to end-user terminals, cross-border cooperation and country-tailored initiatives can improve connectivity, avoiding possible disproportion between both countries and regions. International initiatives, such as the Global Infrastructure Connectivity Alliance endorsed by G20 Leaders, can play a relevant role to enhance the synergy and cooperation among infrastructure connectivity programs.
- **Coordination across sectors for digital infrastructure deployment can enable significant savings in capital expenditures and deployment time.** Infrastructure sharing can contribute to socioeconomic development, growth, and productivity including through important savings, avoiding unnecessary duplication, limiting potential adverse environmental and social impacts derived from civil works and unlocking financial resources.
- **Policies should consider stakeholders' inputs to effectively inform joint and public**

initiatives. Establishing effective mechanisms that involve all stakeholders in their respective roles and responsibilities can significantly contribute to jointly identify challenges and ensure sustainability of digital infrastructure operations.

- **Enabling competition and innovation.** The use of internationally-recognized practices can inform initiatives aiming at lowering entry barriers and addressing market competition challenges, according to local legal, institutional and regulatory frameworks.
- **Technical interoperability standards can play a crucial role in lowering transaction costs for users and entry barriers for providers.** International and national institutions with the relevant mandate can promote the development of international standards based on principles of openness, transparency, coherence, interoperability and consensus to facilitate innovation and the deployment of digital infrastructure.
- **Structured dialogue and cooperation between public authorities and private stakeholders are essential to enhance digital infrastructure reliability and security.** International, regional and national coordination, including quick and precise information sharing and incident response protocols, as well as qualified and continuously trained professionals, are key factors for building citizens' trust, increasing transparency and protecting digital infrastructure and its related services.

3- Policy references to promote a pro-investment and competitive environment

- **Initiatives aimed at accelerating digital infrastructure deployment benefit from predictable enabling investment environments.** Public policies should create cohesive environments and incentivize private sector investments to accelerate digital infrastructure deployment and enhance the accessibility, affordability, and quality of connectivity services, providing efficient and sustainable economic and social foundations.
- **Passive and active infrastructure sharing, “dig once” policies, “rights of way” and harmonized authorization processes can improve the business case for digital infrastructure deployment.** Coordination efforts between sectoral public authorities constitute a significant challenge to expanding the geographic scope of investments in infrastructure to less attractive areas and lowering entry barriers for digital infrastructure deployment.
- **Modern radiofrequency spectrum management frameworks can enable innovative business models and services driven by new technology developments.** Adopting agile and flexible radiofrequency spectrum management frameworks, as well as allocating spectrum blocks that have not been licensed yet, are essential instruments to lower barriers of entry, maximize the utilization of this valuable and scarce resource, and, as a result, increase competition in services.
- **Interconnecting existing digital infrastructure assets can enhance international**

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connectivity capacity. Policy frameworks on international connectivity, bilateral or multilateral internet traffic exchange points, and the adoption of interoperable technical standards can enable the use of existing digital infrastructure to enhance international connectivity and regional integration.

- **A coordinated national strategy to ensure the protection of critical infrastructure and provision of essential services is a high priority.** Public authorities, in coordination with other stakeholders, should develop strategies and execution processes, including a robust governance model and specific key performance indicators (KPIs) to make them monitorable and sustainable.

- **Coordinated digital policies and legislation developed and harmonized at national and regional level.** Public authorities, in coordination with other stakeholders, should develop regulatory frameworks to preserve privacy and security, balancing collective and individual rights, providing the ground for the private sector to compete in a transparent way and on equal terms to make connectivity more affordable, particularly for marginalized societal groups.