



Task Force 2
Our Common Digital Future: Affordable, Accessible
and Inclusive Digital Public Infrastructure



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DIGITAL PUBLIC INFRASTRUCTURE: MITIGATING NEW FORMS OF EXCLUSION TO ENABLE TECH FOR ALL

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Abstract




Investment in digital public infrastructure offers opportunities for economic and social progress, but catalysing these and ensuring the benefits of a data-driven economy are widely shared requires the development of appropriate models of governance and regulation. This is important not only for the implementation of rights, such as privacy and agency over data, but also for realising opportunities from


new data-based services. This brief considers the challenges and trade-offs involved in two areas that are increasingly reliant on data-based services and are of fundamental importance in people's daily lives: transport and finance. It concludes that there is a meaningful leadership and co-ordination role for the G20 in ensuring a just technological transition and recommend some specific policy actions.



The Challenge



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The G20 under India's presidency has brought attention to digital public infrastructures (DPIs), or, rather, the foundation that enables digital public and private services. Underpinning this, there is increasing evidence of the importance of DPI as part of an enabling environment for innovation.¹ This policy brief focuses on the progress towards social and economic value created through services delivered using DPI. It explores how G20 countries might learn from experiences in specific sectors on how to leverage DPI for more inclusive public services.


Services, including health, finance, or transportation, can utilise data to improve their offerings and generate efficiencies. However, this can result in unequal value distribution and new forms of exclusion. For example, as public and private services increasingly rely on DPI, citizens who cannot easily access or use digital means—this can be due to diverse factors like location, disability and poverty—become invisible and are excluded from service delivery. Those who are already under-served are at risk of ever more acute forms of exclusion due to digitisation and

data use. For G20 countries to ensure inclusive digital services, all members must give attention to the outcomes achieved for citizens, which policy and technological conditions are best suited to prevent exclusion, and what they might gain from other members' developments.

This policy brief addresses two important questions:

- How can policy makers across G20 countries better assess the progress—and its distribution across citizens—created through investment in DPI?
- How can this knowledge be used to inform investment as well as regulatory and governance decisions around DPI?

The modern metric of economic progress has been GDP growth, but there have been critiques of this standard measure.² Income and wealth distribution have more recently moved centre stage, after previously being side-lined in economic policy debate for decades. Continuing technological change raises new challenges concerning both the assessment of progress and the unequal distribution of gains. Technology has



fundamentally reshaped consumption and (increasingly) production, yet its impacts are hard to measure both in terms of consumer welfare and productivity. If anything, the pace of technical change in a digital world is accelerating. We have not yet found the best framework for understanding a society in the process of being restructured by digital technologies. To take a well-known metaphor, data is not really ‘the new oil’, but what is it?^a

While there are challenges, digital services are highly valued by consumers³ and have enabled substantial innovation in products and business models, albeit hard to identify in existing statistics.⁴ Now, there is a need to focus on DPI as an enabler of *inclusive* technological progress.⁵

Scope


To help the G20 and G20 engagement groups address potential exclusions of using DPI for services, this policy brief focuses on economic issues, and on two important domains of life:

transport and finance. These are areas where there has been progress among G20 countries in developing and utilising DPI to transform the delivery of services, such as India’s Unified Payments Interface (UPI) and private ride hailing services like Ola or Uber. Therefore, early developments in these areas offer important areas for learning among G20 countries. Both transport and finance are also foundational for all other activities; everybody needs to move from one place to another, and to engage in financial transactions. Both require increasing investments in DPI and have seen the growth of innovative public-private partnerships. And both have been substantially transformed by digital technologies. Although aggregate economic outcomes are important, the bottom line is what difference “digital” has made or can make to people’s life experiences.

Key Issue Areas

There is a great deal of academic and statistical work under way to better measure the digital economy in

a While it may become the fuel of the digital economy, its characteristics are notably different. Data is non-rival, meaning many can make use of it at the same time and it can be used in perpetuity without being depleted (unlike oil). Datasets may also grow in value over time as there are new developments in science and technology and aggregated data is more valuable than individual data.



academic research. But in addition to aggregate measures, the distribution of value, and therefore, data governance, is a priority for policymakers. The transport and finance examples highlight three broad themes needing more focus to enable greater inclusion through digital services⁶:

- **Data generation, access and use:** There is variation in data generation, access, and use, and in the regulatory and business models that inform the distribution of benefits. Data is the foundation for DPI and digital services. Therefore, gaps and inaccuracies in data have an impact on who benefits and how from digital services.⁷ What data is generated and how? Does it omit certain groups? Do the classifications and categories embed biases or obscure important aspects? While much debate has focused on the loss of privacy as individual data is combined to create a transparent or “high resolution” profile, it is essential to also consider that there are still others who are not digitally engaged or are unable to afford access to such services. This makes them digitally invisible. Not only does this result in unequal benefits across citizens, but the use of data to inform decision

making can potentially reinforce their exclusion, as their needs and activities are not captured in data.⁸ Who can access and use the vast amounts of data being generated? Who benefits from the resulting services, which require data use? At the same time, top-down approaches to data value do not account for trade-offs and interdependencies between aggregate and individual outcomes.⁹ More attention needs to be paid to new opportunities and forms of exclusion in measures of progress, to those who are digitally less visible.¹⁰

- **Private and social value:** This leads to the wedge between private and social value in data-driven digital networks. How are external benefits from network effects captured and distributed? What is better for whom in different models of public services? For example, in urban transport, the approach that is most efficient for private sector providers to meet demand may not result in the best network outcomes or congestion outcomes. Moreover, it may not equally serve residents across a city.¹¹ Some externalities can be positive, with benefits mostly captured by private providers currently. Therefore, there is a



key co-ordinating role for public bodies to ensure that social benefits are also enabled.¹² And, there is often a partial trade-off between private and social interest. Other externalities are negative, for example, increased congestion caused by an influx of uncoordinated transport service providers, which lead to a greater need for public oversight and regulation.

- **Geographic distribution:** This is important to understand the effects of digital services. Technology clearly offers the potential to reduce place-based inequalities but may in practice reinforce them.¹³ For example, bank branch closures resulting from the shift to online platforms can map onto other forms of geographical exclusion, and increase inequalities, depending on the affordability and accessibility of digital services.¹⁴ Localised research is therefore important to better understand the needs of a community and ensure that those who may not be recorded—or who are under-indexed—in data models, are represented in the decision making that affects fundamental aspects of their lives. One key challenge in all this is the lack of investment in monitoring the distribution of economic and

social value through data use and investigating what and who are missing in data.

Case Study Overviews

FinTech: In addition to the intensive use of digital in incumbent financial services, emerging businesses focus on new models aiming to provide more efficient, cost-effective, convenient and personalised services. Around the world, financial access is on the rise and the COVID-19 pandemic accelerated investments in and the use of digital financial services.¹⁵

However, trust in financial institutions has eroded over time.¹⁶ Technology may also have enabled a “predatory inclusion”.¹⁷ Long-standing challenges such as financial exclusion, high fees and the cost or availability of sub-prime credit that could perhaps be eased using technology have not been addressed. Financial data is being combined with other information in unprecedented ways. While many have gained access or enjoyed service improvements, issues may be exacerbated for those who sit at an intersection of income deprivation, lower levels of education and lack of internet access. The G20 has already recognised the need for an explicit focus



on digital financial inclusion through its High-Level Principles and can play a role in oversight, shaping guardrails for customers and best practice sharing.¹⁸

Governments must recognise their role as important enablers re-thinking financial infrastructure for digital and data. This can be done in a number of ways,¹⁹ such as:

- Establishing digital identity
- Ensuring open, interoperable payments systems
- Enabling electronic provision of government services and payments
- Co-ordinating design of digital markets and systems.

Developments that support the “rails” of the financial system are increasingly being used for private-sector-led innovation and developments, as are the new frameworks for financial data and public-private partnerships.

Transport: In recent decades, innovation in data use has also become an important element of discussions on how to improve transport options. The use of data in transport in cities

varies globally. Data infrastructure build upon the layers of physical transport infrastructure, such as roads,²⁰ and become integral foundations for accessing services, facilitating their use, shaping operations, and informing decision-making processes.

While there seem to be clear opportunities for some easy wins, such as providing users with more rapid, detailed and personalised information on services, it is not straightforward to define what progress looks like. In addition, how data has been integrated into public and private transport services in cities can lead to inequalities in access, use and benefit. Data has been used to transform the point of service, which feeds into planning. This misses out on information (e.g., about trips not taken) that is not represented in the data generated.

A key question for governments using data in providing transport services is who benefits and in what ways.²¹ Progress must not be judged only in terms of economic ends, but also consumer value and environmental aims. Impact also entails accounting for the direct experiences of transport services, and what it enables people




to achieve. However, most measures focus on direct user experiences of transport, as opposed to what people can achieve (or not) because of transport availability. Bridging this to scholarship that considers inequality and exclusion across individuals' transport experiences is important for seeking inclusive social and economic outcomes. An opportunity for the G20 would be to push for prioritizing measures focused on the distribution of benefits, as opposed to what is easily quantifiable.

Governance opportunities and challenges: There are strong arguments for policy intervention in the data economy.²² Arguably, inclusive digital services require both technological and regulatory and policy foundations. The importance of policy to inclusive value creation is evident from the research into finance and transport discussed previously in this paper.

Governance of data in financial services sits at the intersection of several risk areas and associated regulatory perimeters. For example, as financial services become increasingly interconnected, governments will need to grapple with third party risks,

concentration risk, accountability and oversight due diligence and compliance, solvency and financial stability, and consumer protection.²³ Thus far, governments have tended to rely on existing regulatory tools and approaches with some attention to the potential for RegTech, or an integrated regulatory technology, that uses data for supervisory functions to help with real-time assessment of macro risks, illicit activity and distributional effects. However, so far, FinTech seems to result in unequal opportunities, which potentially exacerbate other inequalities.

In transport, regulators across cities globally often favour open data to support innovation and market entry. Technical standards and common formats have helped in the implementation of open data policies. However, private companies' generation and use of data for transport services presents distinct regulatory challenges around competition as well as and value distribution. There is no single "best" approach across locations about when regulation of transport services should be developed, by whom and the form it should take. Another, often unaddressed, question for regulation that the authors' research highlights



refer to the missed opportunities to better serve all citizens as unrealised preferences—these are not visible in data. A challenge for regulators across G20 countries is how to identify missed opportunities, while continuing to ensure secure, rights-respecting data use and innovation.

Summary

So, is digital innovation driving progress for G20 countries? As with all important technologies, there are pluses and minuses. Against a background of the


cost-of-living crisis and a decade of rumbling doubts about how well the market model is functioning, there is also reason to believe that digital and the use of data are exacerbating some inequalities. This is a failure when the technology holds so much positive potential to achieve Sustainable Development Goals. As the G20 countries seek to work together, it is even more important that they are able to learn from one another on how to design and implement policy environments for inclusive digital progress.



The G20's Role

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The aim of the G20 under India's presidency includes navigating global crises and change in a 'sustainable, holistic, responsible and inclusive manner'.²⁴ We address the last point highlighted in the aim. Inclusive progress requires a context- and sector-specific view. The G20 has an opportunity to collate, discuss and promote measures of progress through services delivered using DPI that promote a fair and inclusive digital transition.

Potential roles for the G20 in response to the issues and evidence presented in this brief include:

- **Building a shared global recognition of progress as entailing shared social and economic value:** As G20 countries consider how to progress together and individually, appropriate measures are important. Data use in public and private service delivery can contribute to value creation in direct and diffuse ways for individuals, firms and communities. Current measures of progress through data use are inadequate for considering direct and indirect gains, and the

trade-offs between outcomes. Research²⁵ has laid out different approaches to measurement. The G20 can explore and share different opportunities for value creation, and promote more comprehensive approaches for states to consider social and economic value. This could be done through existing working groups, like the Development Working Group or the Digital Economy Task Force, or through research and convening conducted in engagement groups like the T20.

- **Sharing experiences, challenges and opportunities for cross-context learning:** G20 countries have a diversity of experiences supporting digital services that operate at different scales, including within and across countries. Their diverse experiences, motivations and challenges offer an important opportunity to share learning about inclusion and value creation. By utilising the multiple forums around the G20, it is possible to collate different experiences of progress within varied geographical, sectoral and economic contexts as well as evidence of exclusion and strategies for expanding the reach of the value created.

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- **Focusing on cases where there are both significant opportunities for progress and large risks of exclusion:** A focus on high impact areas like finance and transport is important to ensuring that investments in DPI do not prove counterproductive—if for example,

it results in new forms of exclusion and harm to (some) users. A closer comparative look, which is possible within international structures like the G20, can enable governments to consider and weigh different approaches and support productive investments.



Recommendations to the G20



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- Convene a multi-country and cross-sectoral body to explore gaps in specific forms of data generation as well as risks and opportunities. Policy debate has focused on issues such as localisation once the data has been generated, but the underlying question is how is society being represented in data because that will shape what it can become.
- Promote measures of progress that better account for social and economic value and its distribution, and also extend work on digital measurement beyond high-income economies. Many innovations in DPI and digital services originate outside of high-income economies. The G20 is in a unique position as a multilateral body to highlight and learn from these diverse experiences, and what inclusive progress through digitalisation of services looks like. A beneficial approach could be to focus on data use cases that will have the biggest impact on people, and how to ensure more inclusive benefits and mitigation of risks in these cases. In addition to transport and finance, health and food supply chains are important areas related to well-being and exclusion.²⁶
- Agree and commit to evaluating DPI investments from the perspective of the creation and distribution of economic and social value. There is a need to go beyond high-level principles and into specific governance and regulatory models. While these will differ according to context, there will be opportunities for sharing insights and challenges across the G20. In fact, G20 countries might consequently be better positioned to determine which approaches to DPI might best benefit all and make more evidence-based decisions about governance and regulation.

Attribution: Diane Coyle, Stephanie Diepeveen, and Sumedha Deshmukh, "Digital Public Infrastructure: Mitigating New Forms of Exclusion to Enable Tech for All," *T20 Policy Brief*, July 2023.

Endnotes

- 1 Kevin O’Neil and Nicole Rasul, “Co-Develop: Digital Public Infrastructure for an Equitable Recovery” (New York: Rockefeller Foundation, August 2021), <https://www.rockefellerfoundation.org/wp-content/uploads/2021/08/Co-Develop-Digital-Public-Infrastructure-for-an-Equitable-Recovery-Full-Report.pdf>; Anna Metz, Georgina Marin, Jonathan Marskell, Julia Clark and Karol Karpinski, “A Digital Stack for Transforming Service Delivery” (World Bank, 22 February 2022), <https://documents1.worldbank.org/curated/en/099755004072288910/pdf/P1715920edb5990d60b83e037f756213782.pdf>
- 2 Diane Coyle, *The Weightless World* (Oxford: Capstone, Cambridge MA: MIT Press, 1997); Diane Coyle, *GDP: A Brief but Affectionate History* (Princeton: Princeton University Press, 2014).
- 3 Diane Coyle and David Nguyen, “Free Digital Products and Aggregate Economic Measurement,” *Economie & Statistique* (2023, forthcoming).
- 4 David M. Byrne, “The Digital Economy and Productivity, no. 2022-038,” *Finance and Economics Discussion Series, Board of Governors of the Federal Reserve System (US)* (2022), <https://econpapers-repec-org.ezp.lib.cam.ac.uk/RePEc:fip:fedgfe:2022-38>
- 5 Patrick Collison and Tyler Cowen, “We Need a New Science of Progress,” *The Atlantic* (2019). <https://www.theatlantic.com/science/archive/2019/07/we-need-new-science-progress/594946/>
- 6 These data-related questions are relatively under-studied in the literature. For a more in-depth examination, see Diane Coyle, Sumedha Deshmukh and Stephanie Diepeveen, “Understanding Progress in a Changing Society” (Cambridge: Bennett Institute for Public Policy, 2023), <https://www.bennettinstitute.cam.ac.uk/publications/understanding-progress/>
- 7 Sora Park and Justine Humphry, “Exclusion by Design: Intersections of Social, Digital and Data Exclusion,” *Information, Communication & Society* 22, no. 7 (2019):934–53.
- 8 Eugène Loos, Maria Sourbati and Frauke Behrendt, “The Role of Mobility Digital Ecosystems for Age-Friendly Urban Public Transport: A Narrative Literature Review,” *International Journal of Environmental Research and Public Health* 17, no. 20 (2020):7465; Peterson K. Ozili, “Impact of Digital Finance on Financial Inclusion and Stability,” *Borsa Istanbul Review* 18, no. 4 (2018):329–40.
- 9 Diane Coyle and Annabel Manley. “What Is the Value of Data? A Review of Empirical Methods” (2022).

- 10 Jan Van Dijk, *The Digital Divide* (Cambridge: Polity, 2020); Justin Longo, Evan Kuras, Holly Smith, David M Hondula and Erik Johnston, "Technology Use, Exposure to Natural Hazards, and Being Digitally Invisible: Implications for Policy Analytics," *Policy & Internet* 9, no. 1 (2017):76–108.
- 11 Mingshu Wang and Lan Mu, "Spatial Disparities of Uber Accessibility: An Exploratory Analysis in Atlanta, USA," *Computers, Environment and Urban Systems* 67 (2018):169–75.
- 12 Cristian Alonso, Tanuj Bhojwani, Emine Hanedar, Dinar Prihardini, Gerardo Uña, and Kateryna Zhabska, "Stacking Up the Benefits: Lessons from India's Digital Journey" (2023).
- 13 Paul DiMaggio, Eszter Hargittai, Coral Celeste, and Steven Shafer, "Digital Inequality: From Unequal Access to Differentiated Use," *Social Inequality* (2004):355–400; Massimo Ragnedda, Maria Laura Ruiu, and Felice Addeo, "The Self-Reinforcing Effect of Digital and Social Exclusion: The Inequality Loop," *Telematics and Informatics* (2022):101852.
- 14 Coyle et al., "Understanding Progress," pages 40-41
- 15 Asli Demirgüç-Kunt, Leora Klapper, Dorothe Singer, and Saniya Ansar, "The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19" (2022); Jonathan Fu and Mrinal Mishra, "Fintech in the Time of COVID-19: Technological Adoption during Crises," *Journal of Financial Intermediation* 50 (2022): 100945.
- 16 Maryna Brychko, Yuriy Bilan, Serhiy Lyeonov & Grzegorz Mentel, "Trust crisis in the financial sector and macroeconomic stability: a structural equation modelling approach," *Economic Research-Ekonomska Istraživanja*, 34, no. 1 (2021): 828-855, DOI: 10.1080/1331677X.2020.1804970
- 17 Louise Seamster and Raphaël Charron-Chénier, "Predatory Inclusion and Education Debt: Rethinking the Racial Wealth Gap," *Social Currents* 4, no. 3 (2017):199–207.
- 18 Global Partnership for Financial Inclusion, "G20 High-Level Principles for Digital Financial Inclusion," Global Partnership for Financial Inclusion, (2016).
- 19 Douglas W. Arner, Ross P Buckley, Dirk A Zetsche, and Robin Veidt, "Sustainability, FinTech and Financial Inclusion," *European Business Organization Law Review* 21, no. 1 (2020):7–35.
- 20 International Transport Forum, "Reporting Mobility Data: Good Governance Principles and Practices," International Transport Forum Policy Papers, no. 101 (Paris: OECD Publishing, 2021).

- 21 Government Office for Science UK, "A Time of Unprecedented Change in the Transport System" (2019).
- 22 Diane Coyle, Stephanie Diepeveen, Lawrence Kay, Jeni Tennison and Julia Wdowin, *The Value of Data: Policy implications* (Cambridge: Bennett Institute for Public Policy, 2020). <https://www.bennettinstitute.cam.ac.uk/publications/value-data-policy-implications/>
- 23 Peter Zettereli, *The Great Unbundling: How Technology Is Making Financial Services Modular and What It Means for Inclusion* (CGAP, 2021). <https://www.cgap.org/research/slide-deck/great-unbundling-how-technology-making-financial-services-modular>
- 24 "Logo and Theme," *G20 India*, <https://www.g20.org/en/g20-india-2023/logo-theme/>
- 25 Diane Coyle and Annabel Manley, "What is the value of data? A review of empirical methods." Bennett Institute Policy Brief (2022).
- 26 Abraham Augustine, "Agent commerce: how e-commerce in Africa is changing," Techcabal (24 February 2023), accessed 17 March 2023, https://techcabal.com/2023/02/24/retail-aggregation/?utm_source=substack&utm_medium=email



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