

**ÉTUDES
DE L'IFRI**

GEOPOLITICS OF TECHNOLOGY PROGRAM



FEBRUARY
2023

The Technology Policies of Digital Middle Powers

Alice PANNIER (ed.)



The French Institute of International Relations (Ifri) is a research center and a forum for debate on major international political and economic issues. Headed by Thierry de Montbrial since its founding in 1979, Ifri is a non-governmental, non-profit foundation according to the decree of November 16, 2022. As an independent think tank, Ifri sets its own research agenda, publishing its findings regularly for a global audience.

Taking an interdisciplinary approach, Ifri brings together political and economic decision-makers, researchers and internationally renowned experts to animate its debate and research activities.

The opinions expressed in this text are the responsibility of the authors alone.

ISBN: 979-10-373-0668-5

© All rights reserved, Ifri, 2023

Cover: © Carlos Andre Santos/Shutterstock

How to quote this publication:

Alice Pannier (ed.), “The Technology Policies of Digital Middle Powers”,
Études de l’Ifri, Ifri, February 2023.

Ifri

27 rue de la Procession 75740 Paris Cedex 15 – FRANCE

Tel.: +33 (0)1 40 61 60 00 – Fax: +33 (0)1 40 61 60 60

Email: accueil@ifri.org

Website: Ifri.org

Authors

Marilia Maciel is Head of Digital Commerce and Internet policy at Diplo Foundation and PhD candidate in Information and Communication Sciences at Université Bordeaux Montaigne, France.

Erez Maggor is a post-doctoral Fellow at the Martin Buber Society of Fellows at the Hebrew University of Jerusalem.

Bruna Martins dos Santos is a Visiting Researcher at the Politics of Digitalization Study Group at the Berlin Social Science Center (WZB).

Zach Meyers is a Senior Research Fellow at the Centre for European Reform in London.

Grace Mutung'u is Project Head, Open Society Foundations, Nairobi.

Julien Nocetti is an Associate Research Fellow at the French Institute of International Affairs (Ifri) and an Associate Professor at the Saint Cyr Military Academy.

Babatunde Okunoye is a Researcher affiliated with the Department of Communication and Media Studies, University of Johannesburg.

Alice Pannier is the Head of the Geopolitics of Technology program at Ifri.

Trisha Ray is a Fellow and Deputy Director, Center for Security, Strategy and Technology, at the Observer Research Foundation in New Delhi, and a member of the UNESCO's Information Accessibility Working Group.

Mariko Togashi is Research Fellow for Japanese Security and Defence Policy at the International Institute for Strategic Studies in London.

Joonkoo Yoo is a Research Professor at the Korea National Diplomatic Academy.

Acknowledgment

The editor wishes to thank Rubén Pépin for assistance in research and editing.

Executive Summary

Digital technology is an element of power in the international system as well as an area for competition among countries. Considering the economic weight and political voluntarism of the U.S., China, and the EU, those three poles of power have received a lot of attention when it comes to their technology policies. This study aims to shift our gaze toward countries outside of the trio. Digital middle powers are those countries that are caught in the middle of the power play in an emerging multipolar international system where digital technology is a determining factor of power. It also refers to countries with established or growing clout in digital technology, and which are regional leaders or global ones in certain sectors.

The study provides a qualitative comparison of the technology policies of nine of the digital middle powers: Brazil, India, Israel, Japan, Kenya, Nigeria, Russia, South Korea, and the United Kingdom. It seeks to reflect the diversity of national technology policies, as well as to identify those countries' convergences and divergences with Europe, the United States, and China. Each case study introduces national technology and digital innovation ecosystems, data policies, and the state of digital infrastructure. These elements serve to examine the strengths of the country's private sector in technology, the government's regulatory capacity, and the degree of digital development. The chapters then look at how the digital domain is embedded in the broader dynamics of their bilateral relations with the U.S., the EU, and China.

A first conclusion is that digital middle powers can usefully be differentiated between rising digital powers and established ones. Established digital powers have well-developed ecosystems, regulations, and infrastructure, but they are all having to renew and re-focus their technology policies to remain relevant. By contrast, rising digital powers tend to have budding ecosystems in digital services and mobile applications, and large ongoing infrastructure development projects, albeit with limited or patchy regulatory capacity.

When it comes to foreign relations, the study confirms well-identified trends whereby the EU's influence occurs chiefly through the elaboration of norms; the U.S.'s via the strength of its digital services and private sector investment, as well as strong bilateral security ties; while China's growing influence is underpinned by large infrastructure projects. All the countries studied are attempting to balance their relationships with U.S., China, and the EU. None, save for Russia, has outrightly "picked a side" and severed ties with one or two of the blocs.

Résumé

La technologie est un facteur de puissance et un enjeu de compétition dans le système international. Compte tenu du poids économique et du volontarisme politique des États-Unis, de la Chine et de l'Union européenne, les politiques technologiques de ces trois pôles de puissance ont fait l'objet d'une grande attention. Cette étude entend déplacer le regard vers les pays hors de ce trio. Les puissances numériques moyennes (*digital middle powers*) sont ces États qui se trouvent pris dans ces jeux pouvoir, dans un système international de plus en plus multipolaire et dans lequel le secteur numérique devient un facteur de puissance déterminant. Il s'agit également de pays qui exercent une influence établie ou croissante dans le domaine des technologies, et qui sont des leaders régionaux ou mondiaux dans certains secteurs.

L'étude propose une comparaison qualitative des politiques technologiques de neuf puissances numériques moyennes : le Brésil, l'Inde, Israël, le Japon, le Kenya, le Nigeria, la Russie, la Corée du Sud et le Royaume-Uni. Elle vise à refléter la diversité des politiques technologiques nationales, ainsi qu'à identifier les convergences et les divergences de ces pays avec l'Europe, les États-Unis et la Chine. Les études de cas présentent les écosystèmes technologiques, les politiques relatives aux données et les infrastructures numériques de chaque État. Ces éléments servent à examiner les forces du pays en matière de technologies, la capacité de régulation du gouvernement et le degré de développement du secteur numérique. Les chapitres examinent ensuite la façon dont le numérique s'inscrit dans les dynamiques plus larges de leurs relations bilatérales avec les États-Unis, l'Union européenne (UE) et la Chine.

Une première conclusion est que les puissances numériques moyennes peuvent être différencierées entre puissances numériques montantes et puissances numériques établies. Les puissances numériques établies disposent d'écosystèmes, de régulations et d'infrastructures bien développés, mais toutes doivent se renouveler et revoir leurs politiques technologiques pour rester dans la course. Par contraste, les puissances numériques montantes se caractérisent par des écosystèmes florissants dans les services numériques et les applications mobiles et de grands projets nationaux de développement d'infrastructures, mais aussi par leur capacité de régulation souvent limitée et hétérogène.

En ce qui concerne leurs relations extérieures, l'étude confirme des tendances bien identifiées : l'influence de l'UE se manifeste principalement dans le domaine des normes ; celle des États-Unis par la diffusion de ses services numériques et l'ampleur des investissements du secteur privé, ainsi

que par des liens bilatéraux forts en matière de sécurité ; tandis que l'influence croissante de la Chine s'appuie sur de grands projets d'infrastructure. Tous les pays étudiés tentent d'équilibrer leurs relations avec les États-Unis, la Chine et l'UE. Aucun, à l'exception de la Russie, n'a ouvertement « choisi son camp » et rompu ses liens avec un ou deux des blocs.

Table of Contents

INTRODUCTION.....	7
Digital Middle Powers and the Global Tech Competition.....	7
Case Studies and Indicators	9
Key Takeaways.....	11
THE DIGITAL BOOM OF MIDDLE-INCOME ECONOMIES.....	18
Brazil: A “Soft” Digital Power	18
India: A Pivotal Player	26
Kenya: A Selectively Thriving Digital Economy.....	35
Nigeria: A Rising Digital Power	42
ESTABLISHED TECHNOLOGICAL POWERS: NECESSARY TRANSFORMATIONS.....	50
Israel: Still a “Start-up Nation”	50
Japan: In Need of Renewal.....	59
South Korea: (Striving to Stay) at the Cutting Edge.....	67
Russia: A Narrow and Blurry Path Ahead	75
United Kingdom: Influential but Directionless.....	83

Introduction

Alice Pannier

Digital Middle Powers and the Global Tech Competition

The international context is characterized by ever-growing economic rivalry and technological competition between the United States (U.S.) and China. Both countries dominate in terms of market capitalization and market share in key digital technology and are leading breakthroughs in emerging technologies. The competition in which they are engaged translates into their respective national investments and innovation policies, but also in their ambition to export technologies and in a bid to forge new international partnerships. This geopolitization of technology can translate into the use by the two great powers of diplomatic pressures, or even “weaponization” of economic interdependences (coercion, retaliation) to force other, smaller states into compliance¹. As a result, states caught in the middle of this competition are increasingly pressed to determine which side they are on.

Although it has not used pressure, coercion, or retaliation in the same way, the European Union (EU) has since 2019 been seeking to affirm its geopolitical weight in technology and to adapt its foreign policy and international partnerships to those new realities². The EU has a strong market share in specific technological segments (5G equipment, semiconductors), but it is better known as a normative power, able to use the size of its market to shape the global rules of the game, in goods as well as in digital services. The EU is currently seeking to carve a place for itself alongside the U.S. and China in the emerging multipolar international system and to become more strategic and holistic in its approach to partners.

Considering the economic weight and political voluntarism of the U.S., China, and the EU, those three poles of power have received a lot of attention when it comes to their technology policies. This study aims to shift our gaze toward countries outside of the trio. Many countries around the world want to benefit from the opportunities offered by digital technologies for economic

1. H. Farrell, A. Newman, “Weaponized Interdependence: How Global Economic Networks Shape State Coercion”, *International Security*, Vol. 44 No. 1, 2019; M. Velliet, “Convince and Coerce: U.S. Interference in Technology Exchanges Between its Allies and China”, *Études de l’Ifri*, February 2022.

2. A. Pannier, “Europe in the Geopolitics of Technology: Connecting the Internal and External Dimensions”, *Briefings de l’Ifri*, April 9, 2021.

development and competitiveness and are engaged in fostering their own national digital ecosystems, whether it is in mobile technology and services, or in research-intensive technologies. Governments are also having to develop digital infrastructure and services to benefit their citizens and to arbitrate on levels of data protection and market openness. Societal models conveyed by technology – matters of privacy and surveillance in particular – can affect or determine the preferences of governments, in terms of legislation (data policy) and procurement (acquisition of technology). In making these various policy choices, countries de facto position themselves vis-à-vis offers or pressures of the three poles of power which are the U.S., China, and the EU.

The study looks at (digital) technology as an element of power in the international system as well as an area for competition and cooperation among countries. Indeed, technology is a primary engine for economic growth which states can then convert into power³. Helen Milner and Sondre Solstad recently argued that states' drive to elevate their position through the adoption of technology is even stronger in an international context characterized by competition – like the one we are in today⁴. Besides, technology is not only an engine for growth and economic power, but also a battlefield. Various non-military tools like export controls, sanctions, data regulation and the weaponization of trade are being used to curb the other's technological rise or force other states into compliance⁵. For countries with less leverage than the U.S. and China have, this means potentially using defensive measures (such as Foreign Direct Investment (FDI) screening or data protection) to limit their vulnerability⁶. That being said, unlike traditional domains such as trade, diplomacy or the military, technology emanates largely from the academic and industrial sectors.⁷ Therefore governments have only limited leverage to shape their own national technological ecosystems and their own digital power.

In this study, “middle powers” refers to two main attributes. On the one hand, it refers to countries around the globe which are caught in the middle of the power play between competing models, in an emerging multipolar international system where digital technology is a determining factor of power. On the other hand, it refers to countries with established or growing clout in digital technology, and that are regional leaders or global ones in certain sectors.

3. The link between technology and power has for long been addressed in the political science literature. For a recent take on the matter see D. Drezner, “Technological Change and International Relations”, *International Relations*, Vol.33, No. 2, 2019, pp.286-303.

4. H. Milner and S. U. Solstad, “Technological Change and the International System”, *World Politics*, Vol.73, No.3, 2021, pp.545-589.

5. M. Leonard (ed.), *The Power Atlas: Seven Battlegrounds of a Networked World*, ECFR, December 2021, p.4.

6. *Ibid.*

7. P. Fusaro, N. Jouan, L. Retter, and B. Wilkinson, “Science and Technology as a Tool of Power: An Appraisal”, RAND Corporation, 2022, p.3.

Case Studies and Indicators

This study aims to provide a qualitative comparison of the technology policies of countries, outside the EU/U.S./China trio, which carry weight in the global digital sector. In doing so, the study seeks to reflect the diversity of national policies in a synthetic manner, as well as to identify points of convergence and divergence with Europe, the United States and China. The study covers 9 countries: Brazil, India, Israel, Japan, Kenya, Nigeria, Russia, South Korea, and the United Kingdom. The case selection aimed to reflect the diverse realities of this broad set of countries which, individually, have the ambition of sustaining and/or developing a vibrant national tech sector and, as a group, are economically and geographically diverse.

Some caveats are worth mentioning here. Firstly, we have chosen to include lesser-studied cases (such as Brazil, Kenya, and Nigeria), but several other countries could have been worth covering. These include the city-state of Singapore, which has positioned itself as a trade and finance hub and is one of the world's most innovative countries; Canada and Australia, which have strong research ecosystems, including in key emerging technologies like quantum computing; Taiwan, which is a world leader in semiconductor manufacturing but has a contested status; and the United Arab Emirates (UAE), which is investing heavily in innovation and capacities in areas such as space and green technologies.

Secondly, as mentioned, the countries that compose the broad group of “digital middle powers” are very diverse, and so are the cases covered in this study. Differences include both high-income and (lower) middle-income economies; post-colonial nations as well as (former) colonial powers, etc. This diversity is especially telling when comparing gross domestic product (GDP) per capita figures (Table 1). The cases of Kenya and Nigeria are interesting: while they are comparatively less digitalized when compared to global figures⁸, they stand out as regional or even continental leaders, in terms of digital as share of GDP, number of start-ups, and – especially in the Nigeria case – the size of their user base for digital services.⁹

Finally, two countries are undergoing significant changes in their domestic politics and foreign policies. The UK, since the Brexit vote of 2016, has experienced a period of political instability and is still having to review its position as an international actor as well as its relationship with the EU. Even more, Russia appears as an odd case being currently engaged in a major military conflict since its invasion of Ukraine in February 2022.

8. Kenya and Nigeria are classified in the “lower middle-income economies” group by the World Bank.

9. Direction Générale du Trésor, “L'écosystème innovant au Nigéria”, French Ministry of Economy, July 22, 2021, available at: www.tresor.economie.gouv.fr.

Table 1: Economic indicators for the selected cases

Country	GDP per capita in 2021, in current USD [1]	R&D as a share of GDP [2]	Households with Internet access in percentage [3]	Population covered by at least a 4G network, in percentage [4]	Mobile phone subscribers in millions [5]
Brazil	7,507	1.21	83	88	205.83
India	2,256	0.8	36	98	1153.71
Israel	52,170	5.44	82	97	12.27
Japan	39,312	3.26	97	100	195.05
Kenya	2,081	0.79	24	77	61.41
Nigeria	2,065	0.13	22	41	204.23
Russia	12,194	1.1	80	89	238.73
South Korea	34,997	4.8	100	100	70.51
UK	46,510	1.84	95	100	79.01

Sources: [1] World Bank, 2021; [2] Statista 2020; Brazil: World Bank, 2020; UK: World Bank, 2019; [3, 4, 5] ITU, 2020

With these caveats in mind, the contributing authors were asked to collect comparable qualitative data, allowing for a comprehensive overview of the diverse cases and the identification of trends. Each chapter presents in a synthetic manner:

- The country's technology and digital innovation ecosystems, including the main national players in the digital domain, current government-led investment programs, market regulation, and (FDI) screening tools;
- The country's data policy, including the main texts surrounding data protection, and their proximity to the EU's General Data Protection Regulation (GDPR);
- Digital infrastructure, including the reach and quality of telecom networks, key infrastructure projects ongoing or planned, and main equipment providers (e.g., in 5G);
- The country's links with U.S., China, and the EU in the digital domain, including partnerships and/or disputes with U.S., China, and/or EU, and participation in multilateral initiatives on digital issues.

The elements in the first three sections serve as proxies for examining the notion of digital power, by identifying the strengths of the country's private sector in technology, the government's regulatory capacity (data, FDIs), and the degree of digital development (infrastructure, connectedness). These indicators provide insights into the current level of development of select countries, and clues about their growth potential. The final section allows us to examine whether and how this power is exercised internationally, and how it is embedded in other dynamics of their bilateral relations with the U.S., the EU, and China. However, the chapters do not look at the practice of diplomacy through digital tools (e.g., e-diplomacy, influence).

Key Takeaways

On Digital Middle Powers

The tables on the next pages (Table 2 and Table 3) summarize the key takeaways of the case studies. A first conclusion is that digital middle powers can usefully be differentiated between rising digital powers and established ones.

Established digital powers, in this study, comprise Israel, Japan, Russia, South Korea, and the United Kingdom. Their digital technology ecosystems are decades-old and tend to include specific segments of hardware design and manufacturing, and to build on more traditional industries. All these countries have to renew their technology policies to remain relevant, either to keep up with the pace of technological change, or to make up for domestic political and/or economic disruptions – most exemplified by Russia, and to a lesser extent, the UK. Government-led

investment plans play a key role in providing a push and a direction for innovation. Finally, established digital powers tend to have a well-regulated digital sector with strong enforcement capacity.

By contrast, rising digital powers are found among lower- and upper-middle-income economies – in this study, Brazil, India, Kenya, and Nigeria. They tend to have younger ecosystems specialized in software, services, and mobile applications. Access to the Internet occurs chiefly via mobile phones, and government investments are primarily geared towards infrastructure development (fiber networks; 4G and to a lesser extent, 5G). Regulatory capacity (for data protection, taxation and/or foreign investment) tends to be patchy or difficult to implement.

Among rising as well as established digital powers, the GDPR tends to serve as a blueprint for establishing national personal data protection regimes. However, in both groups, we also find countries with risk or occurrences of democratic backsliding, which at times translates in the use of digital technology for the surveillance of citizens or the control of Internet contents.

Table 2: Domestic indicators of digital power

Country	Ecosystem	Regulatory capacity	Connectivity and infrastructure
Brazil	Presence of large international IT firms Dynamic cloud market Relatively low level of R&D	Variations from the GDPR No official FDI screening mechanism	Chiefly mobile Internet usage Federal plan for fiber networks Modest progress in 5G roll-out
India	#3 in number of Unicorns Software & IT services New investment plan for microelectronics	No FDI screening in the digital sector, save for the media New digital tax New data protection bill in process, leaning toward GDPR	Chiefly mobile Internet usage Massive plan for fiber networks World-leading digital public infrastructure

Israel	<p>Leader in number of start-ups and VC relative to size</p> <p>High-tech sector 15% of GDP</p> <p>Electronics, military technologies, cyber, AI, fintech</p>	<p>No FDI screening in high-tech sectors</p> <p>Variations from the GDPR, but has adequate status</p>	<p>Low levels of e-government services and 5G deployment compared to the size of the tech sector in the economy</p>
Japan	<p>Relatively low number of startups</p> <p>Ambitious government-led initiatives</p>	<p>1st country to receive GDPR adequacy</p> <p>Promoter of "Cross-border data flow with trust"</p>	<p>Supports 5G "Open RAN" and leads in its technological development</p>
Kenya	<p>Role of government in investment in digital tech</p> <p>Mobile applications in transport, health, payment, agriculture</p>	<p>Data protection act mirroring the GDPR</p> <p>Concerns about the independence of the Data Protection Commissioner</p>	<p>Ranked best e-infrastructure in Africa</p> <p>Still uneven access to ICT across the country</p> <p>Hub for international submarine cables</p>
Nigeria	<p>Digital sector 15% of GDP</p> <p>Fintech, e-commerce, and other services</p>	<p>Little regulation of the tech sector</p> <p>GDPR-inspired data protection bill in process for several years, but strong government control over personal data</p>	<p>Nearly only mobile Internet use</p> <p>Hub for international submarine cables</p>
Russia	<p>Cloud, cybersecurity, social networks, AI, space launchers</p> <p>Sanctions strongly affect the economy</p>	<p>Laws for data localization</p> <p>State surveillance over cyberspace</p> <p>GDPR adequacy lost</p>	<p>Modest progress in 5G deployment</p>

South Korea	<p>Consumer electronics, automotive, semiconductors, AI</p> <p>Semiconductor industry 20% of exports</p>	<p>Comprehensive data regulation</p> <p>GDPR adequacy</p>	<p>Forerunner in the deployment of 5G</p> <p>Strong optical fiber roll-out</p>
United Kingdom	<p>#4 in number of unicorns</p> <p>Software, Fintech, Chip design, Space</p> <p>Low R&D intensity compared to GDP</p>	<p>FDI screening tool for strategic sectors</p> <p>Competition regime for digital platforms in progress</p> <p>GDPR adequacy, but goal to liberalize data protection</p>	<p>Top-level Internet networks</p> <p>Supports 5G “Open RAN”</p>

AI: Artificial intelligence; **Open RAN:** open radio access network; **R&D:** Research and development; **VC:** venture capital.

On The Foreign Relations of Digital Middle Powers

The study looks at the relations between digital middle powers’ international tech policies (see Table 3). The report shows that all the countries studied are attempting to balance their relations with the U.S., the EU, and China. None, save for Russia, has outrightly “picked a side” by severing ties with one or two of the blocs.

Positions vis-à-vis the U.S. and China are best exemplified by decisions on 5G equipment providers, with a clear tendency for established digital powers, with strong security ties to the U.S., to opt for a (partial or total) ban on Chinese equipment. Russia stands out within this group, having severed most of its links with Western (digital) economies with the invasion of Ukraine in February 2022 and thereby reinforced already existing dependencies on Chinese technologies.

The study confirms well-identified trends whereby the EU’s influence occurs chiefly through the elaboration of norms, like the GDPR; the U.S.’s via the strength of its digital services and private sector investment, as well as strong bilateral security ties; while China’s growing influence is underpinned by large infrastructure projects. Overall, rising digital middle powers tend to take less clear-cut positions in the U.S.-China rivalry.

The U.S.'s presence in most countries occurs via strong levels of private investments, and leadership in digital services and infrastructure like the cloud. The United States government also generally succeeds in tying digital partnerships to defense and security partnerships, and can exert diplomatic pressure on its partners to align their technology choices with U.S. preferences. The concrete outcome however is hard to see outside of the 5G infrastructure case.

A second, simultaneous trend, is China's growing role, not only in digital infrastructure (5G, and increasingly, cloud, space, and submarine cables) but also trade agreements and FDI into the countries studied, especially the rising digital powers. These growing economic dependences make it harder for those countries to take a strong stance against China, e.g., by banning Chinese equipment or software. India stands out as an exception on that front. What is more, in fragile democracies or non-democracies, political leaders can be tempted to mirror some of the Chinese practices of digital surveillance (cf. Kenya, Nigeria cases). Russia, for its part, has turned more fully towards China since the invasion of Ukraine.

Meanwhile, the EU's influence is confirmed to occur chiefly through norms, in particular norms of personal data protection. Pretty much all countries converge toward the GDPR or some related form of personal data protection regime. Four out of the 9 cases studied have GDPR adequacy. The EU has strong bilateral partnerships that include a digital component, with high-income economies as well as with developing countries. The recent EU-Nigeria Digital Economy Package, as part of the "Global Gateway" initiative, is a clear example of a shift in the EU's strategy toward a more holistic and strategic view of digital development in partner countries.

Lastly, the chapters look at digital middle powers' international policy engagement. We can observe that established digital powers are strongly embedded in international institutions, alliance circles, and international trade agreements, whether it is the United Nations, the Indo-Pacific Quad, the G20, or the Regional Comprehensive Economic Partnership (RCEP). Digital middle powers tend to try and exert leadership on specific segments within the United Nations (UN), e.g., Brazil on Internet governance, Russia on cyber norms, and Nigeria through the election at the ITU; or outside, e.g., Japan on "Data Free Flow with Trust", India on Digital Public Infrastructure. The way digital middle powers exercise their power and ambition internationally is, however, only partially covered in this study, and would deserve further investigation.

Table 3: Foreign relations

Country	EU	U.S.	China
Brazil	Convergence in areas such as digital markets regulation and data protection	Significant bilateral cooperation Strong trade and investment links	Strong trade and investment links Brazil nevertheless kept a distance from the Belt and Road Initiative (BRI)
India	Growing normative convergence 2021 Connectivity partnership	Strong U.S. FDI inflow Indo-Pacific Quad member Competing views on fair digital trade	Growth of Chinese FDI inflow Deteriorated security relation Ban over Chinese 5G equipment and apps
Israel	Participation in Horizon Europe Strong scientific cooperation	Strong U.S. FDI inflow Recent agreements to counter decrease in R&D cooperation U.S. pressure to lower dependence on China	Growing trade and investment links FTA under negotiation Strong Chinese presence in digital infrastructure
Japan	Normative convergence on data regulation Japan-EU Digital Partnership	Quad and "Chip 4" member Cooperation on sensitive supply chains Strong U.S. pressures on semiconductor export controls	Participation in the Regional Comprehensive Economic Partnership Strong market dependencies

Kenya	Joint EU-U.S. plan for last-mile connectivity	Negotiating a trade agreement including data and e-commerce Joint EU-U.S. plan for last-mile connectivity	Strong Chinese presence in digital infrastructure Government tempted to adopt Chinese model of e-identity
Nigeria	Significant links, enhanced with the 2022 Digital Economy Package	Links are private sector driven	Strong involvement of China in digital infrastructure Government tempted to import digital authoritarian model
Russia	EU sanctions and withdrawal of European companies following invasion of Ukraine	US sanctions; opposition to the U.S. drives Russian tech policy, even more so since February 2022	Strong presence of Huawei in telecom networks Growing Russian tech dependencies, even more so since February 2022
South Korea	Bilateral Digital Partnership Common interests in global governance	Strong U.S. pressures for semiconductor export controls “Chip 4” alliance member	Strong trade dependencies, but limited governmental cooperation Reducing Chinese footprint in equipment
United Kingdom	Poor relationship and limited coordination on digital policy	Comprehensive Dialogue on Technology and Data Strong economic links and growing alignment on China	China viewed as systemic challenge Government rejected Chinese investment in chip-making plant Huawei excluded from 5G networks

The Digital Boom of Middle-Income Economies

Brazil: A “Soft” Digital Power

Marília Maciel and Bruna Martins dos Santos

Brazil has contributed significantly to international discussions on digital governance in recent years, notably through the UN, and takes part in mechanisms for cooperation between large digital economies, notably within the BRICS (Brazil, Russia, India, China, and South Africa). At the national level, the country was a pioneer in designing institutional frameworks for multistakeholder Internet governance, and with the approval of the Civil Rights Framework for the Internet in 2014, a law elaborated collaboratively through online consultations. These are some of the reasons why Brazil could be considered a middle power on digital policy issues. Although it does not have sufficient material and technical resources to match those of great powers, it has the capacity to influence decisions and to exert leadership and soft power in the international scene. There are some early signs that digital issues will be given more attention during the tenure of recently appointed president Lula. For example, a Secretariat for Digital Policies has been created to deal with media pluralism, media literacy, and disinformation.

Technology and Digital Innovation Ecosystems

Brazil is currently the second largest innovation economy in Latin America and the Caribbean, after Chile.¹⁰ Government-led innovation programs are guided by the decree on National Innovation Policy and its Governance, published in October 2020. The decree provides the baseline for the National Innovation Strategy and its action plans, as well as for monitoring and evaluation. The National Innovation Policy is anchored in the Brazilian Strategy for Digital Transformation (E-Digital) of 2018¹¹. E-Digital is an inter-ministerial policy which establishes a whole-of-government approach under the coordination of the Inter-ministerial Committee for Digital Transformation (CITDigital). This strategy aims at:

10. World Intellectual Property Organization (WIPO), *Global Innovation Index 2022: What is The Future of Innovation-Driven Growth?*, 2022, available at: www.wipo.int.

11. The Brazilian Strategy for Digital Transformation (decree 9.319/2018) is considered a “living” policy and has been subsequently updated in 2019 and 2022.

- the digital transformation of the economy into a data-based economy;
- the digital transformation of the government, making it more efficient and accessible to citizens.

The implementation of E-Digital has been criticized for allocating most investment inwards, in the transformation of the government, and too little on the digital progress of the broader economy.¹² Public financing in innovation is indeed limited: Brazil spends only 1% of its GDP on research and development, if public and private investments are included.¹³ Moreover, resources from the National Fund for Scientific and Technological Development have been significantly reduced in 2022.¹⁴

In the ranking of the top 10 largest information technology companies in Brazil, two telecommunication companies, Vivo and Claro, occupy the first positions. The Brazilian branches of multinationals, such as HP, IBM, Oracle, or Microsoft also stand out in the list. Infrastructure as a service (IaaS) and cloud computing sectors grew significantly in recent years. When it comes to start-ups, the largest part is in the IT sector, but there has been a significant growth of start-ups in financial services. The legal framework for start-ups and innovative entrepreneurship was established by Supplementary Law n. 182/2021, aiming to support small technology companies, now considered key for economic, social, and environmental development.

Until 2019, legislative proposals related to foreign investments focused on attracting and facilitating investment. However, in 2020, the focus shifted to controlling foreign investments in identified sensitive sectors.¹⁵ This change was triggered by the crisis of the Covid-19 pandemic and by the international trend of promoting Investment Screening Mechanisms (ISMs). The new bills introduced on this issue address security and public order concerns. The focus on investments from State-owned companies and the risks associated with technological innovation reflect an implicit concern with growing Chinese investment in key sectors in Brazil.¹⁶ While the discussion about these bills is ongoing in the House of Representatives, the government of Jair Bolsonaro allegedly already subjected certain Chinese investments to restrictions, such as in the Angra 3 nuclear plant project.¹⁷

12. B. Amaral, “TCU Tece Críticas à Estratégia Digital do Governo Bolsonaro”, *Teletime*, July 8, 2022, available at: www.teletime.com.

13. Agência de Notícias da Indústria, “Apenas 10% das Empresas Usam Recursos Públicos Para Inovação, Diz Sondagem da CNI”, March 9, 2022.

14. Provisional Measure (MP) n. 1.136 of August 29, 2022, on amendments to Law No. 11.540 of November 12, 2007, which provides for the National Fund for Scientific and Technological Development – FNDCT.

15. See draft bills 2.491/2020 and 3.122/2020 currently under discussion at the House of Representatives.

16. M. Sanchez-Badin and A. Morais, and C. Bonini, “Instrumentos de Avaliação de Investimento Externo e o Debate Legislativo no Brasil”, *Boletim de Economia e Política Internacional (BEPI)* n. 31, September/December 2021.

17. J. Wiziack, “Brasil Cria Travas que Dificultam Investimentos Chinês no País”, *Folha de São Paulo*, August 8, 2020, available at: www1.folha.uol.com.

Data Policy

The Civil Rights Framework for the Internet in Brazil¹⁸ is one of the main legal frameworks that regulates data policies and online content. The law was enacted in 2014 during the NetMundial conference, hosted in São Paulo. This landmark legislation is not just responsible for setting an intermediary liability system but also represents one of the first legal texts to speak more clearly about privacy and data protection rights, thanks to the involvement of civil society in the early stages of its drafting.

Brazil has made considerable progress in its data policy with the enactment of the Brazilian Data Protection Regulation (LGPD) in 2018. The LGPD introduced important safeguards to users and data controllers, with consequences for data processing activities in and outside of Brazil and provides citizens with safeguards such as the right to access their data, correct incomplete or inaccurate information, exercise data portability and anonymize, block, or delete unnecessary or excessive data, among others.

The LGPD and the GDPR are considerably convergent in three important aspects: the principles enunciated by both regulations, the *ex-ante* model of protection, the definitions and rights of the data subjects, as well as the central role of accountability in both regulatory models.¹⁹ However, the LGPD is a concise law, without many interpretative cues; it is still in a formative time and lacks specificity with regards to the data protection officer requirement or proper deadlines for security incidents reporting, for example.

Going against the efforts towards the creation of a national data protection and privacy culture, former president Jair Bolsonaro signed a decree in 2019, establishing a new centralized database of citizens' data held by federal bodies. The "Cadastro Base do Cidadão" was conceived to allow the exchange of data between governmental agencies and bodies, and would enable access to information, such as health records and biometric information, without the consent or notification of the data subjects. More recently, after claims that the database violated the right to privacy in the country – while enabling potential misuse or abusive access to personal information – the Brazilian Supreme Court (STF) decided that the access to data should depend on legitimate, specific, and explicit purposes for its treatment.²⁰

18. Law n. 12.965/2014 on principles, guarantees, rights and duties for the use of the Internet in Brazil.
19. L. Schertel and B. Bioni, "O Regulamento Europeu de Proteção de Dados Pessoais e a Lei Geral de Proteção de Dados Brasileira: Mapeando Convergências na Direção de um Nível de Equivalência", *Revista de Direito do Consumidor*, vol 124, 2019, pp. 157-180.

20. ADPF-695 and ADI 6649 analyzed the constitutionality of "Cadastro Base do Cidadão".

Digital Infrastructure

The percentage of households with access to the Internet is at 81.50% in 2022.²¹ Despite notable growth in cable and fiber-optic use in recent years, 64% of users accessed the Internet exclusively via mobile phone. In 2017, the government launched a public consultation for a new connectivity plan named *Internet para Todos* (Internet for All), dedicated to the expansion of access in underserved areas and to improving broadband infrastructure in Brazil. Satellite-broadband connectivity is part of the current federal accessibility program since 2017 and a geostationary defense and strategic communications satellite has been connecting communication points and public schools.

In December 2020, changes were introduced to the Fund for the Universalization of Telecommunications Services (FUST), facilitating investments in the construction and improvement of broadband infrastructure. In parallel to this, the Government started discussions on the spectrum auction for fifth-generation (5G) technology. The main commitment made during the auction – which has been said to be the biggest one in Latin America²² – was to provide all 5,570 municipalities with 5G connection by July 2029.²³ 5G only became available in July 2022, and Brasilia, the capital, served as a pilot city for the technology's implementation and other cities are expected to follow.

Bilateral and Multilateral Links in the Digital Domain

In line with the traditional principles of Brazil's foreign policy (sovereignty, autonomy, non-intervention, and national development), the country's approach to partnerships in the digital domain can be qualified as pragmatic. Brazil often resists the notion of establishing partnerships primarily with "like-minded" countries,²⁴ and bilateral divergences related to trade or defense tend to remain encapsulated and rarely spill over to other areas of the relationship.

Brazil-China Relations

Since the 1993 Brazil-China "Strategic Partnership", bilateral relations have been marked by a high degree of institutionalization. Both countries are

21. Regional Center for Studies on the Development of the Information Society (Cetic.br). *TIC Domicílios – 2021* [ICT Households – 2021], available at: www.cetic.br.

22. "Leilão do 5G Foi o Maior Certame de Radiofrequência da América Latina", *Agência Brasil*, December 10, 2021, available at: www.agenciabrasil.ebc.com.br.

23. Ministry of Communications, "Compromissos de Abrangência do Leilão do 5G", *Gov.br*, January 19, 2022, available at: www.gov.br.

24. Some authors characterize Brazil as a "swing state" in Internet governance discussions. See, for example, T. Maurer and R. Morgus, "Tipping the Scale: An Analysis of Global Swing States in the Internet Governance Debate", *Internet Governance Papers*, paper N. 7, May 2014, available at: www.cigionline.org.

committed to a constructive bilateral partnership, regardless of differences in political views. Pragmatism can be explained by the strategic importance of bilateral relations. China is Brazil's main trade partner: a third of Brazil's exports are destined to China, while China is a key investor in the Brazilian economy.

Despite positive relations, there are some frustrated expectations on both sides. On the one hand, Brazil pushes for the diversification of its exports to China toward a larger share of slightly higher value-added goods to counter trends of de-industrialization, and has nurtured the hope that China will assist in Brazil's technological upgrade. With regards to the latter issue, the China-Brazil Business Council, for example, has called for enhanced partnership in areas related to "connectivity, artificial intelligence, new materials, 5G, nanotechnology, genetic programming, autonomous vehicles, industry 4.0 and new energies".²⁵ On the other hand, China expected that Brazil would join the Belt and Road Initiative (BRI).

Brazil has so far kept a deliberate distance from the BRI.²⁶ In spite of that, the country is one of the largest recipients of Chinese infrastructure funding in South America, notably in energy, oil, and IT sectors.²⁷ There is a growing presence of Chinese tech companies in Brazil. For example, Huawei is one of the main suppliers of 5G technology to the three largest Brazilian telecom providers – despite the opposition of the U.S. government²⁸ – and will support the development of artificial intelligence in Brazil.²⁹ Huawei is also involved in strategic plans for the development of smart cities. A pilot project will be developed by TIM Brasil and Huawei in Curitiba.³⁰

Brazil and China also cooperate on digital issues through the BRICS, which have increased their cooperation in the fields of science and technology, while promoting synergies in relation to digital policies in several areas, from cybersecurity and data protection to issues related to the digital economy and trade.^{31 32}

25. China-Brazil Business Council, *Sustainability and Technology as Foundations for Brazil-China Cooperation*, October 14, 2021, available at: www.cebc.org.

26. M. Caramuru de Paiva and C. Lins and G. Ferreira, *Brasil e China: o Estado da Relação Belt and Road e Lições Para o Futuro*, Rio de Janeiro: CEBRI, 2019.

27. T. Cariello, "Chinese Investments in Brazil: 2021 – a Year of Recovery", *China-Brazil Business Council*, 2022.

28. A. Kharpal, "U.S. Tries to Get Huawei Blocked from Brazil's 5G Networks With \$1 Billion Financing Pledge", *CNBC*, October 21, 2020, available at: www.cnbc.com.

29. M. Sakate, "Inteligência Artificial: País Define Plano Para Avançar Em Pesquisa", *Exame*, March 1, 2022, available at: www.exame.com.

30. Julião, H. "TIM E Huawei Assinam Acordo Para 5G e Cidade Inteligente em Curitiba" Teletime, March 2, 2022, available at: www.teletime.com.

31. S. Suchodolski, "Preface: Building Universally Accepted Norms, Standards and Practices" in L. Belli (ed.), *CyberBRICS: Cybersecurity Regulations in the BRICS Countries*, Switzerland: Springer, 2020.

32. Some examples of this growing institutionalization include the creation of the Digital BRICS Task Force (DBTF), the Digital BRICS Forum, the BRICS Partnership on New Industrial Revolution Innovation Center in Xiamen, and the BRICS Technology Transfer Center, the first official cooperation mechanism for technology transfer among BRICS countries.

Brazil-United States Relations

Brazil's foreign policy toward the United States can be described as cyclical, marked by moments of seeking alliance and alignment, followed by the desire for increased autonomy, and by the search for adjustment and recalibration of bilateral ties.³³ It is against this background that bilateral cooperation in several fields, including technology, should be understood.

The two countries have maintained a Global Partnership dialogue – a framework for talks on high-level themes – since 2010, and a U.S.-Brazil Strategic Partnership was set up in 2019. Soon after, Brazil and the United States approved a Work Plan in Science and Technology for the 2020-2023 period, but there is not a clear emphasis on digital issues. Brazil and the U.S. also have an Internet and Information and Communication Technology (ICT) Working Group³⁴, expected to promote technical exchanges and conduct consultations to share best practices on data protection, cross-border data flows, ICT procurement, international security in cyberspace, cybersecurity, and military and law enforcement cooperation.

The current level of exchange in digital cooperation does not seem to accurately reflect the strategic importance of the relationship. Segments of the industry in the U.S. and Brazil – spearheaded by the Information Technology Industry Council (ITI) – are thus calling to include topics such as data flows, access to the source code of computer programs, online privacy, cybersecurity, and online taxation into a Digital Economy Agreement, as part of the existing 2011 Agreement on Trade and Economic Cooperation (ATEC).³⁵

The U.S. expects Brazil to remain aligned with Western democracies in global politics, most notably amidst the geopolitical dispute with China. Brazil has taken steps in this direction, by supporting the principles contained in the Clean Network proposal made by the U.S., for example. Nevertheless, the main Brazilian telecommunication companies succeeded in putting pressure on the government to ensure that they would still be able to buy technology from Huawei to build 5G networks in Brazil.³⁶ Brazilian operators claimed that the impossibility of buying equipment from the Chinese company would increase costs, which could negatively impact

33. M. Hirst, *The United States and Brazil: a Long Road of Unmet Expectations*, New York: Routledge, 2005.

34. This bilateral dialogue cooled down after revelations of mass surveillance programs by Edward Snowden, but the Working Group was reactivated in 2015. C. Benett, "U.S., Brazil to Restart Long Dormant Internet Working Group", *The Hill*, June 30, 2015, available at: www.thehill.com.

35. Information Technology Industry Council (ITI), "Tech Industry Urges U.S., Brazil to Ensure Inclusion of Digital Trade Principles in Bilateral Talks", *ITI News*, September 10, 2020, available at: www.itic.org.

36. According to media sources, the U.S. offered Brazil financing of up to \$1 billion through the Export-Import Bank to finance purchases by Brazilian telecom companies of equipment from Huawei's competitors. A. Boadle and A. Shalal, "U.S. Offers Brazil Telecoms Financing to Buy 5G Equipment from Huawei Rivals", *Reuters*, October 21, 2020, available at: www.telecom.economictimes.indiatimes.com.

technology deployment and, ultimately, development. Brazil also did not sign the Declaration for the Future of the Internet, spearheaded by Washington, and signed by more than 60 countries.

Brazil-European Union Relations

The European Union and Brazil have a long-standing partnership based on shared fundamental values and principles and underpinned by several cooperation agreements. Science and technology are one of the most active areas under the ongoing Strategic Partnership.

The Brazil-EU Dialogue on Information Society and Digital Economy, created in 2010, has been a forum for establishing cooperation in a plurality of areas, such as 5G, the Internet of Things (IoT), AI, standardization and interoperability of ICT services, and advanced manufacturing. It has also fostered the promotion of joint digital infrastructure projects, such as the EllaLink transatlantic cable, concluded in 2021 under the framework of the EU Data Gateway Strategy. The EU and some member states of “Team Europe” also have ongoing projects to support digital transformation in Brazil, comprising policy dialogue, technical assistance, research and innovation cooperation and public and private financing of activities. In addition, in 2014, both sides decided to institutionalize cooperation on cybersecurity in the form of a separate EU-Brazil Cyber Dialogue. Among other issues, the cyber dialogue served to bring the positions of the two countries closer in multilateral spaces, such as the UN Group of Governmental Experts (GGE).³⁷

There is also convergence in areas such as digital market regulation and data protection, and the ‘Brussels effect’ can significantly be felt in the Brazilian approach to regulating digital issues. This is the case, for example, of the EU’s approach to network neutrality, which influenced how this topic is tackled by the Civil Rights Framework for the Internet (see section 2). The LGPD shows a high degree of convergence with the EU’s GDPR.

The ground for bilateral collaboration is fertile. This could serve as encouragement for the strengthening of digital cooperation in a few areas. First, the EU could seek ways to help fulfill Brazil’s frustrated expectations with regard to the U.S. and China in terms of technological assistance and digital transformation. Second, both sides could leverage their convergence around values and human rights to enhance not only bilateral digital cooperation, but also convergence in multilateral fora. In the field of data, for example, bilateral dialogue could more significantly encompass competition and platform regulation in the data economy – both Brazil and the EU are concerned with data concentration and the power of big tech companies from the U.S. and China – as well as mechanisms for the promotion of fair access to and use of data (including non-personal,

37. H. Ebert and L. M. Hurel, “Brazil-EU Cyber Cooperation: Swinging Bridges on the Road to Stability in Cyberspace”, *Council of Foreign Relations*, March 25, 2020, available at: www.cfr.org.

machine-generated, and industrial data) to unlock economic and social value. Trade negotiations currently encompass many digital policy issues, such as network neutrality, privacy, cybersecurity, and data flows. This means that the potential for convergence between Brazil and the EU in trade discussions has increased as well.

India: A Pivotal Player

Trisha Ray

The past decade has seen India rise as a “digital power”. Its remarkable growth, its ambitious digitalization projects and the way Digital India captures the ambitions and aspirations of the country’s young population, have been a part of what has made the country a pivotal player in a range of new emerging technology coalitions and processes. India’s growing digital economy, vast troves of tech talent, and IT services sector have been a reason it is such a prominent power on digital issues. At the G20 Summit in Bali in November 2022, Prime Minister Modi outlined India’s thinking on digital technologies: "Digital transformation is the most remarkable change of our era. The proper use of digital technologies can become a force multiplier in the decades-long global fight against poverty."³⁸

While the idea of technology for development is prominent in India’s digital policies, the state is also balancing the digital “trilemma” of simultaneously generating economic growth, protecting individual privacy, and safeguarding national security. Indeed, the U.S.-China trade war, the war in Ukraine and the resulting digital blockade on Russia, disruptions from the COVID pandemic, have re-imprinted the idea of “self-reliance”. As India takes on the helm of the G20 in 2023, the digital economy is at the forefront of its agenda. Concurrently, the government has prioritized strengthening India’s electronics manufacturing base, with the announcement of investment and other incentive schemes such as the Modified Electronics Manufacturing Clusters (EMC 2.0) Scheme, Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS), and Production-Linked Incentives (PLIs) for Large Scale Electronics Manufacturing, with a collective outlay of INR 50,000 crore (about €5.7 billion³⁹), as well as an INR 76,000 crore (about €8.6 billion) Semicon India Program that will provide fiscal support to semiconductors companies for developing and producing components.⁴⁰ It would be pertinent for observers to track how it manages its digital trilemma as it expands engagement with global partners.

38. “English translation of Prime Minister Shri Narendra Modi’s address at the G-20 Summit in Bali, Session III: Digital Transformation”, *Press Information Bureau*, November 16, 2022, available at: www.pib.gov.in.

39. Exchange rate as of January 2023. Unless stated otherwise, the same methodology will be used throughout this study.

40. *Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors*, Ministry of Electronics and Information Technology, April 1, 2022, available at: www.meity.gov.in; *Production Linked Incentive Scheme (PLI) for Large Scale Electronics Manufacturing*, Ministry of Electronics and Information Technology, March 14, 2022, available at: www.meity.gov.in; *Modified Electronics Manufacturing Clusters (EMC 2.0) Scheme [Notification]*, Ministry of Electronics and Information Technology, April 1, 2020, available at: www.meity.gov.in; *Programme for Development of Semiconductors and Display Manufacturing Ecosystem in India*, Ministry of Electronics and Information Technology, December 23, 2021, available at: www.meity.gov.in.

Technology and Digital Innovation Ecosystems

The Strength of the IT Services Sector

The Indian tech ecosystem is particularly strong in the sectors of software and software-based services. Despite the economic turmoil caused by COVID-linked lockdowns, its 2021 service exports surpassed 2019 levels within the first quarter of the year.⁴¹ Software service exports that year stood at an estimated \$156.7 billion (about €146 billion) or 66% of total service exports.⁴²

The government has designed policies aimed at supporting the continued growth of the sector with a unified approach. The *Digital India* (DI) initiative launched in 2015 consolidated India's disparate e-governance and digital public infrastructure initiatives under one banner.⁴³ The overseeing ministry for the initiative is the Ministry of Electronics and Information Technology (MeitY), but several line ministries are involved in implementing DI initiatives.

India is home to several IT services companies that rose to prominence in the 1970s and 1980s and remain key players in the digital innovation ecosystem as well. These include Infosys, established in 1981 with a capital of \$250 (about €234), now valued at \$77.8 billion (about €73 billion). Similarly, Tata Consultancy Services Limited, founded in 1968, surpassed Accenture in 2020 to become the world's most valuable IT company.⁴⁴ The country also houses the world's third largest startup ecosystem overall, behind just the United States and China.⁴⁵ A record 44 startups achieved unicorn status in 2021 alone, and by September 2022, India was home to 107 unicorns.⁴⁶ Several of these unicorns are in the service sector and capture a diversity of offerings including cryptocurrency exchanges, gaming, e-payments, logistics, mobility, and e-commerce.

Market Regulation

With the advent of economic liberalization policies in 1991, India has gradually eased restrictions on foreign investment, barring sensitive sectors like defense and transportation. There is no cap on foreign direct investment (FDI) in IT services, e-commerce, or telecom and FDI under this category

41. *Key Statistics and Trends in International Trade: The Effects of the COVID-19 Pandemic on International Trade*, United Nations (Geneva), 2022, available at: www.unctad.org.

42. "Survey on Computer Software and Information Technology Enabled Services Exports: 2021-22", Reserve Bank of India, September 8, 2022.

43. "Ecosystem", *Digital India*, accessed October 1, 2022, available at: www.digitalindia.gov.in.

44. "TCS Surpasses Accenture in M-Cap to Become World's Most-Valuable IT Company", *The Economic Times*, retrieved October 13, 2020, available at: www.economictimes.indiatimes.com.

45. *Economic Survey 2021-22*, Government of India, January 31, 2022, p. 340, available at: www.indiabudget.gov.in.

46. "The Indian Unicorn Landscape", Invest India, accessed September 22, 2022, available at: www.investindia.gov.in.

can go through the automatic route, with no prior approval from the government.⁴⁷ FDI in digital news media, however, is subject to a 26% cap, and must be approved by the government.

While growth in digital services has burgeoned over the past decade, concerns arose among lawmakers about whether India was benefiting sufficiently from the global digital ecosystem, particularly from enterprises that conduct business in India through digital means but were not taxed under Indian law. In April 2020, the Government of India (GoI) implemented a digital tax, building upon the earlier Equalization Levy (2016), of 2% on revenue generated in India.⁴⁸ The measure will be in effect till 2024, when India will align itself with international frameworks, including the OECD's "Two-Pillar Solution to Address the Tax Challenges Arising from the Digitalization of the Economy".⁴⁹

Data Policy

Presently, the Information Technology Act (IT Act) 2000 is the primary legislation governing data in India, however, the MeitY has, since 2018, been working toward a more comprehensive data protection legislation. After two successive drafts, in August 2022, the government presented the Digital Personal Data Protection Bill (2022).

IT Act (2000-Present)

The IT Act 2000 is the culmination of the Government of India's efforts to align national legislation with the United Nations Commission on International Trade Law's (UNCITRAL) Model Law on Electronic Commerce (MLEC).⁵⁰ The MLEC sought legal recommendations to ease barriers to e-commerce by recommending that states enact or amend national legislation so that electronic communications have statutory backing. The IT Act is therefore not primarily a data protection act, but rather an e-commerce and cybercrime legislation.

The IT Act makes punishable unauthorized access to data, damage or alteration of data, failure to adequately protect personal data, and privacy violations. The Information Technology Rules, 2011 places obligations on bodies corporate to provide an easily accessible privacy policy, obtain consent before collecting any sensitive personal data, limit data collection to

47. "Foreign Investment in India", Reserve Bank of India, May 7, 2018.

48. "Ministry of Finance (Department of Revenue) Notification: Equalisation Levy", Ministry of Finance, Government of India, October 28, 2020, available at: www.incometaxindia.gov.in.

49. "India and USA Agree on a Transitional Approach on Equalisation Levy 2020", Press Information Bureau, November 24, 2021, available at: www.pib.gov.in.

only that which is necessary for the provision of a service, and only for the purpose and duration for which it is required.⁵¹

The Journey to a Digital Personal Data Protection Bill (2022)

In July 2017, GoI set up a Committee of Experts on data protection, headed by Justice B.N. Srikrishna,⁵² with the ambition of “[formulating] a legal framework relating to personal data that can work as a template for the developing world.” The Srikrishna committee’s report took direct inspiration from the EU GDPR – which at the time had just been adopted and was at the “vanguard of global data protection norms”.⁵³

Many of the recommendations of the report – including data localization, the right to be forgotten and the concept of the “data fiduciary” – were reflected in the 2018 and 2019 drafts of the Personal Data Protection Bill. The draft Bill imposed certain restrictions on the transfer of critical and sensitive personal data abroad. The draft also outlined the obligations of privately-owned data fiduciaries, including “specific, clear and lawful” purposes for processing personal data, informed consent, and limits on the retention of personal data.

Following several parliamentary recommendations on the draft text, in late 2021,⁵⁴ the government drafted a new legislation, the Digital Personal Data Protection Bill, which was released for public comments on November 18, 2022.⁵⁵ The DPDP applies only to data collected and/or stored in a digital format, and that goes through automated processing. It has shed restrictions on cross-border flows. Instead, the government will notify a list of countries to which cross-border transfer of personal data is permitted. This leaner draft could indicate a few things: first, the DPDP Bill is meant to be a flexible framework, and the government has decided to leave the granularities to sectoral regulators. Second, the removal of localization requirements demonstrates that, while national interest is at the forefront, the government is willing to change course to align with international partners.

51. “Reasonable Security Practices and Procedures and Sensitive Personal Data or Information Rules, 2011”, Government of India, available at: www.indiacode.nic.in.

52. “A Free and Fair Digital Economy Protecting Privacy, Empowering Indians Committee of Experts under the Chairmanship of Justice B.N. Srikrishna”, Ministry of Electronics and Information Technology, 2018, available at: www.meity.gov.in.

53. *Ibid*, p. 3

54. “Report of the Joint Parliamentary Committee on the Personal Data Protection Bill, 2019”, Lok Sabha Secretariat, December 2021.

55. *The Digital Personal Data Protection Bill, 2022*, Ministry of Electronics and Information Technology, November 18, 2022, available at: www.meity.gov.in.

Digital Infrastructure

Internet Connectivity

India is home to the world's second-largest Internet user base and can be best described as "mobile first", as most people access the Internet on mobile devices: as of July 2022, there were 776.8 million mobile broadband subscribers, and a further 29.47 million wired broadband subscribers.⁵⁶

To bridge the fixed broadband gap, the GoI has been undertaking the *BharatNet* project, which aims to lay 800,000 km of fiber optic cable, to connect each of the 250,000+ rural villages in the country.⁵⁷ Given its scale, the project has faced some challenges, whether from terrain and weather conditions or the Covid-19 pandemic.⁵⁸ Nevertheless, as of September 2022, 584,747 km of fiber optic cables have been laid under the project.⁵⁹

India's mobile broadband prices are some of the most competitive in the world: 1 GB of data costs \$0.17 (about €0.16), the fifth cheapest rates in the world.⁶⁰ High demand, competition among service providers, and the entry into the market of one provider in particular — Reliance Jio, have helped keep prices low.⁶¹

In August 2022, the Government of India concluded 5G spectrum auctions, garnering bids worth INR 1.5 Lakh crore (about €17.3 billion)⁶² The country's three largest consumer telcos, Reliance Jio, Bharti Airtel, and Vodafone Idea all participated, as did Adani Data Networks Limited, but only for private, industrial uses. The telcos have partnered with Ericsson, Nokia, and Samsung for 5G equipment.⁶³ Jio is also building its own indigenous 5G stack.⁶⁴ The government has placed a soft ban on Chinese 5G vendors, by

56. "Press Release No. 63/2022", Telecom Regulatory Authority of India, September 15, 2022, available at: www.trai.gov.in.

57. The project was officially announced in 2011 as the National Optical Fibre Network (NOFN), but due to delays in field surveys, it officially started work only in 2014 and was then renamed Bharat Broadband Network, or BharatNet. Bharat Broadband Network Limited, accessed September 10, 2022, available at: www.bbnl.nic.in.

58. "Progress of Implementation of BharatNet", Standing Committee on Information Technology (2017-2018), Seventeenth Lok Sabha, August 2018, available at: www.eparlib.nic.in; A. Aryan, "Government to rope in private players to speed up work on rural net plan", Indian Express, July 1, 2021, available at: www.indianexpress.com.

59. Bharat Broadband Network Limited, available at: www.bbnl.nic.in.

60. "Worldwide Mobile Data Pricing 2022", *Cable.co.uk*, accessed September 5, 2022, available at: www.cable.co.uk.

61. N. Sharma, "Reliance Jio's Cheap Data Turned India's Internet Dreams Into Reality", *Quartz India*, September 7, 2021, available at: <https://qz.com>.

62. S. Barik, "5G Spectrum Auction Ends, Govt Earns Over Rs 1.5 Lakh Cr; Reliance Jio Top Bidder", *Indian Express*, August 2, 2022, available at: www.indianexpress.com.

63. Vodafone Idea has not placed a purchase order with any 5G vendor yet. K. Rathee, "DoT Keeping an Eye on Cash-Strapped Vodafone Idea's 5G Service Rollout Plans", *ET Telecom*, January 10, 2023, www.telecom.economictimes.indiatimes.com.

64. "Jio Gets Ready to Roll-Out The World's Most Advanced 5G Network Across India and to Make India The Global Leader in Digital Connectivity and Digital Solutions", Reliance Industries Limited, August 1, 2022, available at: www.ril.com.

excluding them from its list of “trusted vendors”.⁶⁵ Limited 5G rollouts began in major metropolitan cities in Q4 2022, with a nationwide rollout expected in 2023.

Looking ahead, the MeitY is designing a 6G strategy that aims to develop Indian 6G technology by late 2023 or 2024. As per Ashwini Vaishnaw, Minister of Electronics and Information Technology, 6G technology in the country will be rolled out using indigenously developed hardware and software – technology which could then be exported abroad.⁶⁶

Digital Public Infrastructure

Finally, India’s digital revolution has been powered by its digital public infrastructure, primarily through IndiaStack, a suite of APIs, or Application Programming Interfaces. Conceived in 2012, IndiaStack encapsulates such tools as the United Payments Interface (UPI) which enables instant and seamless inter-bank payments using a smartphone. It also includes CoWin, India’s contact-tracing and covid response app. IndiaStack is a public-private partnership, built by “volunteers” from industry,⁶⁷ and its APIs can be used by governments, businesses, entrepreneurs, and individuals.

India is a global leader in digital public infrastructure. As of September 2022, the Unique Identification Authority of India (UIDAI) has generated 13 billion Aadhaar numbers, as part of India’s national biometric ID program, and the Unified Payments Interface facilitated 5.4 billion transactions in the month of March 2022 alone.⁶⁸ Building on the domestic success Digital Payments Index (DPIs), India is now looking to export its model to other nations. DPIs are prominent on India’s agenda as it takes on the presidency of the G20.⁶⁹ The Prime Minister launched “Indiastack.global”, a single repository of all major IndiaStack projects.⁷⁰

65. A. Kuehn and T. Ray, “This Connection is Secure: A 5G Risk and Resilience Framework for the Quad”, National Security College, Australian National University, September 2021, available at: www.nsc.crawford.anu.edu.au.

66. R. Jain, “India to Get 6G by 2023 End or 2024, India’s Communications Minister Says While The Country Still Waits For 5G Rollout”, *Business Insider India*, November 24, 2021, available at: www.businessinsider.in.

67. Indian Software Product Industry Round Table, available at: www.isprt.in.

68. *Benchmarking India’s Payment Systems*, Reserve Bank of India, July 2022.

69. “India’s Forthcoming G20 Presidency”, Ministry of External Affairs, September 13, 2022, www.meia.gov.in.

70. “India Stack Knowledge Exchange 2022”, Press Information Bureau, July 8, 2022, <https://pib.gov.in>.

Bilateral and Multilateral Links in the Digital Domain

China: Souring Security Relations and Digital Decoupling

In the 2010s, several prominent Indian tech startups were beneficiaries of Chinese investment, although Chinese FDI in this period was dwarfed by investments from the United States, Singapore, Japan, the Netherlands, and Mauritius,⁷¹ which together accounted for nearly three-fourths of FDI inflows. Nevertheless, Chinese FDI grew by twelve times in just three years between 2016 and 2019.⁷²

Over the past five years, the combined impact of the shift in the United States' trade policies on China, as well as India's own deteriorating security relations with its neighbor, have led to policy efforts to "decouple" from China. A continual point of friction between the two has been over Chinese apps and platforms, and concerns about data privacy and lax content moderation. In December 2017, the Ministry of Defense directed members of the armed forces to uninstall 42 Chinese apps, citing "reliable reports" about spyware and malware.⁷³ In April 2019, ByteDance (parent company of TikTok) became the subject of a public interest litigation (PIL) for its inaction on the rampant use of their platforms by child predators, prompting the Madras High Court to ban the app.⁷⁴ Finally, starting in the wake of border clashes in 2020, up till as recently as August 2022, the Indian government has banned over 200 Chinese apps.⁷⁵

The souring security relations between India and China have similarly severed ties in telecommunication infrastructure as well, particularly 5G. In June 2020, the Indian government barred state-owned telecom providers from using Chinese equipment. In March 2021, the Department of Telecommunications (DoT) mandated that telecom service providers use only "Trusted Products" in their networks, as designated by the National Cyber Security Coordinator. In this vein, the DoT has launched a portal that lists trusted telecom equipment suppliers. The criteria for "Trusted Sources" were communicated to TSPs and telecom vendors in a meeting from which Huawei and ZTE were reportedly excluded.

71. See: "Mauritius route". Investors often leverage the Double Taxation Avoidance Agreement between India and Mauritius, along with Mauritius' status as a tax haven.

72. "India Received \$1.81 bn FDI from China During Apr'14- Mar'19: Piyush Goyal", *The Economic Times*, June 28, 2019, available at: www.economictimes.indiatimes.com.

73. S. Dhapola, "Defence Ministry to Indian Armed Forces: Uninstall these Chinese Apps Immediately", *Indian Express*, December 2, 2017, available at: www.indianexpress.com.

74. "Madras High Court Bans Downloading Tik Tok", Software Freedom Law Centre, August 4, 2019, available at: www.sflc.in.

75. "Meity Blocks 348 Apps Identified by Home Ministry: MoS IT", *Economic Times Telecom*, August 3, 2022, available at: www.telecom.economictimes.indiatimes.com.

European Union: From a Shared Vision to Policy Action

India and the EU have, in the past half-decade, undergone a period of narrative and normative convergence, especially around issues of digital sovereignty. For instance, both geographies agree that economic value from data generated locally should support local socio-economic development and prosperity. Like the GDPR, the Data Empowerment and Protection Architecture proposed by NITI Aayog, India's planning commission, gives users more power over how their data is used.⁷⁶ Similarly, both India and the EU see digital taxation as a means of getting their fair share of profits generated by companies operating within their borders.

In 2021, India and the EU signed the EU-India Connectivity Partnership. It sets ambitious goals for cooperation on sustainable digital, transport, and energy networks, and the flow of people, goods, services, data, and capital between the two entities.⁷⁷ The Connectivity Partnership, in addition to facilitating bilateral digital cooperation between India and the EU, will also serve as a launchpad for trilateral initiatives in South Asia, East Asia, Central Asia, and Africa, in pursuit of Sustainable Development Goals.⁷⁸

United States: Cooperation and Contention

India and the U.S. are also increasingly aligned on the threats of tech dependence on China, particularly within the Quad. The Quad has constituted subgroups on 5G, semiconductors, AI, biotech, supply chains, among others, under the aegis of the Quad Critical and Emerging Technology Working Group.⁷⁹

While the United States and India's economic partnership has gone from strength to strength in the past two decades, digital cooperation between the two has yet to reach its full potential. The vision for the way forward, however, is not yet clear, as both have competing visions for the pathways to a *fair* digital economic relationship. GoI sees the inequitable distribution of value generated by digital trade as a sore point and has drafted and implemented regulations to correct this. The U.S. government, however, sees India's measures as fundamentally discriminatory. For instance, on the issue of the Equalization Levy (2020), the U.S. Trade Representative's investigation notes that 72% of the companies liable under

76. "Data Empowerment and Protection Architecture: Draft for Discussion", NITI Aayog, August 2020, available at: www.niti.gov.in.

77. "India-EU Connectivity Partnership", Ministry of External Affairs, May 8, 2021, available at: www.meaindia.gov.in.

78. RIS, "India-EU Connectivity: New Context, New Horizons", YouTube video, April 27, 2022, available at: www.youtube.com.

79. "Quad Framework and Engagement", AMS Division, Ministry of External Affairs of India, available at: www.meaindia.gov.in.

the levy are U.S. companies.⁸⁰ Nevertheless, India and the U.S. were among the 135+ countries that joined the OECD's framework agreement on digital taxation in October 2021.⁸¹ Both are also a part of the Indo-Pacific Economic Framework for Prosperity (IPEF).⁸², which can act as a forum to resolve points of contention between the U.S. and India, such as cross-border data flows and digital taxation.

80. "Report on India's Digital Services Tax", Office of the United States Trade Representative, January 6, 2021, available at: www.ustr.gov.

81. "India and USA Agree on a Transitional Approach on Equalisation Levy 2020", Press Information Bureau.

82. "United States and Indo-Pacific Economic Framework Partners Announce Negotiation Objectives", U.S. Department of Commerce, September 9, 2022, available at: www.commerce.gov.

Kenya: A Selectively Thriving Digital Economy

Grace Mutung'u

Kenya has a blended mix of government, development and market policies targeting the technology ecosystem.⁸³ While significant technology development has taken place after market liberalization in the late 1990s, the government has also played a key role in investment and policy development. The current digital policy is the Digital Economy Blueprint (2019), an adoption of the World Bank's Digital Economic Blueprint for Africa.⁸⁴ It builds up on existing policies that leverage on digitization such as Vision 2030 national development policy and the devolved system of government under the 2010 Constitution. External developments such as the European Union's General Data Protection Regulation (GDPR), China's Digital Silk Road Initiative and World Bank's Digital Economic Strategy for Africa, and moments like the Covid-19 pandemic have also defined Kenyan digital policies.

While Kenya has managed to advance information and communications technology (ICTs) coverage to almost all of the country, this does not translate to access for all. Access to ICTs is hindered by factors such as gender, poverty, low digital literacy, lack of access to smart devices, and poor quality of services in underserved areas. While most people access digital services through mobile networks, consumers have limited choices due to a non-competitive market dominated by one mobile operator, Safaricom. For Kenya's economy to be truly inclusive, there is a need to advance infrastructure and target people and areas that have been excluded from the digital economy.

Technology and Digital Innovation Ecosystem

Mobile telephony, the devolved system of government, and the Covid-19 pandemic are among the drivers of digital development. There are three mobile network operators (MNOs), Airtel, Safaricom, and Telkom Kenya. Besides mobile communication, mobile networks act as platforms where services such as mobile Internet, money, and information services are delivered. Safaricom has a significant market share in most of the segments, leading to debate on how to correct the market.⁸⁵ Various law

83. B. Ndemo and T. Weiss (eds.), *Digital Kenya: An Entrepreneurial Revolution in the Making*, London: Palgrave Macmillan, 2017.

84. Republic of Kenya, Ministry of ICT, *Digital Economy Blueprint: Powering Kenya's Transformation*, 2019.

85. Communications Authority, *First Quarter Sector Statistics Report for the Financial Year 2021/22, 2022*.

and regulatory options, including separating mobile money from other services are being considered.⁸⁶

The most celebrated product of the mobile economy is mobile money, which began as a means of sending and receiving money, and has evolved into many more uses such as bill payments, linkage to bank accounts, micro-savings, and loans.⁸⁷ This economy has spurred other innovations in various sectors such as transport, health, payment systems, digital lending and agriculture where start-ups create platforms connecting various players.⁸⁸ For example Twiga foods connects farmers with vendors and consumers of their products. The company recently got about \$2.5 million (about €2.3 million) for onward loaning to its platform users.⁸⁹ Twiga joins a host of companies in the financial technology services who dominated the Kenyan innovation ecosystem in 2022.⁹⁰ Following the U.S.-Africa summit in December 2022, U.S. firms committed over \$20 million (about €18.8 million) funding for Kenyan start-ups.⁹¹ Many of the start-ups' attempt to solve development challenges such as service delivery in remote and underserved areas. In 2010, Kenya adopted a new Constitution that devolves services to 47 sub-national (county) governments. The system has catalyzed digital connectivity in the counties through the expansion of fiber and mobile connectivity to county and sub-county headquarters.⁹² Connectivity is also required to run elections that have been expanded to cover county positions. Since 2013, voter registration, publication of voter rolls, transmission of election results, and publication of results are carried out digitally.⁹³ Among policies of the newly elected administration which took over in 2022 is to move over 5,000 government services online, and to fund start-ups, many of which are in the digital space.⁹⁴

The Covid-19 pandemic ushered another phase of digital development, characterized by increased digitalization of government and private services, and support for cashless transactions.⁹⁵ For example, the judiciary adopted

86. Departmental Committee on Communication, Information and Innovation, *Report on the Inquiry into Legislative and Regulatory Gaps Affecting Competition in the Telecommunications Sub-Sector*, 2019

87. N. Ndung'u, *A Digital Financial Services Revolution in Kenya: The M-Pesa Case Study*, African Nairobi: Economic Research Consortium, 2021.

88. *Ibid.*

89. K. Namunwa, "Twiga Food Launches 'Soko Solution'", *CIO Africa*, December 1, 2022.

90. L. Owoko, "63 Kenyan Start-Ups Raise Sh62bn in 2022", *Business Daily*, December 27, 2022.

91. D. Akure, "Kenya Start-Ups Cut Sh29bn Deals with U.S. investors", *Business Daily*, December 30, 2022.

92. Kenya Vision 2030, *National Optic Fibre Network Backhaul Initiative (NOFBI)*, 2022.

93. Independent Electoral and Boundaries Commission (IEBC), *The Post-Election Evaluation Report for the 8 August 2017 General Election and 26 October 2017 Fresh Presidential Election*, 2018.

94. C. Omulo, "William Ruto: State in Final Stages of Setting up Startup Fund", *Business Daily*, December 11, 2022.

95. G. Mutung'u, "Placing All the Bets on High Technology", in L. Taylor and others (eds), *Data Justice and COVID-19: Global Perspectives – Meatspace Press*, London: Meatspace Press, 2021.

e-filing and hearings.⁹⁶ Similarly, schools, hospitals and other service providers embraced e-services that they have maintained even as in-person services have resumed.

Data Policy

Kenya has large datasets, which have national security, public interest, and economic uses. These include public agency databases such as the register of persons, voters roll, motor vehicle, land, marriage, and business registers. Some of the registers date back to the colonial period and they have been digitized for e-government services. Under a 2018 project known as *Huduma Namba*, the government is transforming these registers into a population register known as the National Integrated Identity Management System (NIIMS). NIIMS contains primary biometric records of each citizen and resident through which every person's identity can be verified as they access public and private services.⁹⁷ There are also many private datasets such as hospital records, customer loyalty programs, and the mobile phone subscriber database. NIIMS consolidates several identification and authentication laws such as mandatory SIM card registration, private security, and know-your-customer (K-Y-C) practices.⁹⁸

These increased uses of personal data, together with the capability of the system to be used by national security forces for intelligence, crime investigation and tax compliance led to the enactment of Data Protection Act in 2019.

The Data Protection Act mirrors the GDPR in terms of definitions, principles, rights of data subjects, regulation of cross-border transfers and sanctions.⁹⁹ Like the GDPR, it regulates data processing, whether directly as a controller or on behalf of another as a processor. Principles include limitation, lawful processing, retention, and adequacy. Cross-border data transfers are subject to adequacy in the country of transfer. The Kenyan law however goes further to limit transfer of certain categories of data. While the law is still in the novel stages of implementation, there are concerns regarding the independence of the Data Protection Commissioner particularly in reference to state agencies. In ongoing litigation, Katiba Institute, a civil society organization, contends that a proper data protection impact assessment was not done in the NIIMS project.¹⁰⁰

96. Chief Justice/President of the Supreme Court, *Kenya Law: Practice Directions on Electronic Case Management*, 2020.

97. Registration of Persons Act, section 9A.

98. Kenya Information and Communications (Registration of SIM-Cards) Regulations 2015; Private Security Regulation Act 2016; Proceeds of Crime and Anti-Money Laundering 2009;

99 Data Protection Act 2019.

100. "Republic of Kenya, Republic v Joe Mucheru, Cabinet Secretary Ministry of Information Communication and Technology & 2 others Ex Parte Katiba Institute & another", Immaculate Kasait, Data Commissioner (Interested Party), *eKLR*, 2021.

As for Internet contents regulations, most online content is freely available, with restrictions on immoral content and hate speech.¹⁰¹ In response to rising mis- and disinformation particularly during elections, the 2018 Computer Misuse and Cybercrimes Act outlawed false news or publications intended to cause panic.¹⁰² These provisions have been applied to control online speech, particularly during national emergencies and elections. At the onset of the Covid-19 pandemic for example, bloggers were arrested for sharing videos of planes landing in Kenya.¹⁰³ In another example, the National Cohesion and Integration Commission, a public agency mandated to ensure inter-ethnic and national harmony, has employed content surveillance to weed out undesirable content during election periods.¹⁰⁴ Despite these efforts, in the 2022 election period, researchers and advocates noted the rise in misinformation, and called for public education. They also urged social media companies to increase content moderation resources in countries like Kenya where social media is popular.¹⁰⁵

Digital Infrastructure

A study carried out prior to the 2017 General Elections showed that telecommunications networks were available in about 88% of the territory, a high penetration in comparison with many African countries.¹⁰⁶ The 2021 Digital Quality of Life survey corroborates the study, ranking Kenya as having the best e-infrastructure in Africa. However, the high telecom and Internet penetration does not translate to access for everyone, since these services are unaffordable for many.¹⁰⁷ In addition, the quality of the services tends to be higher in urban areas and townships compared to rural and underserved areas.¹⁰⁸

101. Kenya ICT Action Network (KICTANet), *State of Content Policy in Kenya*, 2019.

102. *Computer Misuse and Cybercrimes Act 2018* sections 22, 23.

103. Article 19, Eastern Africa, Kenya ICT Action Network, and Policy, “Unseen Eyes, Unheard Stories: Surveillance, Data Protection, and Freedom of Expression in Kenya and Uganda During COVID-19”, April 2021, available at: www.article19.org.

104. Communications Authority and National Cohesion and Integration Commission, *Guidelines on Prevention of Dissemination of Undesirable Bulk and Premium Rate Political Messages and Political Social Media Content Via Electronic Networks*, 2017.

105. Kenya ICT Action Network (KICTANet) and Collaboration on International ICT Policy for East and Southern Africa (CIPESA), “Disinformation in Kenya’s Political Sphere: Actors, Pathways and Effects”, 2022; O. Madung, “From Dance App to Political Mercenary: How Disinformation on TikTok Gaslights Political Tensions in Kenya”, Mozilla Foundation, 2022, available at: <https://foundation.mozilla.org>.

106. Intelcon Research and Consultancy Ltd., *ICT Access Gap Stud'*, Government Report 2016.

107. M. Ndung'u, T. Waema and W. Mitullah, “Factors Influencing Usage of New Technologies in Low-income Households in Kenya: The Case of Nairobi”, *Info*, vol 14. no. 4, June 2012, pp. 52-64.

108. Communications Authority, *Framework for Assessment of Quality of Service of Telecommunications Systems and Services*, 2017.

Responses to these gaps include monitoring the quality of service and sanctions for poor quality by the communications regulator.¹⁰⁹ Connectivity projects include land fiber for local connections and several projects aimed at targeting underserved areas, and an undersea cable for international connections. Kenya has a Universal Access Fund (UAF), where telecommunications licensees make mandatory contributions based on annual revenues.¹¹⁰ The fund has been used to advance network access in underserved areas and support special projects such as voice infrastructure, education and accessibility for persons with disability.¹¹¹ The government has also been connecting all county and sub-county headquarters under a project known as the National Optic Fiber Backbone Infrastructure (NOFBI). In July 2022, the NOFBI was extended to court stations at sub-national level to support e-judiciary services.¹¹² The Covid-19 pandemic has also driven connectivity projects. Examples include the Google Loon project that was however shut down for lacking technical viability, and a rural connectivity project by local Internet Service Provider (ISP) Mawingu Networks Ltd.¹¹³ The country is also advancing in 5G networks where Safaricom, in partnership with Nokia and Huawei, begun testing 5G services in several towns in the country.¹¹⁴ Airtel Kenya obtained additional spectrum to improve existing networks and possibly test 5G.¹¹⁵ The Authority also signed a technical cooperation agreement with Huawei for rolling out 5G networks.¹¹⁶ 5G rollout has so far focused on home Wi-Fi and commercial uses, as individual use is limited by lack of availability and affordability of 5G smartphones.¹¹⁷

Besides publicly funded and private solutions, Kenya is also experimenting with non-commercial networks such as community networks. Community networks are small scale non-profit locally owned infrastructures for provision of Internet that are modeled as cooperatives or social enterprises.¹¹⁸ In 2021, the Communications Authority approved a community network license that supports small locally owned ISPs in rural and

109. Communications Authority, "Authority Fines Telcos Over Ksh. 300m for Poor Quality Services", Communications Authority of Kenya January 12, 2018, available at: www.ca.go.ke.

110. Kenya Information and Communications (Universal Access and Service) Regulations, 2010.

111. Communications Authority, *Communications Authority Universal Access Projects*, 2022.

112. Kenya News Agency, "67 Court Stations to Benefit from NOFBI Internet Connectivity", *KBC*, July 16, 2022.

113. Presidential Strategic Communications Unit (PSCU), "Kenya Approves Roll out of Google Loon 4G to Mitigate Coronavirus Work Disruptions", March 23, 2021, available at: www.president.go.ke.

114. B. Ambani, "Safaricom Boosted by Prime Spectrum for 5G Rollout", *Business Daily*, May 9, 2022.

115. O. Oyugi, "Airtel Pumps Sh4.7b into 4G Network Expansion, Eyes 5G", *The Standard*, July 25, 2022.

116. M. Pham, "Kenya Inks 5G Deal with Huawei", *Developing Telecoms*, June 27, 2022, available at: <https://developingtelecoms.com>.

117. F. Ngila, "Kenya Has 5G Now. But Who Can Afford It?", *Quartz*, November 3, 2022.

118. Association for Progressive Computing (APC), *Community Networks: A People - and Environment-Centred Approach to Connectivity*, 2020.

underserved areas.¹¹⁹ This added Kenya to a handful of countries that have introduced an alternative licensing framework for non-commercial uses.¹²⁰

Finally, Kenya is a hub for Africa's international connectivity, due to its location as a landing country for many submarine cables. In 2022, the Pakistan & East Africa Connecting Europe (PEACE) cable landed in Mombasa.¹²¹ The cable's main investor and operator is PEACE Cable International Network, a subsidiary of Chinese company Hengtong Group, and supplied by HMN Tech (formerly Huawei Marine). Its construction created geopolitical tensions as the traditional U.S. allies partnered with China.¹²² PEACE Cable's Kenyan partner is state-owned Telkom Kenya. The 15,000 km cable connects Asia, Europe and Africa and is the sixth submarine cable to land in Kenya.¹²³

Bilateral and Multilateral Links in the Digital Domain

Traditionally, Kenya has partnered with the West in its development policies. Present digital development can be attributed to market liberalization in the late 1990s as well as U.S. and EU inspired regulation of competition, cybercrime, innovation and data protection.¹²⁴

In recent years, however, Kenya has been pursuing the Chinese model of state-led digital transformation and has partnered with the Chinese government and companies for financing and supplying infrastructures, such as submarine cables, clouds, and 5G networks. In addition, China's philosophy of social control has permeated the government's digitalization projects, where for example, the digital ID aspires to create a centralized database that can provide a "single source of truth" on personal identity.¹²⁵ Similar to systems in China, Kenya's digital ID system envisages tracking each person's transactions with the government from birth to death through a unique personal identifier.¹²⁶

119. Communications Authority, "Draft Licensing and Shared Spectrum Framework for Community Networks in Kenya", *Draft framework*, 2021.

120. Community Networks Wiki, *Policy and Regulation for Community Networks*, 2022.

121. PEACE, "PEACE Cable and Telkom Land New Submarine Cable in Kenya", *PEACE Cable*, April 12, 2022, available at: www.peacecable.net.

122. H. Fouquet, "China's 7,500-Mile Undersea Cable to Europe Fuels Internet Feud", *Bloomberg* March 5, 2021.

123. It was preceded by sea-cables Djibouti Africa Regional Express (DARE1), SEACOM, The East African Marine System (TEAMS), Eastern Africa Submarine Cable System (EASSy) and Lower Indian Ocean Network (LION II).

124. B. Ndemo and T. Weiss (eds), *Digital Kenya: An Entrepreneurial Revolution in the Making*, London: Palgrave Macmillan, 2017.

125. Registration of Persons Act, 1947, sec. 9A.

126. R. Creemers, "China's Social Credit System: An Evolving Practice of Control", *SSRN Electronic Journal*, 2018; X. Dai, "Toward a Reputation State: The Social Credit System Project of China" in Oliver Everling (ed), *Social Credit Rating: Reputation und Vertrauen beurteilen*, Springer Gabler, 2018.

Growing Chinese influence in Kenya has prompted renewed interest from Western states. The U.S. for example is negotiating a trade agreement with many digital aspects, including data trade and e-commerce while EU countries are supporting digital policies.¹²⁷ U.S. technology companies are also aligning their programs to Kenya's development goals, for example setting up development centers in the country.¹²⁸ U.S. and EU member state development agencies are also providing technical support on digital transformation, while the European Commission is mobilizing over €300 billion for post Covid-19 investments under the Global Gateway Initiative.¹²⁹ In December 2022, the U.S. convened a summit with 49 African leaders where a new initiative on digital transformation in Africa was announced.¹³⁰ Prior to that, the EU-U.S. Trade and Technology Council (TTC) announced a joint initiative to support last mile connectivity in Kenya.¹³¹ These developments could counter Chinese investments since they connect to other parts of the digital economy such as innovation and human resource development.

Besides external influence, Kenya actively participates in regional and multilateral digital policy development processes. It was among African countries opposed to a minimum global tax for technology corporations, preferring instead to charge digital service tax (DST).¹³² DST is charged to technology firms transacting in Kenya, even when they do not have a physical presence. As a member of the East African Community (EAC), Kenya promotes regional digital integration, for example through the Regional Electronic Cargo and Driver Tracking System (RECDTS). The country champions digitalization initiatives in the African Union such as SmartAfrica and the African Union's Africa Digital Content and Innovation Program. Kenya is also a signatory of the African Continental Free Trade Area (AfCFTA) agreement, which leverages on digitalization for free trade and has e-commerce provisions.

127. USTR, "United States and Kenya Announce the Launch of the U.S.-Kenya Strategic Trade and Investment Partnership", July 14, 2022, available at: www.ustr.gov.

128. See for example Microsoft News Center, "Furthering Our Investment in Africa: Microsoft Opens First Africa Development Centre in Kenya and Nigeria" May 13, 2019, available at: www.news.microsoft.com; A. Njanja, "Google Opens First Innovation Hub in Africa", *TechCrunch* April 19, 2022; A. Kitimo, "Visa Opens Nairobi Innovation Hub, the First in Africa", *The East African*, April 7, 2022.

129. European Commission, "Global Gateway: up to €300 billion for the European Union's strategy to boost sustainable links around the world", December 1, 2021, available at: www.ec.europa.eu. See also, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), *Kenya Programmes 2022*; R. Chirchir and V. Barca, "Building an Integrated and Digital Social Protection Information System", Technical Paper, GIZ, 2020; United States Agency for International Development (USAID), *Identity in a Digital Age: Infrastructure for Inclusive Development*, 2017.

130. The White House, "Fact Sheet: New Initiative on Digital Transformation with Africa (DTA)", *The White House*, December 14, 2022, available at: www.whitehouse.gov.

131. European Commission, "EU-U.S. Joint Statement of the Trade and Technology Council", *European Commission*, December 5, 2022, available at: www.ec.europa.eu.

132. Organisation for Economic Co-operation and Development (OECD), "International community Strikes a Ground-Breaking Tax Deal For The Digital Age", October 8, 2021, available at: www.oecd.org.

Nigeria: A Rising Digital Power

Babatunde Okunoye

Nigeria emerged as Africa's biggest economy, overtaking South Africa, after an economic rebasing exercise done in 2014. The technology and digital sector was an important contributor to this rebased Gross Domestic Product (GDP), contributing as much as 25%.¹³³ In 2020, the technology sector was a sizeable 15% of GDP, the second largest contributor after agriculture. Also, between 2016 and 2019, Nigeria's technology sector grew at an impressive rate of 18%.¹³⁴ After decades of mostly military rule in the country since its independence in 1960 from the British, in 1999, democratic governance returned to Nigeria. It has impacted the digital sector through the participatory and inclusive development of technology policies which democracy permitted to a greater degree than in the previous military regimes. Some of these policies include the National Digital Economy Policy and Strategy (2020-2030)¹³⁵ and the National Broadband Plan (2020-2025).¹³⁶ Nigeria can be described as a rising digital power, given its growing relevance within the global digital policy space. Illustratively, Nigeria was recently re-elected to the International Telecommunications Union (ITU) council for 2023-2026.¹³⁷

Technology and Digital Innovation Ecosystems

Nigeria's technology and digital innovation ecosystem consists of a number of innovative companies and start-ups in different sectors of the economy. Some of the most innovative technology companies in Nigeria are in the financial technology (fintech), e-commerce, and services sectors. They include Kuda, a digital bank; Andela, a digital skills training hub; Jobberman, an online job portal; Wakanow, an online flight booking platform; Jumia, an e-commerce hub; IrokoTV, a video streaming service; and digital payment platforms such as Flutterwave, Paystack, Opay, Interswitch and Paga.

There has been limited domestic and state investment, but these companies have benefited from international investment in their bid for growth. Indeed, the Nigerian tech market is more attractive than other West

133. "Step Change", *The Economist*, April 12, 2014.

134. *Ibid.*

135. Federal Ministry of Communications and Digital Economy, "National Digital Economy Policy and Strategy 2020 – 2030", November 2019, available at: www.ncc.gov.ng.

136. Federal Ministry of Communications and Digital Economy, "Nigerian National Broadband Plan 2020 – 2025", available at: www.ncc.gov.ng.

137. G. Elimian, "Nigeria Re-Elected as ITU Council Member till 2026", *Technext*, October 4, 2022, available at: www.technext.ng.

African markets largely because of its population and large GDP. For these reasons, Nigeria, Kenya, South Africa and Egypt alone account for 92% of investment in the technology sector in Africa¹³⁸. For example, Kuda raised \$10 million (about €9.4 million) in the seed stage in 2020.¹³⁹ In 2012, IrokoTV received an \$8 million (about €7.5 million) investment from Tiger Global, an investment firm. In August 2021, SoftBank of Japan and Sequoia Capital of China made a \$400 million (about €375 million) investment in OPay, a Lagos-based mobile money company¹⁴⁰. In October 2020, Paystack was acquired by U.S. technology company Stripe for \$200 million (about €188 million)¹⁴¹ while in March 2021, Flutterwave received \$170 million (about €159 million) in funding, attaining a \$1 billion (about €0.94 billion) valuation¹⁴². Pertinent to these successes are the roles of technology incubation hubs like Wennovation Hub¹⁴³ and Co-Creation Hub,¹⁴⁴ which have helped these companies grow from small start-ups before receiving tranches of investment and growing to become unicorns and larger firms.

Regulatory efforts targeted at Nigeria's budding technology sector are relatively new. The sector has largely escaped the regulatory attention of the government, which only became fully aware of the sector's potential in the past five years. However, some analysts see the recent regulatory efforts of the government as simply a means to rein in the independence of the elite in the sector, who operate without servicing systems of political patronage.¹⁴⁵ Generally, Nigeria's Corporate Affairs Commission (CAC) oversees regulatory efforts of companies in Nigeria. Also involved in this regulatory effort by the Nigerian government is the National Information Technology Development Agency (NITDA)¹⁴⁶, which had hitherto been an agency of government providing advisory and funding services to the technology sector.

Created in 2001, NITDA implements the nation's IT policy and coordinates IT development in the country, empowered by the NITDA Act of 2007. It is run by a Director General appointed by the government¹⁴⁷. However, the NITDA Amendment Bill, if passed into law, will enable it to

¹³⁸ A. Dushime, "These Four Countries Are Leading Africa's Start-Up Scene – Here's Why", *World Economic Forum*, August 24, 2022, available at: www.weforum.org.

¹³⁹ I. Lunden, "Nigeria's Kuda Raises \$10M to Be the Mobile-First Challenger Bank For Africa", *TechCrunch*, November 10, 2020, available at: www.techcrunch.com.

¹⁴⁰ A. Idris, "The World's Biggest VCs Are Now Vying for Stakes in Nigeria's Tech Sector", *Rest of World*, September 14, 2021, available at: www.restofworld.org.

¹⁴¹ I. Lunden, "Stripe Acquires Nigeria's Paystack for \$200M+ to Expand into The African Continent", *TechCrunch*, October 5, 2020, available at: www.techcrunch.com.

¹⁴² E. Paul, "Flutterwave Becomes a Unicorn, Raises \$170m at Over \$1 Billion Valuation", *Techpoint.africa*, March 10, 2021, available at: www.techpoint.africa.

¹⁴³ Wennovation Hub, official website, 2023, www.wenovationhub.org.

¹⁴⁴ Co-Creation Hub, official website, 2023, www.cchubnigeria.com.

¹⁴⁵ C. B. Ukonne, "Nigeria's War on Tech", *African Arguments*, October 6, 2021, available at: www.africanarguments.org.

¹⁴⁶ National Information Technology Development Agency (NITDA), official website, 2023, www.nitda.gov.ng.

¹⁴⁷ *Ibid.*

reposition itself as a regulator within the technology sector, giving it the power to license and tax companies.¹⁴⁸ The bill empowers NITDA to impose a 1% levy on companies with revenues, exceeding approximately N100 million (about € 208,800), which is to be channeled to the agency's development fund. Defaulters risk a fine of N30 million (about €62,640) or imprisonment.¹⁴⁹

Nigeria's Start-up Act is another¹⁵⁰ important emerging route for regulation for the technology sector. The Act is a joint effort between the government, private sector organizations and numerous other volunteers. It aims to help realize the potential of Nigeria's digital economy by making sure that the relevant laws and regulations are clear and friendly toward the technology sector.

Data Policy

Nigeria has an extensive data policy ecosystem. Nigeria's data protection legal texts include section 37 of the 1999 Constitution¹⁵¹ (amended) which protects the privacy of Nigerians, their homes, correspondence, telephone conversations, and telegraphic communications. However, for these constitutional provisions in section 37 to be effective, they need to be followed up by corresponding national legislation on data protection. This has not been done; hence the coverage and pertinence of its provisions are unclear.

Nigeria has been in the process of drafting this needed corresponding national legislation covering data protection for many years. This effort has seen the drafting of several versions of a data protection/privacy bill between 2008 and 2019¹⁵², none of which became an Act due to a lack of consensus among the policy stakeholders. The release of the European Union's (EU) General Data Protection Regulation (GDPR) has influenced¹⁵³ and shaped subsequent data protection regulatory attempts in Nigeria. A data protection bill 2020 made significant progress and seemed likely to become Nigeria's substantive data protection legislation, only to be again relegated by the commencement of a fresh process towards a new data protection bill.¹⁵⁴ As of January 2023, this new bill has not yet passed into law.

148. A. Idris, "Nigeria's Regulatory Clampdown Is Rattling Startups", *Rest of World*, August 20, 2021, available at: www.restofworld.org.

149. E. Kanife, "An Enemy of Progress'- Nigerian Tech Community Slam 'Wicked' NITDA Bill", *Technext*, August 17, 2021, available at: www.technext.ng.

150. Nigeria Startup Act, official website, available at: www.startupbill.ng.

151. Constitution of the Federal Republic of Nigeria, 1999, available at: www.nigeria-law.org.

152. Paradigm Initiative, *The Legislative Journey towards a Comprehensive Data Protection Framework in Nigeria*, 2022.

153. "How European Union's GDPR Influenced Data Privacy Law in Africa", *Regtech Africa*, June 3, 2022, available at: www.regtechafrika.com.

154. T. Omoniyi, "Data Protection: Indignation as FG Abandons Draft Bill, Seeks 'Consultants' for Fresh Process", *Premium Times*, November 17, 2021, available at: www.premiumtimesng.com.

In the absence of a data protection law in Nigeria, several legislations with sector-specific coverage such as the Credit Reporting Act, Freedom of Information Act, Child's Right Act, and the Cybercrimes Act hold sway in the regulatory space.¹⁵⁵ Regulations by Federal government agencies are also important privacy regulatory instruments. These include the Nigerian Communications Commission Regulations, the Central Bank's Consumer Framework, and the Nigeria Data Protection Regulation enacted by NITDA – with new ambitions of regulating Nigeria's booming technology sector.

The passage of the data protection law in Nigeria is expected to also herald the establishment of a data protection commission and commissioner, both of which have been included in previous data protection bill drafts. In the meantime, civil society organizations who have championed data protection rights have denounced the fact that the government's control over people's data is near total; they have insisted that digital/data rights in the country have been in decline since around 2015.¹⁵⁶ A notable case involved a coalition of civil society organizations which in January 2019 challenged the National Identity Management Commission (NIMC) in the Federal High Court.¹⁵⁷ The case revealed that the level of data protection of the national identity management system was grossly insufficient. Also, before the conclusion of the case, the Nigerian Data Protection Regulation (NDPR) had been passed, but civil society organizations insist that the Regulation, enacted by a government agency, cannot replace a data protection legislation enacted and backed by the national legislature.

The awareness among civil society that the government's control over people's data and Internet content is near total was heightened when the government in June 2021 blocked access to Twitter¹⁵⁸ in the country in the aftermath of the #EndSARS protests against police violence, forcing millions of Nigerians to use Virtual Private Networks (VPNs) to access the microblogging service. The intent of the government to rein in social media use in the country seems clear with ongoing planned regulations, such as plans to enforce intermediary liability on Internet platforms, which potentially leads to self-censorship by users of such platforms.¹⁵⁹

Digital Infrastructure

Nigeria's digital infrastructure has undergone significant development since 2001, when the government liberalized the telecommunications sector. This led to the entry of mobile telecommunications companies into the country

¹⁵⁵. Paradigm Initiative, "Digital Rights and Privacy in Nigeria", July 2020.

¹⁵⁶. Freedom House, *Freedom on the Net Report: Nigeria, 2022*.

¹⁵⁷. NIMC's Unstructured Supplementary Service Data (USSD) delivered through mobile phones revealed the National Identity Number (NIN) of Nigerians without adequate privacy protections, using only surnames and date of birth information as inputs, available at: www.ng.andersen.com.

¹⁵⁸. N. Princewill and S. Busari, "Nigeria Bans Twitter after Company Deletes President Buhari's Tweet", *CNN*, June 5, 2021, available at: www.cnn.com.

which greatly speeded up digital development,¹⁶⁰ and to a significant change in digital access. For example, mobile subscriptions in 2000 represented a mere 0.02% of the population, while in 2020 it reached 99.7%.¹⁶¹ Similarly, Internet penetration has risen from 0.06% in 2000 to 35.5% in 2020,¹⁶² which mirrors the general increase in Internet adoption in Africa.

As of 2021, the percentage of the Nigerian population covered by at least a 3G mobile network was 85%,¹⁶³ while 62% had access to at least a 4G mobile network and the percentage of active mobile-broadband subscriptions was 37%. Fixed broadband penetration is 0.03% and thus negligible: broadband and Internet connection in Nigeria occur predominantly through mobile. The main telecom providers include MTN, Airtel and Glo mobile, Visafone and 9Mobile (GSM); MTN, Glo, ipNX and 21st century (Fixed wired); and Smile and NTEL (VoIP).¹⁶⁴ Nigeria held 5G trials in 6 locations across the country in November 2019¹⁶⁵ and selected operators such as MTN (the largest mobile operator) commenced 5G services in August 2022.¹⁶⁶ The Chinese government-backed telecommunications companies like Huawei and ZTE are responsible for constructing major parts of Nigeria's broadband network (4G, LTE and 5G).¹⁶⁷ It is estimated that up to 70% of Africa's 4G infrastructure has been built by Chinese companies.¹⁶⁸ Given its location, Nigeria is a hub for international submarine cable. There are six cables with a capacity of at least over 40 Terabits per second landing in Nigeria, although it is estimated that as of 2019 Nigeria has only used 10% of this capacity,¹⁶⁹ due largely to policy hurdles such as "Right-of-Way" charges involved in extending this capacity inland. These submarine cables include Equiano Cable System by Google/West Indian Ocean Cable Company (WIOCC), SAT-3 Cable, MainOne Cable, Glo1 Cable, Africa Coast to Europe (ACE) Cable, West Africa Cable System (WACS) Cable by MTN.¹⁷⁰

160. A. Adepetun, "MTN's Role in 20 Years of Nigeria's Telecoms Revolution", *The Guardian*, October 6, 2021, available at: www.guardian.ng.

161. International Telecommunication Union, "Statistics: Individuals Using the Internet", 2023, available at: www.itu.int.

162. *Ibid.*

163. International Telecommunication Union, "Digital Development Dashboard: An Overview of the State of Digital Development Around the World Based on ITU Data – Nigeria", available at: www.itu.int.

164. Nigerian Communications Commission (NCC), "Industry Statistics", January 20, 2023, www.ncc.gov.ng.

165. Nigerian Communications Commission (NCC), *National Policy on Fifth Generation (5G) Networks for Nigeria's Digital Economy*, 2021.

166. J. Barton, "Nigeria Sets August Deadline for 5G Launches", *Developing Telecoms*, May 5, 2022, available at: www.developingtelecoms.com.

167. London School of Economics and Political Science (LSE), *Assessing China's Digital Silk Road: Huawei's Engagement in Nigeria*, 2021

168. B. Jili, "The Spread of Surveillance Technology in Africa Stirs Security Concerns", *Africa Center for Strategic Studies*, December 11, 2020, available at: www.africacenter.org

169. Submarine Cable Networks, "Cable Landing Stations in Nigeria", 2022, www.submarinenetworks.com.

170. L. Ajanaku, "Nigeria's Sea of 'Redundant' Submarine Cables", *The Nation*, April 26, 2022, available at: www.thenationonlineng.net

Bilateral and Multilateral Links in the Digital Domain

The European Union

Nigeria has significant links with the European Union (EU) in the digital domain. Under its Global Gateway initiative (EU-Nigeria Digital Economy Package 2021-2024),¹⁷¹ the EU has planned an €820 million investment in Nigeria's digital transformation strategy. This investment is a combination of €160 million in grants and €660 million in loans. As regards digital infrastructure investments, the EU will support building the fiber optic cables and data centers needed to improve Nigerian's access to high-speed connectivity. The European Investment Bank will invest €100 million to expand secure 4G connectivity in Lagos and Ogun states in Southwest Nigeria and triple national data capacity. This investment also includes the digitalization of public services, where the EU will support the digitalization of Nigeria's administration to allow accessible public services to citizens. The European Investment Bank is also investing €250 million to strengthen Nigeria's digital identity infrastructure with the highest data protection standards. This partnership also includes Digital entrepreneurship, where the EU will support the creation and scaling up of tech start-ups and boost innovative solutions for Nigeria's society and economy. Furthermore, through a €9.5 million grant to the Nigeria Innovation Programme, the package will promote innovation-friendly ecosystems and new digital solutions.

The EU investment also introduces a digital skills theme, where the EU will support the development of the critical skills needed for Nigerians to succeed in the digital economy, with a focus on youth and women. Also, as part of a €44 million grant to the Nigeria Jubilee Fellowship Program, the EU will support on-the-job training for young Nigerians in the ICT sector. Lastly, the investment will advance a digital governance theme, where the EU will support the development of regulatory frameworks with the highest standards of privacy, safety, and cybersecurity, while promoting an open Internet and digital market that upholds citizens' rights. The EU also plans to engage in policy dialogue and set up a dedicated €2 million technical assistance facility to share expertise and build up administrative capacity.

China

Nigeria also has strong bilateral links with China in the digital domain under the umbrella of its Belt and Road Initiative (BRI). The implementation of China's BRI strategy in Africa has involved the building of infrastructure projects such as roads, rail, dams, and ports in a bid to expand its influence and enhance economic cooperation. As we have

¹⁷¹ European Union, "Global Gateway, the EU-Nigeria Digital Economy Package (2021-2024)", February 2022, available at: www.ec.europa.eu

mentioned, it has also added ICT infrastructure to these portfolios, by building and investing in telecommunications infrastructure across the continent¹⁷².

China has also invested in Nigeria's space sector. China Great Wall Industry Corporation, owned by the Chinese state, manufactured, and launched the NigComSat-1 communications satellite, having won a \$311 million (about €292 million) contract from the Nigerian government in 2005. The satellite was launched in May 2007, but it is no longer in operation. NigComSat-1R, also developed by China, replaced NigComSat-1 in orbit.¹⁷³ Subsequently, China EXIM Bank made a \$550 million (about €516 million) equity investment in NIGCOMSAT, the satellite communications company owned by the Nigerian government.¹⁷⁴

In addition, Huawei is an important partner in building smart cities and e-government applications in an attempt to improve government public services in the country. It is exploring a partnership with the Lagos state government (Nigeria's commercial center) in this regard.¹⁷⁵ The Nigerian government also had a meeting in 2021 with the Cyberspace Administration of China to discuss plans to build an Internet firewall¹⁷⁶ in an apparent slide toward importing the Chinese model of digital authoritarianism. Previously, the government had blocked access to Twitter in the country, following the social media company's blocking of the Twitter account of the President.

United States and Other Actors at the Multilateral Level

In addition to the partnerships mentioned above, Nigeria also has links with the United Kingdom in the digital domain, through the Foreign, Commonwealth, and Development Office's (FCDO) Digital Access Program.¹⁷⁷ The United Kingdom's FCDO also supports Nigeria's Cybersecurity Capacity building.¹⁷⁸

172. A. Hruby, "Africa's Digital Infrastructure Is the Next Playing Field for Great-Power Competition", *Atlantic Council*, November 29, 2021, available at: www.atlanticcouncil.org.

173. Nigeria also has an Earth observation satellite in operation, NigeriaSat-2, which is used for communications and earth observation – this time built by the UK-based Surrey Satellite Technology Limited. S. Oyewole, "One of Nigeria's Satellites Is on Its Last Legs: Why This Is Worrying", *The Conversation*, August 4, 2021, available at: www.theconversation.com.

174. N. Hungerland and K. Chan, "Assessing China's Digital Silk Road: Huawei's Engagement in Nigeria", *LSE Working Paper Series*, 2021.

175. O. Olasunkanmi, "Chinese Tech Firms Show Interest in Lagos Smart-City Project", *Lagos State Government Official Website*, November 22, 2019, available at: www.lagosstate.gov.ng.

176. E. Olander, "Report: Nigerian Government in Contact With Chinese Cyber Authorities Over How to Build New Internet Firewall", *China Global South Project*, June 7, 2021, available at: www.chinaglobalsouth.com.

177. Foreign, Commonwealth and Development Office (FCDO), "Digital Access Program", October 2022, available at: www.devtracker.fcd.gov.uk.

178. HM Government, "UK Pledges £22 Million to Support Cyber Capacity Building in Vulnerable Countries", *Gov.UK*, May 2021, available at: www.gov.uk.

When it comes to the U.S., Nigeria's links with the United States in the digital domain seems private sector driven, such as with Microsoft.¹⁷⁹

At the multilateral level, in 2021, Nigeria also joined the Digital Cooperation Organization (DCO)¹⁸⁰, an alliance of Saudi Arabia, Jordan, Oman, Pakistan, Kuwait, and Bahrain geared toward digital cooperation in digital inclusion, fintech, and artificial intelligence. For example, in May 2022, the DCO entered a partnership with the GSMA Association (the international mobile telecommunications industry association) to expand access to telecommunications technologies, creating skill acquisition programs for youth and entrepreneurs, providing DCO member states with access to the GSMA's capacity building online learning portal, and providing training and resources to policymakers and regulators of the DCO member states.¹⁸¹ Nigeria also participates in international digital policy forums in the African Union, United Nations, International Telecommunications Union (ITU) for standards setting and policy shaping activities, where it is considered among the leading countries on the continent.

179. Microsoft, "Enabling a Digital Nigeria", *Microsoft.com*, 2020, available at: www.microsoft.com.

180. Geneva Internet Platform DigWatch, *Nigeria Joins a Digital Cooperation Framework of Six Middle Eastern Countries*, 2021.

181. A. Geronimo, "Digital Cooperation Organisation, stc and GSMA to "create digital prosperity for all"" , *ITP.net*, May 18, 2022, available at: www.itp.net.

Established Technological Powers: Necessary Transformations

Israel: Still a “Start-up Nation”

Erez Maggor

Israel prides itself on being the “start-up nation”¹⁸² and its thriving high-tech economy is often referred to as “the new Silicon Valley”.¹⁸³ Indeed, Israel ranks seventh in Bloomberg’s 2021 “most innovative countries” index, placing first in the world for both per capita investment in research and development (R&D) and researcher concentration.¹⁸⁴ Altogether, the high-tech sector is responsible for more than 15% of Israel’s total GDP and more than 50% of Israel’s exports. Its workforce consists of 334,000 employees, representing almost 10% of the entire employed population—the highest rate in the OECD and more than double the OECD country average.¹⁸⁵ This chapter presents the key features of Israel’s innovation ecosystem, outlines current government innovation programs, key regulations, data policy, digital infrastructure, and international links. As we demonstrate, Israel’s innovation ecosystem was and remains an outcome of its “entrepreneurial state”¹⁸⁶ with public policy guiding the direction of technological development. In many respects, Israel’s ability to remain a world-leading digital power depends on the state’s continuous initiative and support of the private sector.

182. S. Dan and S. Singer, *Start-up Nation: The Story of Israel's Economic Miracle*, Toronto: McClelland & Stewart, 2009.

183. E. Bino, “Is Israel The Next Silicon Valley?”, *Forbes*, October 21, 2021, available at: www.forbes.com.

184. M. Jamrisko, W. Lu, and A. Tanzi, “South Korea Leads World in Innovation as U.S. Exits Top Ten”, *Bloomberg.com*, February 3, 2021, available at: www.bloomberg.com.

185. Israel Innovation Authority (IIA, hereafter), “Innovation Report”, 2022.

186. M. Mazzucato, *The Entrepreneurial State: Debunking Public vs. Private Sector Myths*, London: Anthem Press, 2013.

Technology and Digital Innovation Ecosystems

Background and Main National Players

Israel's high-tech ecosystem is highly developed and diverse. It is a hothouse for startup activity with the largest number of startups per capita in the world. More recently, Israel has also succeeded in creating high-growth companies—firms whose number of employees increased by more than 20% for three consecutive years.¹⁸⁷ The number of high-growth companies in the high-tech sector has almost doubled in size over the past decade, from 172 in 2010 to 322 in 2018, the number of workers employed by these companies increased from 23,000 to 70,000, and sales rose from €3 billion to €16 billion.¹⁸⁸ Israel is also home to over 350 foreign multinational corporations (MNCs), a large majority of which are innovation centers. Israel's high-tech industry is complemented by a prospering venture capital (VC) sector that outperforms any other country in VC volume per capita. The state's leading technological sectors have changed throughout the years. In the early 1990s, Israel was a leader in information-communication technologies (ICT), electronics, electro-optics, and military technologies. In recent decades, however, the industry's focus on high-tech manufacturing has shifted towards high-tech services, with enterprise software, fin-tech, and cyber-technology leading the way.¹⁸⁹

Although Israel is often celebrated for its entrepreneurial culture and innovative private sector, the emergence and ongoing success of the high-tech sector would not have been possible without continuous government initiative and support.¹⁹⁰ As early as 1971, Israel founded the Chief Scientist Office (currently Israel's Innovation Authority, IIA) — a state agency responsible for designing and implementing a variety of original innovation policies which provided crucial early investments, network building, and the infrastructure necessary for Israel's high-tech sector to thrive. Its key programs have included the R&D Fund, which offers matching R&D grants; the “Yozma” program, a state-owned VC fund responsible for spawning Israel's VC sector; and the Technology Incubator program which provides government funding of up to 85% of an early-stage project. Even though the industry relies far less on direct public funding than in the past, state policies continue to guide the industry. A good example is Israel's National Cyber Directorate (INCD). Founded in 2010, the INCD is responsible for the design

187. This follows the accepted definition of the OECD and EuroStat for high-growth companies.

188. IIA, *Innovation Report*, 2019.

189. IIA, *Innovation Report*, 2022.

190. D. Breznitz, *Innovation and the State: Political Choice and Strategies for Growth in Israel, Taiwan, and Ireland*, New Haven: Yale University Press, 2007; E. Maggor, “The Politics of Innovation Policy: Building Israel's “Neo-Developmental” State”, *Politics & Society* Vol. 49, No. 4, 2021, pp. 451-87.

and formulation of policies geared towards fostering the cyber industry.¹⁹¹ Although Israel continues to lead the world in R&D investment as a percentage of GDP, the level of state funding for innovation in Israel is lower compared to other countries. Indeed, in recent decades, there has been a continuous decline in the level of state expenditure on R&D out of total investments, from 25% at the beginning of the 1990s to less than 2% today.¹⁹² This fact is the combined outcome of the outstanding success of government incentives in mobilizing additional private investment in both the high-tech and the VC sectors, and the ongoing erosion of the IIA budget. A large fraction of the private funding of the sector originates from outside of Israel. Almost 50% of R&D investment in Israel is funded by foreign investors, the majority of which originate from the U.S., while almost 95% of the venture capital invested in Israeli firms is foreign.¹⁹³

Current Government-Led Investment Programs

In early 2022, Israel adopted recommendations of an inter-government committee that identified FoodTech, renewable energy, energy storage, bio-convergence (which combines engineering and biology), and space and ocean technologies as future growth industries which will receive significant investment over the next five years. The committee also recommended continuing state support of Artificial Intelligence (AI) and quantum computing, which were targeted in a previous government decision.¹⁹⁴ To promote these sectors, the state will take on the responsibility of coordinating between various public actors involved in each sector, while also allocating most of the R&D grants funded by the Ministry of Innovation and Science to these selected sectors. Indeed, a look at the allotment of Innovation Authority funds shows that while the private sector provides the lion's share of funding to more established sectors such as software and cyber-security, the public sector is still the one funding the more high-risk sectors that offer more long-term public rewards, such as Digital Health, AgTech, FoodTech, and renewable energy. These segments are less popular in the private sector, despite their potential to significantly contribute to society and for becoming the next technology trend.¹⁹⁵

One sector that has already enjoyed some early success is AI. In 2019, the IIA provided grants to 219 firms for a total sum of roughly €111 million. These grants were mostly provided for groundbreaking AI technologies and AI infrastructure projects. This public investment has helped fuel private investment. From 2011-2019, investments in Israeli high-tech AI projects

191. E. Matania and A. Rapaport, *Cybermania- How Israel Became a Global Powerhouse in The Domain that Is Revolutionizing the Future of Humanity*, Cybertech-Arrowmedia, 2022.

192. IIA, "Innovation Report", 2021.

193. D. Breznitz, "What Silicon Valley Gets Wrong about Innovation", *Boston Review*, October 21, 2021, available at: www.bostonreview.net.

194. R. Ben-David, "Food, Energy, Space Tech in top 5 of Israel's New National R&D Priorities", *The Times of Israel*, September 8, 2022, available at: www.timesofisrael.com.

195. IIA, "Innovation Report", 2019.

increased by a factor of 12.5, from €290 million to €3.8 billion. As a result, Israel is now among the world's top three countries operating in the field of AI, following China and the U.S.¹⁹⁶ It also ranks high in the number of companies that develop infrastructure technologies for AI, such as special-purpose chips, infrastructure algorithms, and complex systems for the acceleration of computing.¹⁹⁷ Despite the rapid growth of Israel's AI industry, in 2019, the IIA identified various obstacles that can slow future growth in the field. These include a shortage of human capital, limited access to public and government databases, inadequate supercomputing infrastructure, inadequate regulation, and a lack of ethical guidelines.¹⁹⁸ The IIA, together with partners in government and industry, has worked to address these challenges. For example, Israeli academia has responded to the increasing demand for skilled AI professionals and, in 2018, launched the National Program for the Advancement of Data Science in Higher Education. The IIA is also working on non-academic training programs to provide alternative career paths in AI, such as coding boot camps. Finally, to advance regulation that supports the further development of the AI sector, toward the end of 2022, Israel's Ministry of Innovation, Science and Technology, and the Ministry of Justice, published a comprehensive regulatory and ethics policy document in the field of AI. While the document is non-binding, its guidelines serve as a blueprint for a future regulatory infrastructure for the development and implementation of AI technologies in Israel.¹⁹⁹

Market Regulation and FDI Screening Tools

Until very recently, Israel did not have any general unified foreign direct investment (FDI) legislation. However, on October 2019, a Ministerial Committee on National Security Affairs (the State Security Cabinet) adopted Resolution B\372 which called to establish a process and mechanism for evaluating national security aspects of foreign investments in Israel. As a result, an Advisory Committee, headed by the Chief Economist at the Ministry of Finance, was formed. The committee's role is to advise regulators responsible for approving foreign investments about national security aspects pertaining to the approval of such investments.²⁰⁰ Originally, approaching the committee was voluntary. Recent amendments, due largely to continuous and growing pressure from Washington,²⁰¹ have outlined specific sectors which are required to receive the committee's approval.

196. DAIN Studios, "Global AI Landscape by Asgard", June 11, 2018, available at: www.dainstudios.com.

197. IIA, "Innovation Report", 2019.

198. *Ibid.*

199. Ministry of Science and Technology, "For The First Time In Israel: The Principles Of The Policy For The Responsible Development Of The Field Of Artificial Intelligence Were Published For Public Comment", November 17, 2022, available at: www.gov.il.

200. The Chief Economist, "The Advisory Committee for Evaluating National Security Aspects of Foreign Investments", January 23, 2020, available at: www.gov.il.

201. S. Mathews, "U.S.-China Tensions Cloud Israel free Trade Deal", *Middle East Eye*, October 10, 2022, available at: www.middleeasteye.net.

The list of sectors in which government approval for foreign investment will be required from now on has not yet been finalized. However, it is expected to include energy, water, transportation, and communication as well as investments in the financial sector (banking or institutional entities). For the time being, the mechanism does not apply to investments in high-tech, yet this issue is still being negotiated between Israel and the U.S. (cf. infra).²⁰² The updated regulations have also lowered the threshold for defining foreign control over a company from 25% to 20%, and, in “special cases” (which have remained ambiguous) the threshold was lowered to 5%. Furthermore, the authority of the committee was extended to the review of government tenders, when there is a foreign entity involved.²⁰³

Data Policy

Data Protection in Israel is governed primarily by the Protection of Privacy Law and enforced by the Ministry of Justice’s Privacy Protection Authority (PPA).²⁰⁴ The Privacy Law covers the collection and use of personal data and sensitive data, sets the rights and obligations of the parties collecting and using the data, including security requirements, and sets the rights afforded to individuals whose data is collected and used. In recent years, efforts have been made to bring Israeli law in line with the GDPR. In early 2022, a bill was introduced, proposing several significant changes to the existing Privacy Law. The motivation for this legislation is to maintain EU recognition of Israel as an adequate country that Israel received in 2011. The main elements of the bill are streamlining key definitions, introducing a requirement to appoint a data privacy officer (DPO), and granting wider enforcement powers to the PPA. The bill also moves toward the GDPR data protection approach and would limit the current requirement, widely viewed as unduly onerous and outdated, to register almost all databases. The final and perhaps most significant change is the expansion of the powers of the PPA to enforce compliance and prosecute privacy violations. These include a long list of investigatory and punitive powers that are far beyond the PPA’s current powers.²⁰⁵

Digital Infrastructure

Paradoxically, while Israeli technology companies are at the forefront of global innovation, their products and services are frequently exported elsewhere and produce limited technological spillovers beyond the high-tech sector. This is

202. To encourage Israel to strengthen oversight on Chinese technological investment, the U.S. has worked to enhance Israel-U.S. research collaborations. For more details see below.

203. A. Bar-Eli, “Under American Pressure, Israel to Tighten Oversight of Foreign Investment”, *Haaretz*, October 5, 2022, available at: www.haaretz.com.

204. The Privacy Protection Authority, “Privacy Protection (Data Security) Regulations”, February 9, 2021, available at: www.gov.il.

205. R. Dvash, “Reducing the Gap Between Israel’s Data Protection Regime and The GDPR – A Governmental Proposal”, *Israel Tech Policy Institute*, July 12, 2022, available at: www.techpolicy.org.il.

especially the case regarding technological infrastructures and digitalization in the public sector. According to the UN E-Government Survey, Israel's position in the E-Government Index has dropped from 16th in the world in 2012 to 30th in 2020. Israel also ranks below average in critical infrastructures, such as participation in digitization processes of the public sector in the Global Innovation Index (GII) for 2021.²⁰⁶ There are several reasons why Israel's public sector lags in digitalization. One reason has to do with most of the country's digital firms being export-oriented (due to Israel's small domestic market) resulting in them overlooking the local economy. Secondly, and no less important, is Israel's relatively low government spending (as a percent of GDP), ranking sixth from last place in the OCED with 40.8%.²⁰⁷

The pace at which advanced communications infrastructures are deployed in Israel – via optic fibers – was accelerated recently and reached 50% of the country's homes by the end of 2021. This was achieved following a massive investment aimed at closing the existing gap.²⁰⁸ Israel has also begun work on upgrading its mobile infrastructure. The IIA recently approved grants for a Pilot Program that aims to support the expansion of 5G networks in Israel and to develop innovative applications that make use of this infrastructure. The Pilot Program allows technological companies that have completed the development of ready prototypes to test the technology they have developed at quality pilot sites and to establish quality pilot facilities, on the way to transforming Israel into a quality international-level beta site.²⁰⁹ 5G officially arrived in Israel in 2020 when three Israeli companies (Partner, Hot Mobile, and Pelephone) received licenses to operate the new network following approved tender bids.²¹⁰ While Israel has officially joined the list of countries in which 5G technology is available, there is still a long way to go for this technology to be widespread. So far, mobile carriers have prioritized increasing the number of subscribers, and have invested less in developing applications, sites, and infrastructure that will enable this technology to operate. Currently, each of the mobile carriers in Israel has only a few hundred partial sites. The sites are not connected to public infrastructure designed for 5G, but function independently, so their capabilities are limited.²¹¹

206. IIA, "Innovation Report", 2019.

207. OECD, "General Government Spending", 2021, available at: www.data.oecd.org.

208. IIA. "Innovation Report", 2022.

209. Ministry of Communications, "The Ministry of Communications and the Israel Innovation Authority Have Published the List of Winners Funded by The Fourth Round in the Pilot Program", June 19, 2022, available at: www.gov.il.

210. D. Rachel Edmunds and H. Hacohen, "5G Network Officially Launches Across Israel", *The Jerusalem Post*, September 29, 2020, available at: www.jpost.com.

211. G. Perez, "Israeli Carriers Selling 5G, but Not Developing Network", *Globes*, April 19, 2022, available at: www.en.globes.co.il.

The Israeli government has also been at work implementing “Project Nimbus”—a cross-government project with an over €1 billion investment intended to provide all government agencies and military cloud computing services via local cloud storage server centers. Google and Amazon were selected to construct and operate the cloud storage server centers, and KPMG won the bid for consulting and training.²¹²

Bilateral and Multilateral Links in the Digital Domain

Links with the U.S., China, and the EU in the Digital Domain

Strong Israel-U.S. relations date back to Israel’s independence, and technological collaborations have always gone together with diplomatic relations. Recently, however, there are growing concerns in Washington regarding intensifying Chinese investments in the Israeli economy. Israel’s decision to establish a foreign investment oversight mechanism described above was a result of growing American pressure and Israel’s fears of damage to its strategic relations with the U.S. China is Israel’s third-largest trade partner behind the EU and the U.S. Since the two started Free trade agreements (FTA) talks in 2016, the value of trade has grown from \$10.5 billion (about €9.8) to \$17 billion (about €15.9 billion) in 2021.²¹³ In the shadow of the intensifying “trade war” between China and the U.S., senior administration officials have admitted their concern about Chinese involvement in Israel’s northern port in Haifa, 5G cellular communications infrastructure, and the Israeli high-tech sector, which, as of now, remains outside the foreign investment committee’s purview despite U.S. opposition.²¹⁴ These tensions will likely only intensify in the upcoming year with talks of an Israel-China FTA entering their final stages.²¹⁵

The U.S. has also shown concerns about what has looked like intensifying Israel-EU collaborations in the realms of science and technology and R&D. In the last decade, the share of joint projects between Israel and the U.S. has decreased from 27% to only 19%, while the share of joint technological research between Israel and Europe grew from 53% to 56%. A recent study found that in 2021, 18,500 scientific publications were the result of Israeli-European collaboration, compared to only

^{212.} A. Ziv. “Israel Picks Google, Amazon for Massive Official Cloud; ‘Data Will Remain Here’”, *The Marker*, April 21, 2021, available at: www.haaretz.com.

^{213.} Mathews, “U.S.-China Tensions Cloud Israel Free Trade Deal”, *Middle East Eye*, October 10, 2022, available at: www.middleeasteye.net.

^{214.} D. Ella, “A Regulatory Mechanism to Oversee Foreign Investment in Israel: Security Ramifications”, *Institute for National Security Studies Insight No. 1229*, November 19, 2019, available at: www.inss.org.il.

^{215.} R. Jennings, “China, Israel Free-Trade Deal, Beijing’s First in Middle East, in ‘last stages’ amid troubles with US”, *China Macro Economy*, September 8, 2022, available at: www.scmp.com.

6,300 publications that were the result of Israel-American cooperation.²¹⁶ One of the main reasons behind these figures is Israel's inclusion in the European R&D program (Horizon) – to which Israel was accepted as a full member in 2014 and 2021.²¹⁷

To address these trends, Israel and the U.S. have recently been at work advancing new initiatives that aim to restrengthen Israel-U.S. collaboration around science and technology. These include a new agreement to collaborate in the field of quantum computing, under the auspices of the BSF (Binational Science Foundation). More importantly, it was recently agreed that NIST's doors would be opened for Israeli startups, and researchers would be given access to federal laboratories and research infrastructures. At the same time, the number of Israeli researchers and post-doctoral students in research institutions in the U.S. will be increased. The purpose of these initiatives is to double the rate of joint research between Israel and the U.S. by 2025. Recently, President Biden and former Prime Minister Lapid also launched the U.S.-Israel Strategic High-Level Dialogue on Technology to establish a partnership on critical and emerging technologies. This partnership intends to accelerate technology development in the realms of climate change, food security, and AI applications in healthcare.²¹⁸ While these developments seem to suggest that Israel is on its way to rekindling its science and technological (S&T) collaborations with the U.S., Israel's growing dependence on Horizon R&D funding²¹⁹ would seem to suggest that Israel-EU cooperation should continue.

Regional Technology Partnerships

In 2020, with the mediation of the U.S., a series of joint normalization statements between Israel, the United Arab Emirates, and Bahrain – The Abraham Accords – were signed. This was followed up with an additional agreement between Israel and Bahrain, and the signing of a Free Trade Agreement between Israel and the UAE, which deepened economic relations between the two sides, mostly around the sphere of technology. Israel recently signed a memorandum of understanding with Abu Dhabi Global Market, Abu Dhabi's leading international financial center, to work together to explore and promote collaboration and investment opportunities. A similar agreement was signed nearly a year ago with DIFC, the Dubai International Financial Center, focusing on collaborations in the field of fintech. These relations have opened the door for further collaboration

216. A. Bar-Eli, "The U.S. Will Open a Door To Israeli High-Tech – In Exchange for Monitoring Technological Exports", *The-Marker*, September 28, 2022, available at: www.themarker.com.

217. Delegation of the European Union to the State of Israel, "The European Union and the Israeli Innovation Authority Mark Launch of a New Chapter in Research & Innovation Cooperation", May 19, 2022, available at: www.eeas.europa.eu.

218. White House Press Release, "U.S.-Israel Strategic High-Level Dialogue on Technology", September 30, 2022, available at: www.whitehouse.gov.

219. Horizon grants awarded to Israeli companies in 2019 were 2.4 times higher than the total awarded in 2018 and rose from €39 million to €89 million, see: Israel Innovation Authority, "Innovation Report", 2019, p. 105-6.

between Israel and countries in the region. For example, this year Turkey and Israel announced that they would restore full diplomatic ties and there is business taking place between companies in Israel and its Arab neighbors, even without official diplomatic relations.²²⁰

Japan: In Need of Renewal

Mariko Togashi

Japan's foreign and defense policy is at a turning point, launching its new National Security Strategy at the end of 2022. While the technology and digital fields have been one of the most critical areas for Japan to achieve its foreign policy goal, a free and open Indo-Pacific, the new strategy put further emphasis on them under the context of enhancing its defense capability and economic security. In the digital field, while Tokyo has played a key role in digital trade and global data governance, domestic initiatives toward achieving a digital society have just started. In this sense, Japan is an old and new digital power. Although Japan certainly has an advantage and a history of leading multiple technology and digital areas, it is going through a drastic change both externally and internally.

Technology Innovation Ecosystems

Japan's Technology and Digital Innovation Systems

Japan's innovation model has been tightly linked to what is called "Japanese" management, such as long-term employment, the main bank system,²²¹ a large number of stable shareholders, and a high degree of discretion for managers.²²² Until the 1990s, Japan's innovation model focused on improving the quality of existing technology, led by large companies with central laboratories, such as Toyota, Panasonic, and Canon.²²³ Many Japanese companies had high global market shares, which led to "Japan as No. 1"²²⁴ in many sectors, such as automobile, robotics, semiconductor, electronics, telecom, and chemical industry. However, since the burst of the bubble economy in the 1990s, Japan's innovation system stagnated. While the global trend shifted toward the 21st century type innovation model since the 2000s, Japan has not been able to fully adapt to the new model. Although the Japanese government focuses on promoting start-ups as the main players in innovation, the presence of start-ups in Japan is relatively small, which still leaves the large companies as the biggest player in the innovation system. For instance, the percentage

²²¹. The main bank system is a financial system/custom unique to Japan in which one main bank monitors corporate management for a long time.

²²². Cabinet Office, "第4節 我が国のイノベーションをめぐる課題 [Section 4: Issues concerning innovation in our country]," Economic and Fiscal White Paper, August 2007, available at: www5.cao.go.jp.

²²³. New Energy and Industrial Technology Development Organization, "オープンイノベーション白書第三版 [Open Innovation White Paper, third edition]," May 2020, available at: www.nedo.go.jp.

²²⁴. *Japan as Number One* was a best-seller book in Japan, written by Ezra Vogel and published in 1979. The book argued that the U.S. should learn from Japan, which developed into the world's most effective industrial power.

of people indifferent to entrepreneurship is 75% in Japan, while it is 21.6% in the U.S., 30% in Germany, 36% in the UK, and 37% in France.²²⁵

Current Innovation Policy and Government-Led Investment Programs

Japan's technology policy sets the goal of achieving "Society 5.0," a human-centered society that achieves economic development and solutions to social issues through systems that highly integrate cyberspace and physical space. To achieve this goal, science and technology are the key, and the Integrated Innovation Strategy 2022 states the three pillars of Japan's current innovation policy.²²⁶

- 1. Enhancement of knowledge bases (research capabilities) and human resource development*

The first pillar includes a 10 trillion yen (about €71 billion) university fund that reinforces research infrastructure and university reforms, promotion of regional universities, and promotion of STEAM education and recurrent education to enhance the competitiveness of Japanese universities.

- 2. Creation of an innovation ecosystem*

The second pillar includes thorough support for start-ups, promotion of fund circulation involving private funds, and acceleration of the Digital Rural City State Concept. The Sixth Science and Technology Innovation Basic Plan,²²⁷ of which the Integrated Innovation Strategy 2022 is part, sets the goal of approximately 30 trillion yen (about €213 billion) for government R&D investment and 120 trillion yen (about €853 billion) for public and private R&D investment in the next five years. In June 2022, the Kishida administration launched the Grand Design and Implementation Plan of the New Capitalism, laying out concrete steps to accelerate start-up creation, such as increasing investment channels for start-ups, developing talent, and improving the environment to generate start-ups.²²⁸

- 3. Strategic promotion of advanced science and technology*

The Integrated Innovation Strategy lists strategic focus areas, such as AI, biotechnology, quantum technology, materials, health and medical care, space, oceans, food, agriculture, and forestry and fisheries.²²⁹ The strategy also focuses on initiatives for safety and security, such as creating and utilizing think tanks and implementing the Economic Security Promotion Act.

225. *Ibid.*

226. Cabinet Office, "統合イノベーション戦略 2022 [Integrated Innovation Strategy 2022]", June 2022, available at: www8.cao.go.jp.

227. Cabinet Office, "科学技術・イノベーション基本計画 [Science, Technology and Innovation Basic Plan]," March 2021, available at: www8.cao.go.jp.

228. Cabinet Secretariat, "新しい資本主義のグランドデザイン及び実行計画 [Grand design and implementation plan of the new capitalism]", June 2022, available at: www.cas.go.jp.

229. Cabinet Office, "科学技術・イノベーション基本計画 [Science, Technology and Innovation Basic Plan]", March 2021.

The Act supports 27 technologies in four categories (marine, space and aeronautics, cyberspace, and biotechnology), using 250 billion yen (about €1.78 billion) in up to ten years.²³⁰

Changes in the Perception of Dual-Use Technologies

One key trend that may shift Japan's innovation system is the change in the perception of dual-use technologies.²³¹ The Ministry of Defense (MoD) is considering setting up a new research institute by FY2024 to incorporate innovative civilian technologies into equipment, with reference to U.S. Defense Advanced Research Projects Agency (DARPA).²³² Furthermore, the Science Council of Japan, which had been against military research consistently, has changed its position to effectively allow research on dual-use technologies.²³³ Currently, Tokyo is discussing the measures to eliminate the stove-piping between science and technology and national security.²³⁴

The increase in investment for innovation, a more flexible approach toward start-ups, and changes in the perception of dual-use technologies can create a virtuous cycle for innovation in Japan, although implementation and operationalization are yet to be seen.

Data Policy

Japan's Data Strategy

Tokyo announced the National Data Strategy (NDS), which was its first comprehensive data strategy, in June 2021, to establish the bases for a digital society.²³⁵ The strategy states that the fundamental value is to “realize a citizen-centric society that balances efficiency and trust” and that this value will be embodied through the human-centric society that “creates new value by achieving both economic development and solving social issues,” which will be achieved through digital twin.²³⁶ To implement this strategy, Tokyo established the Digital Agency in September 2021.

230. “極超音速など27技術に財政支援へ、経済安全保障で政府 [Government to provide financial support for 27 technologies, including hypersonic, for economic security]”, *Nikkei*, September 16, 2022, available at: www.nikkei.com.

231. Japan uses the term “multi-use” as the distinction between peacetime and contingency/commercial and military use is blurred.

232. “防衛強化へ技術革新支援 防衛省、24年度にも新研究機関 [Support for technological innovation to strengthen defence, Ministry of Defence to launch new research institute in FY24]”, *Nikkei*, October 19, 2022, available at: www.nikkei.com.

233. “軍民両用技術で歩み寄り 学術会議見解 政府は評価 [Compromise on dual-use technology, government appreciates the view of the Science Council of Japan]”, *Nikkei*, October 28, 2022, available at: www.nikkei.com.

234. “研究開発、安保活用で2案 防衛力強化へ「縦割り打破」 [Two proposals for security applications of R&D, 'breaking down stove-piping' to strengthen defence capabilities]”, *Nikkei*, October 23, 2022, available at: www.nikkei.com.

235. Cabinet Secretariat, “National Data Strategy”, June 18, 2021, available at: www.digital.go.jp.

236. *Ibid.*

Japan's Data Protection and GDPR

Japan has rigorous protection for data and privacy, which allowed Japan to earn the first Adequacy Decision from the European Commission (EC) in January 2019 after the General Data Protection Regulation (GDPR) came into effect.²³⁷ The mutual adequacy decisions by the EC and the Personal Information Protection Commission of Japan allow the transfer of personal data between the European Economic Area (EEA) and Japan.²³⁸ Japan's Act on the Protection of Personal Information (APPI) restricts transfers of personal data outside Japan, similar to GDPR. Prior to earning the Adequacy Decision from the EC, Japan adopted additional safeguards to match the level of GDPR, including supplementary rules²³⁹, a new complaint-handling mechanism, and limitations on government access to data to what is necessary and proportionate for law enforcement and national security purposes.²⁴⁰ Tokyo amended APPI in 2020 to further protect individual rights and interests and emphasized the importance of protecting personal data in the NDS.

Data Free Flow with Trust

Japan has been one of the leaders in international data governance. In January 2019, Japan proposed the concept of Data Free Flow with Trust (DFFT)²⁴¹, which became more concrete in June 2019 at the G20 Osaka Summit.²⁴² DFFT promotes the cross-border free flow of data and strengthens consumer and business confidence by addressing concerns on privacy, data protection, intellectual property, and security.²⁴³ Since the proposal, DFFT has developed steadily, including the Roadmap adopted at the G7 Digital and Technology Ministers' meeting in 2021 in the UK and the Action Plan adopted at the G7 Digital and Technology Ministers' meeting in 2022 in Germany. Throughout this process, Japan has been the key advocate to promote DFFT. The Ministry of Economy, Trade, and Industry initiated research on cross-border transfers of data²⁴⁴ and is currently preparing to establish a system that serves as a coordination

237. European Commission, "Joint statement on the first review of the EU-Japan mutual adequacy arrangement," October 26, 2021, available at: www.ec.europa.eu.

238. T. Hickman and S. Asayama, "EU-Japan Adequacy Decision Now in Force," *White&Case.com*, January 30, 2019, available at: www.whitecase.com.

239. European Commission, "Supplementary Rules under the Act on the Protection of Personal Information for the Handling of Personal Data Transferred from the EU based on an Adequacy Decision", available at: www.ec.europa.eu.

240. T. Hickman and S. Asayama, "EU-Japan Adequacy Decision Now in Force," *White&Case.com*, January 30, 2019, available at: www.whitecase.com.

241. Ministry of Foreign Affairs, "Speech by Prime Minister Abe at the World Economic Forum Annual Meeting," January 23, 2019, available at: www.mofa.go.jp.

242. Ministry of Foreign Affairs, "G20 Osaka Summit (Summary of Outcome)", June 29, 2019, available at: www.mofa.go.jp.

243. Cabinet Secretariat, "National Data Strategy", June 18, 2021, available at: www.digital.go.jp.

244. Ministry of Economy, Trade and Industry, "データの越境移転に関する研究会報告書 [Report of the Study Group on Cross-border Transfer of Data]", February 28, 2022, available at: www.meti.go.jp.

measure for smooth cross-border transfers of data toward the G7 meetings in Japan in 2023.²⁴⁵

Digital Infrastructure

Japan emphasizes a comprehensive approach toward the digitalization of society through four layers of infrastructure: network, data storage/processing, rules, and secure layer. This section focuses on the network layer (5G and Beyond 5G), given the government's focus, its impact on other layers, and the geoeconomic importance.

5G Network

In Japan, NTT Docomo, KDDI and Softbank started the 5G commercial service in March 2020.²⁴⁶ The current coverage of 5G is around 30% as of March 2022 mainly in urban areas, but the Ministry of Internal Affairs and Communications (MIC) targets to raise the coverage to 95% by the end of FY2023, 97% by the end of FY2025, and 99% by the end of 2030.²⁴⁷ Among total 5G essential patents, Japanese companies hold around 10.7% in total, while the U.S. holds 18.2%, China holds 15.8%, and Europeans hold 13.2%.²⁴⁸

The Japanese government promotes the spread of safe, secure, and open 5G information and communications infrastructure, based on the 5G Law, which came into force in August 2020.²⁴⁹ Tokyo's screening on equipment has gotten tighter in recent years. In 2018, in response to the U.S. ban on government agencies' procurement of Huawei's and ZTE's telecommunications equipment, Tokyo announced a guideline regarding equipment procurement for government agencies, mandating to avoid purchasing equipment with the risk of data leakage.²⁵⁰ In 2022, Tokyo passed the Economic Security Promotion Act, which allows the government to screen the equipment of core infrastructure companies to mitigate the risk of cyberattacks.

245. T. Mizushima, “DFFTの具体化を加速する経済産業省 商務情報政策局 総務課 国際室の取り組み [Accelerating the embodiment of the DFFT, International Office, Policy Planning and Coordination Division, Commerce and Information Policy Bureau, METI]”, JIPDEC, June 6, 2022, available at: www.jipdec.or.jp.

246. Ministry of Internal Affairs and Communications, “2022 White Paper on Information and Communications”, available at: www.soumu.go.jp.

247. NHK, “5G 「人口カバー率」2023年度末に95%へ 総務省 [5G 'population coverage' to 95% by the end of FY2023 MIC]”, March 29, 2022, available at: www3.nhk.or.jp.

248. Ministry of Internal Affairs and Communications, “Beyond 5G 推進戦略 [Beyond 5G Promotion Strategy]”, June 30, 2020, available at: www.soumu.go.jp. The market share of each country/region only includes that of top 15 companies.

249. Government of Japan, “包括的データ戦略 [National Data Strategy]”, June 18, 2021, available at: www.digital.go.jp.

250. Nikkei, “機密漏洩防止へ調達指針 政府、ファーウェイ念頭 [Procurement guidelines to prevent leakage of confidential information, assuming Huawei]”, December 10, 2018, www.nikkei.com.

Beyond 5G Technologies

In June 2020, MIC announced the Beyond 5G Promotion Strategy.²⁵¹ The strategy assumes the rollout of the 6G network to be around 2030 and sets the following goals to achieve “Society 5.0”: to establish essential technologies from around 2025 in R&D, to hold more than 10% of Beyond 5G patent market share in IP & standardization, and create value worth 44 trillion yen (about €313 billion) by FY2030 in deployment. Japan is slated to invest 100 billion yen (about €711 million) in Beyond 5G between 2021 and 2025.²⁵²

Architecture – Open RAN

Regarding the network architecture, the Japanese government promotes Open radio access network (RAN), which enables interconnection with equipment and systems from a variety of vendors by making the wireless base stations open and standardized. This architecture challenges the oligopoly of vendors, such as Huawei, Ericsson, and Nokia, and Japan is currently promoting deeper public-private dialogue to that aim.²⁵³ In Japan, NTT Docomo and Rakuten Mobile are leading the world in deploying Open RAN-compliant base stations, while NEC and Fujitsu lead Open RAN-related equipment.²⁵⁴

Bilateral and Multilateral Links in the Digital Domain

U.S.-Japan

In the digital trade field, Japan and the U.S. signed the U.S.-Japan Digital Trade Agreement in October 2019, which came into force in January 2020.²⁵⁵ The standard of the U.S.-Japan Digital Trade Agreement is higher than that of CPTPP, which already has one of the highest standards among the digital trade agreements Japan have. In digital infrastructure, the U.S.-Japan Competitiveness and Resilience (CoRe) Partnership launched in April 2021 includes critical aspects, such as cooperation in open 5G networks, investment in the digital field, global standards development, and sensitive supply chains, such as semiconductors.²⁵⁶ The CoRe Partnership made

^{251.} *Ibid.*

^{252.} Ministry of Internal Affairs and Communications, “Beyond 5G に向けた情報通信技術戦略の在り方に関する検討について [Study on the state of the information and communication technology strategy towards Beyond 5G]”, November 4, 2021, available at: www.soumu.go.jp.

^{253.} Ministry of Internal Affairs and Communications, “Beyond 5G推進戦略プログレスレポート2021 [Beyond 5G Promotion Strategy Progress Report 2021]”, March 2022, available at: www.soumu.go.jp.

^{254.} M. Takahashi, Y. Yamamoto, and S. Sugiura, “日本の視点：Open RAN国内競争動向の考察 [Japanese perspective: a review of Open RAN domestic competition trends]”, *Technology, Media and Telecommunications Predictions (2021 Japan)*, Deloitte, available at: www2.deloitte.com.

^{255.} Ministry of Foreign Affairs, “デジタル貿易に関する日本国とアメリカ合衆国との間の協定 [Agreement between Japan and the United States of America Concerning Digital Trade]”, January 1, 2020, available at: www.mofa.go.jp.

^{256.} White House, “Fact Sheet: U.S.-Japan Competitiveness and Resilience (CoRe) Partnership”, April 16, 2021, available at: www.whitehouse.gov.

further progress at the Japan-U.S. Economic Policy Consultative Committee Meeting (Economic 2+2), attended by U.S. Secretary of State, Secretary of Commerce, Japanese Foreign Minister, and Minister of Economy, Trade, and Industry, in July 2022, including the agreement on joint R&D of the cutting-edge 2nm chips.²⁵⁷ Although cooperation in the semiconductor field is deepening in R&D and supply chain security, there are some gaps between the two countries in export controls. Japan has not made any decisions yet on whether to follow the new U.S. regulations adopted in October 2022 that broadly restrict trade in advanced semiconductors with China,²⁵⁸ as this will have a significant impact on the market share and may affect competitiveness in the long run. In 5G and Beyond 5G, the collaboration in the private sector is also ripe between the two countries, such as company-to-company cooperation in promoting Open RAN equipment and private consortiums.²⁵⁹ Most recently, in January 2023, the two countries agreed to accelerate cooperation on the R&D of Beyond 5G technologies.²⁶⁰

EU-Japan

Japan and the EU have various high-level agreements in the digital field. In January 2019, the EC and Japan agreed on mutual adequacy decisions, which allow the transfer of personal data. Although the EU-Japan Economic Partnership Agreement (EPA), which came into force in February 2019, did not include provisions on the free flow of data, the negotiations to include provisions started in October 2022.²⁶¹ In May 2022, the two parties launched the Japan-EU Digital Partnership, which aims to advance cooperation in the digital areas, such as 5G, Beyond 5G, AI, semiconductor supply chains, digital infrastructure, and data.²⁶² The partnership, which made Japan the first country to conclude such a partnership with the EU, is an instrument to “advance cooperation on digital issues to foster economic growth and a human-centric digital transformation based on our common values”²⁶³.

While there are significant gaps between the U.S. and the EU in data policies, both parties are critical partners for Japan in the digital domain, as their deep cooperation demonstrates. Japan is attempting to embody DFFT

257. Ministry of Foreign Affairs, “Japan-U.S. Economic Policy Consultative Committee Meeting”, July 29, 2021, available at: www.mofa.go.jp.

258. R. Tobita, “半導体の対中輸出規制「数週内に進展」富田駐米大使 [Semiconductor export restrictions to China "progress within weeks," says Ambassador Tomita]”, Nikkei, January 18, 2023, available at: www.nikkei.com.

259. J. Schoff and R. Kajima-Tsunoda, “The United States and Japan Should Team Up on 5G,” Carnegie Endowment for International Peace, July 23, 2020, available at: www.carnegieendowment.org.

260. NHK, “Japan, U.S. Agree to Closer Cooperation on 'Beyond 5G'”, January 18, 2023.

261. Ministry of Foreign Affairs, “Japan and the European Union Start Negotiations to Include Provisions on the Free Flow of Data into The Japan-EU EPA With the European Union”, October 7, 2022, available at: www.mofa.go.jp.

262. European Commission, “Japan-EU Digital Partnership – Factsheet”, May 12, 2022, available at: www.digital-strategy.ec.europa.eu.

263. *Ibid.*

by creating adjustment measures for interoperability, not necessarily taking the side of either the U.S. or the EU.

Multilateral Initiatives and Relations with China in the Digital Domain

Japan is leading various multilateral digital initiatives, focusing on the promotion of DFFT and leading concrete steps in the G7 and G20 meetings since 2019. In digital trade, Japan led the negotiation of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), which has a chapter for e-commerce with sophisticated digital trade rules for consumer protections, cross-border data flows, data localization, source code of software, etc.²⁶⁴ On the other hand, Japan also participates in the Regional Comprehensive Economic Partnership (RCEP), which allows members to justify banning the cross-border flow of data and data localization. While CPTPP promotes and embodies DFFT, RCEP indicates potential deviation from the concept.²⁶⁵ Participating in RCEP is creating the opportunity for Japan to deepen its economic ties with China but it is also generating concerns about its data principles at the same time. Although Japan is against data protectionism and does not share norms with China in the digital domain, it seeks to build a “constructive and stable” relationship due to the strong economic tie.

In digital infrastructure, Japan participates in several U.S.-led forums. The Quad, which comprises the U.S., Australia, India, and Japan, increasingly focuses on critical and emerging technologies, such as advancing and interoperability and safety in 5G and beyond 5G technologies and building resilient semiconductor supply chains.²⁶⁶ Another key framework is the Indo-Pacific Economic Framework for Prosperity (IPEF), of which one of the pillars is pursuing high-standard rules in the digital economy, although the actual impact of IPEF remains to be seen.²⁶⁷ In the semiconductor field, Japan is part of Chip 4 alliance, which convenes the U.S., Japan, South Korea, and Taiwan. Chip 4 initiative has not seen significant progress, given China's potential reaction and impact on competition within the alliance.²⁶⁸

264. Cabinet Secretariat, “TPP協定 (TPP Agreement),” available at: www.cas.go.jp.

265. H. Sekine, “Collective Action Can Spark Innovation for Data Flows”, Chatham House, June 28, 2021, available at: www.chathamhouse.org.

266. White House, “Quad Joint Leaders’ Statement”, May 24, 2022, available at: www.whitehouse.gov.

267. White House, “Fact Sheet”, May 23, 2022, available at: www.whitehouse.gov.

268. C. Davies, S. Jung-a, K. Inagaki and R. Waters, “U.S. Struggles to Mobilise Its East Asian ‘Chip 4’ Alliance”, *Financial Times*, September 13, 2022, available at: www.ft.com.

South Korea: (Striving to Stay) at the Cutting Edge

Joonkoo Yoo

Since the 2010s, South Korea began to consolidate its global status as an exemplary digital power, both at the level of government and civil society. It became the world's most connected nation where 96% of adults have Internet access with the world's highest 4G telecommunication availability and the fastest broadband upload speed.²⁶⁹ In 2019, South Korea became the world's first country to roll out 5G service and was ranked as the country with the world's most digitalized government in the OECD Digital Government Index (DGI). In addition to the well-established service capacity, South Korea's manufacturing in consumer electronics and technology has proven its global competency, as seen through the cases of Samsung and LG Electronics which became the common household brands worldwide.²⁷⁰

The global outbreak of the Covid-19 pandemic has put South Korea's digital governance and innovative systems to the test. In the process of tough quarantine measures taken in response to the Covid-19 crisis, the Korean economy faced a serious economic downturn and an employment shock which worsened social problems and intensified political polarization. South Korea, however, was able to respond to the crisis promptly and effectively by maximizing its digital prowess based on nationwide connectivity and fast telecommuting services²⁷¹. The Covid-19 pandemic has not only boosted South Korea's dependency on ICT technology further, but also accelerated the digital transformation across various fields of the country including business, education, government, and more.

However, the geopolitical implications of intensifying U.S.-China competition remain the major set of future challenges. South Korea has long tried to seek the balance between the U.S. and China, each respectively for security and economic interests. It is imperative for South Korea to surmount the changes in the international digital realm resulting from the U.S.-China rivalry – such as the fragmentation of digital standards, splInternet, non-interoperability, global supply chain bottleneck, etc. – in order to leap forward as a global digital power.

269. The connectivity index was established based on the average download-upload speed for mobile, fixed broadband, 4G and 5G availability across 97 countries. R. Daws, "Research: These Countries Are the 'Most Connected' in The World", *Telecoms Tech News*, July 6, 2021.

270. Carnegie Endowment for International Peace, "The Korean Way with Data", 2021.

271. For instance, the geolocation data from citizens' cell phones were utilized in the early stages of the pandemic for contact tracing to minimize the spread of the virus. Sharing of health data such as the vaccination dosage and symptom reporting to relevant government ministries was utilized for protection measures via online channels under e-government services.

Technology and Digital Innovation Ecosystems

Known as the “Miracle of Han River”, South Korea achieved rapid economic growth during the late 20th century with a strategic national focus on the electronics, manufacturing, steel, and heavy industries. Korea sustains a major export-oriented economy where export accounts for 33% of the national GDP²⁷². From specializing in heavy industry and chemical manufacturing during the 1970-1980s, the South Korean export portfolio shifted towards information and communications technology and services (ICT) such as semiconductors, automobiles and their components, petroleum products, electronic goods including display panels, sensors, and other ICT devices. For these main sectors, family-led large conglomerates known as *chaebol* fundamentally hold the industrial structure and play a key role in the technology and digital innovation ecosystems of South Korea.²⁷³

South Korea’s technology and digital innovation ecosystem is best summarized as government-led development. The Ministry of Information and Communication (Ministry of Science and ICT since 2017) specifically played the control tower since the 1980s under the government’s commitment to bolster the technology sector and national ICT infrastructure. The government adopted “invest first, settle later” financing strategy in the late 1990s and promoted large-scale investment in R&D and human resources. Through various public-private partnership (PPP) measures, the government shared the risks with the private sector in the early stages of industry development and gradually shift toward private sector-led growth through privatization and deregulation of business.²⁷⁴

The semiconductor industry accounts for 20% of South Korea’s national export at \$129 billion (about €121 billion). The two world’s leading integrated device manufacturers (IDMs) – Samsung Electronics and SK Hynix – constituted 18.4% of the global semiconductor market in 2020.²⁷⁵ In particular, the two giants hold together 72% of global dynamic random-access memory (DRAM) and 47% of NAND flash market in 2022²⁷⁶, and there are numerous small and medium-sized enterprises (SMEs) producing various components and equipment as part of the supply chain. South Korean government announced a \$450 billion (about €422 billion) national investment plan called “K-Semiconductor Belt Strategy” in 2021 to secure its

^{272.} H. Bae, “South Korea’s Trade Dependency Slips in 2019 Amid Sluggish Reports”, *The Korea Herald*, October 18, 2020.

^{273.} Carnegie Endowment for International Peace, “How South Korea Is Honing a Competitive Edge”, 2022.

^{274.} Inter-American Development Bank Group and Korea Development Institute, “Research on the Digital Transformation and Ecosystem of Korea applicable to Latin American and Caribbean companies”, 2021.

^{275.} S. Rousselot, “The Ambiguous Position of the South Korean Semiconductor Industry in the U.S.-China Tech War”, *Asia Power Watch*, November 16, 2022.

^{276.} U.S. Department of Commerce, “South Korea – Country Commercial Guide”, August 2, 2022, available at: www.trade.gov.

lead globally as the world's semiconductor powerhouse over the next decade.²⁷⁷ The strategy incorporates the expansion of the workforce, R&D investment for next-gen power semiconductors, AI Chips, and tax deduction measures.

Artificial Intelligence (AI) industry is another core element in South Korea's digital sector. In 2019, the government announced its initiative to bolster national AI capabilities through heavy investments in workforce training, infrastructure building, and spreading AI technologies across all sectors, providing nearly \$3 billion (about €2.8 billion) of funding. Currently, 10 local universities operate AI engineering schools and 4 national universities run AI research centers to bolster the national AI talent pools. Major ICT companies are also aggressively increasing their R&D investment in AI technologies. Korea's leading electronics companies Samsung Electronics and LG Electronics are constructing overseas AI centers in the UK, Canada, the U.S., etc. to promote international cooperation. Major search engine companies Naver and platform giant Kakao are also investing heavily in AI engines and domestic AI start-ups.

Data Policy

The paradigm of South Korea's data policy has shifted from the conservative, government-managed approach to an innovative, open approach. From the 1980s to 2010, South Korea's focus was to establish the government architectures to secure the public's access to the administrative database which includes information on residential registration, real estate, customs clearance, etc. From administration network building to creating a national database, and establishing a more comprehensive e-government, various projects to develop a state-centered integral framework were initiated. With the introduction of smartphones, however, South Korea's data policy begins to evolve towards opening the public data, nurturing the big data industry, and initiating pilot projects to utilize AI in data management from the 2010s onwards.²⁷⁸ The Data Dam project under the Korean New Deal Plan reflects South Korea's latest policy direction regarding data management.

In 2020, the National Assembly passed amendments on "Three Laws of Data" – Personal Information Protection Act (PIPA), the Act on the Promotion of Information and Communications Network Utilization and Information Protection (Network Act), and the Act on the Use and Protection of Credit Information (Credit Information Act) – to streamline regulatory measures and establish the concept of "pseudonymization of data" to meet GDPR requirements. However, plenty of criticisms soon

²⁷⁷. European Strategy and Policy Analysis System (ESPAS), "Global Semiconductor Trends and the Future of EU Chip Capabilities", *ESPAS Ideas*, 2022.

²⁷⁸. Carnegie Endowment for International Peace, "The Korean Way with Data", 2021.

followed in the context of “data innovation vs data privacy”, as various civil societies were concerned with the broadened scope of data that could be processed without the data owners’ consent under the “pseudonymization”.²⁷⁹

In April 2022, South Korea’s central data privacy regulator, the Personal Information Protection Commission (PIPC), provided amended guidelines to encourage more active processing of pseudonymized data. While it is too soon to tell the impact of the new amendments, South Korea’s efforts to promote the utilization of personal information and pseudonymized data in a safer and more efficient way are expected as additional guidelines and legislative updates are under preparation.²⁸⁰

With the amendments to Three Laws of Data, the Financial Service Commission (FSC) launched a comprehensive data service project called MyData which allows licensed service providers to gather and utilize personal data scattered across the finance sector with the consumers’ consent, similar to the open banking system adopted by the EU and UK. From the consumers’ perspective, managing their financial information across multiple financial institutions and transferring their personal data became more convenient by exercising their data portability rights.

Since the one-month pilot phase of MyData under the supervision of the national Financial Service Commission in December 2021²⁸¹, more than 33 major financial institutions such as banks, financial investment corporations, credit card and insurance companies, and fintech companies including the online service providers (OSPs) Kakao, Naver, and Toss have applied to utilize MyData. As of October 2022, the number of licensed service providers reached 59. The fintech providers have garnered the highest MyData subscribers at 11,010,000 and this intermediary data platform between financial institutions and consumers is expected to develop rapidly in the upcoming future.²⁸²

Digital Infrastructure

In July 2020, South Korea announced the “Korean New Deal Plan”, with the goal to achieve extensive digital transformation of economic and social structures and promote the expansion of Korea’s DNA – “Data, Network, and AI” – ecosystem. The Korean New Deal consists of three main pillars – the Digital New Deal, the Green New Deal, and the Strong Safety Net –

²⁷⁹. Konrad Adenauer Stiftung (KAS), “Data Innovations and Challenges in South Korea, Data and Innovation in Asia-Pacific”, 2021.

²⁸⁰. S. Kang et al., “PIPC’s Amendment to the Guidelines on Processing Pseudonymized Data”, *Lexology.com*, May 31, 2022, available at: www.lexology.com.

²⁸¹. D. Tost, “South Korea Launches Government-Backed Consumer Finance Data Service”, *Global Government Fintech*, December 14, 2021

²⁸². S. Lee, “Data Sharing through MyData Services: Implications for Big Tech’s Fair Competition”, Korea Capital Market Institute, October 25, 2022, available at: www.kcmi.re.kr.

which applies to both public and private sectors. South Korea allocated \$11.7 billion (about €11 billion) for the Digital New Deal in 2021, which aims to build Big Data platforms, building and providing of AI learning data, and providing online vouchers to enhance education infrastructure, and digitalizing Social Overhead Capital (SOC) infrastructure – such as roads, hospitals, and schools – to enhance safety and convenience of the public.²⁸³

One of the core projects of the Digital New Deal is to construct “Data Dam” – echoing the U.S. President Roosevelt’s New Deal and the Hoover Dam project – for the collection and utilization of various data across the private and public sectors. A wide range of data related to culture, transportation, healthcare, finance, big data, and AI-based learning data are shared by SMEs and government bodies.²⁸⁴ Through this project, the South Korean government aims to foster a data-driven economy, create new industries, and accelerate the digital transition of the major industries.

South Korea’s data economy relies on robust digital infrastructure in the hyper-connectivity as Koreans enjoy one of the fastest Internet networks in the world. According to a Statista report, South Korea’s Internet penetration rate is at 96.51% with nearly 100% availability of nationwide 4G networks.²⁸⁵ There are three major network operators (MNOs) – SK Telecom Co., KT Corp., and LG Uplus Corp.²⁸⁶ – and all three are recording a steady increase of 5G subscriptions. Since the world’s first rollout of 5G service in 2019, the number of 5G subscriptions surpassed 22 million in March 2022 and the number of 5G base stations reached 162,299, which accounts for 11% of the whole mobile base stations in South Korea. In terms of market share, the three major MNOs are dominating – KT 41.2%, SK 28.2%, LG Uplus 20.7% – and few other operators such as CJ HelloVision and T-broad constitute 9.4%.²⁸⁷ South Korea is currently in the process of reducing Huawei equipment in the 5G networks in coordination with the U.S., similar to France, Germany, and UK. The government has banned Huawei from public networks while the private sector is seeking gradual removal.

²⁸³. As part of Big Data ambitions, 16 platforms, 150 centers, and 4,036 data types have been built and made publicly available. When it comes to AI Learning Data, 170 types of data have been built and made publicly available across eight areas including human voice and natural language (as of June 2021). Finally, to improve education infrastructure, wireless networks have been established at schools, covering a total of 310,000 classrooms (as of June 2021), and 255,000 outdated PCs have been replaced (as of April 2021).

²⁸⁴. R. Jones, “The Korean New Deal”, Korea Economic Institute of America, July 13, 2021, available at: www.keia.org.

²⁸⁵. N. Jobst, “Internet Usage in South Korea – Statistics & Facts”, *Statista.com*, November 17, 2022, available at: www.statista.com.

²⁸⁶. *SK Telecom* is in the same conglomerate group as *SK Hynix*, and the same for *LG Uplus* with *LG Electronics*.

²⁸⁷. J. Yoon, “Market Share of High-Speed Internet Service Providers South Korea 2021”, June 27, 2022, available at: www.statista.com.

Regarding public efforts to achieve inclusive digital infrastructure, the government also installed and upgraded the wireless Internet in more than 310,000 classrooms of schools nationwide, as well as 10,000 high-speed Wi-Fi systems in public areas, such as bus stops and rural areas of the country as part of the Korean New Deal in 2021.²⁸⁸

Bilateral and Multilateral Links in the Digital Domain

The EU

As one of the EU's 11 "strategic partners" (five of which are in Asia), the EU recognized the Republic of Korea (ROK) as a country with whom cooperation is instrumental "to contribute to the resolution of international crises and to address the key challenges of the 21st century".²⁸⁹ In the area of foreign and security policy, the EU and South Korea have cooperated bilaterally as well as in interregional and global multilateral institutions on a wide range of issues.

On June 30, 2020, President Moon Jae-in, European Council President Charles Michel, and European Commission President Ursula von der Leyen, held a leaders' meeting via video conference. In their joint press statement, they underlined their commitment "to strengthen cooperation in responding to the Fourth Industrial Revolution, harnessing human-centric digitalization and promoting safe and ethical implementation of AI technologies".²⁹⁰

Both sides agreed on the launch of the High-Level Dialogue on digital economy in the near future and confirmed their commitment to promote the rules-based international order and effective cooperation in the fields of cybersecurity, disinformation, and additional hybrid threats. Such measures reflect the fact that the EU and South Korea share an interest in an international rules-based order in cyberspace in line with international public and human rights law. In addition, in December 2021, South Korea became one of the few countries to obtain an adequacy decision from the EU, recognizing equivalent levels of data protection between the two polities and allowing for a seamless flow of personal data between South Korea and the EU.

Finally, in November 2022, South Korea and the EU launched a new Digital Partnership to bolster the cooperation on semiconductors, next-generation mobile networks, AI, platforms and data, etc.

288. Born2Global Centre, "Digital New Deal Secures Future Growth Engine", *PR Newswire*, August 3, 2021.

289. European External Action Service, "The European Union and the Republic of Korea", April 8, 2021, available at: www.eeas.europa.eu.

290. European Council, "Republic of Korea – EU Leaders' Video Conference Meeting", June 30, 2020.

China

The future of ROK-China relations faces various geopolitical and geoeconomic challenges, especially with the intensifying U.S.-China rivalry. On average, China accounted for 20-25% of South Korea's total export in the past 10 years, and South Korea's reliance on certain strategic items such as large-capacity batteries and rare earth metals are particularly high.²⁹¹

In 2016, as South Korea announced its plan to deploy Terminal High Altitude Area Defense (THAAD) against North Korean threat, China responded with an economic coercion which costed \$7.5 billion (about €7 billion) loss in Korean economy in 2017 alone. As a result, South Korea's anti-Chinese sentiment exploded and still lingers; however, the intensifying U.S.-China competition and consequent bifurcation of major global affairs are putting South Korea in a rather awkward place. Other geopolitical and security challenges including the North Korean nuclear crisis and ROK-China historical disputes serve as major obstacles to intergovernmental cooperation.

In 2022, for the 30th anniversary of ROK-China diplomatic relations, both countries expressed a desire to pursue cooperation on AI, ICT, and big data, while ensuring national security and interests are protected. Beijing has also pursued to obtain support from the ROK for the 2020 Global Data Security Initiative, but the ROK has not yet expressed official support for the initiative. Either way, links with China in the digital domain will be addressed within the regional economic cooperation platform including RCEP.

United States

As one of its most important allies, South Korea has pursued a deepened partnership with the U.S. in multiple domains including digital affairs and cybersecurity.²⁹² Given Korea's dependence on U.S. security guarantees and the high sophistication of U.S. cyber capacities, this dialogue carries weight.

The two countries have established the South Korea-U.S. Cyber Policy Consultations and the Cyber Cooperation Working Group between their militaries as well as a ROK-U.S. ICT Policy Forum. They also hold joint cyber simulation exercises.

The U.S. and ROK are both committed to the multi-stakeholder Internet governance model and to increasing cyber cooperation by:

- enhancing information sharing on cyber threats, particularly to critical infrastructure;
- strengthening collaboration on investigation on cyber incidents;

²⁹¹. E. Na, "South Korea's Supply Chain Reliance on China Leaves it More Exposed Than the U.S., Japan: Report", *South China Morning Post*, January 13, 2022.

²⁹². J. Yoo, Interview, "The German Marshall Fund", March 21, 2019.

- deepening military-to-military cyber cooperation;
- encouraging collaboration on cybersecurity research and development, education and workforce development, and cooperation on technology between cybersecurity industries.²⁹³

A Presidential Office-White House cyber coordination channel at the highest level underscores the importance. In the economic realm, it seems inevitable that the ROK will eventually have to forge closer relations with the U.S. given its importance as a regional player; their similar underlying values; the political volatility of the U.S. On December 2022, South Korea announced joining the “Chip 4” or “Fab 4”, the U.S.-led semiconductor initiative to accelerate the decoupling of China from the global value chain while reinforcing the allies’ cooperation through “friend-shoring” and developing new fabrication clusters. The reorganization of the global value chain is expected to cause market shrinkage and rising costs in the chips market, and as U.S.-China strategic competition grows only further, South Korea has finally decided to join the initiative after Japan and Taiwan. “Chip 4” is expected to bolster the allies’ cooperation on the next-gen chip design and relevant technological standard setting, and this could serve as an opportunity for Samsung and SK Hynix to pursue an advanced path such as sub-3nm chip for the big techs in the U.S.

²⁹³. White House, “The United States-Republic of Korea Alliance: Shared Values, New Frontiers”, October 16, 2015

Russia: A Narrow and Blurry Path Ahead

Julien Nocetti

Vladimir Putin's military aggression against Ukraine in February 2022 marked a major geopolitical shift that has repercussions in the technological field, both globally and in Russia itself. The gradual adoption of technological sanctions against Moscow by the United States, the European Union (EU), and other allied countries (Japan, Taiwan, etc.) has highlighted Russia's strong technological and digital dependencies. Faced with the progressive asphyxiation of its technological sector, Moscow must and will have to review its policy in this area, in an international environment marked by competition between the major players (United States, China, EU) for control of digital data and so-called emerging technologies (artificial intelligence, 5G, etc.).

Technological and Digital Innovation Ecosystems

Main National Actors

The main players of the Russian digital economy emerged in a relative indifference to political power. From the end of the 1990s, the companies Yandex, Mail.ru, and Odnoklassniki shaped the uses of the emerging Web. The possibilities of coordination and mobilization conferred by digital tools, coupled with the multiplication of the population's digital uses, lead, at the turn of the 2010s, to a capitalist takeover by people close to the Kremlin, resulting in a concentration of the national technological landscape. In 2022, Yandex and Sberbank stand out, despite their differences, in a digital ecosystem under pressure, which they are directing toward a diversification of activities around their commercial strategy.

Founded in 1997 – one year before Google – Yandex's initial aim was to be a search engine similar to its American competitor, before initiating a diversification of its activities in the 2010s. The company is now present in transportation services, data storage via cloud services, messaging, e-commerce, food delivery, digital education, fashion, and music entertainment. Yandex is also one of the leaders in the artificial intelligence sector in Russia. "Alice", the company's voice assistant, controls nearly 77% of the national voice assistant market. Yandex has also developed projects for autonomous cars and domestic robots.

Sberbank – the country's largest banking institution, in which the state owns a majority of the capital (52%) – has undergone a recent evolution of its corporate culture. From a traditional retail bank, it has transformed itself, from the middle of the 2010 decade, into a "big data giant" whose operations mimic the Yandex model. The prefix Sber is now attached to each of the

group's activities: e-commerce (SberMarket), food delivery (SberFood), data storage (SberCloud), entertainment content subscription (SberPrime), or even car reservation (SberAuto). Above all, Sberbank is the main economic player supporting the national artificial intelligence strategy, launched in October 2019 by Vladimir Putin.²⁹⁴

Together, Yandex and Sberbank are now overrepresented in all segments of the Russian digital economy. Both companies are at the heart of technological change: they integrate big data and machine learning into an increasing number of activities, which drastically reduces market opportunities for young start-ups.

The Mail.ru portal, which owns the social network VK (formerly VKontakte, the equivalent of Facebook), attracts less investment but remains a well-identified player in the national ecosystem. Founded like VK by the Durov brothers, the encrypted instant messenger Telegram is a special case. Although it does not want to present itself as "Russian", Telegram has been the subject of various controversies in Russia because of its leader's repeated refusal to hand over the service's encryption keys to the Russian authorities.

The start-up fabric suffers from the extreme political and technological centralization in Russia. Strong territorial disparities persist: Moscow concentrates 90% of the country's technological potential²⁹⁵, while the ecosystems of Kazan (Tatarstan) and Novosibirsk (Western Siberia) retain cutting-edge capabilities in niche areas (industry for the former, algorithms and cyber security for the latter). According to data from the StartupBlink portal, in 2022, Russia ranked 29th in the world for the quality of its start-up ecosystem, a loss of 12 places since 2021.²⁹⁶ The effects of the war in Ukraine and the sanctions on the Russian digital and electronic industries are undoubtedly weighing on the maintenance of national development projects, with the players in these sectors seeing their production efforts redirected at least partially to the benefit of the military-industrial complex.²⁹⁷

Current Government Investment Programs

Since the early 2010s, the Skolkovo cluster on the outskirts of Moscow is supposed to embody Russian technological ambitions. However, the first Western sanctions against Russia, starting in 2014, put a damper on any hopes of catching up or even making a technological breakthrough, at a pivotal moment when the national defense industry claimed to be capturing

294. The text of the national AI strategy is available at: www.publication.pravo.gov.ru.

295. Calculation of the author using the data available on the portal www.startupblink.com, October 2022.

296. See www.startupblink.com.

297. P. Ivanova and M. Seddon, "Russia's Wartime Economy: Learning to Live without Imports", *Financial Times*, December 14, 2022, available at: www.ft.com.

a significant share of research and development efforts in digital technology and, above all, in artificial intelligence.²⁹⁸

The amounts invested remain well below the investments made within other technology ecosystems (California, China, Israel, London, etc.). Between 2017 and 2020, venture capital funds invested only \$80 million (about €75 million) on average each year in the country in the digital and telecommunications sector, compared to the \$30 billion (about €28 billion) invested in the UK in 2021 alone.²⁹⁹ Among start-ups, the relationship with the state remains ambivalent. A 2020 study of Russian start-ups reveals that more than half of them have not spent or do not plan to spend state funding³⁰⁰, due to a distrust of bureaucracy and a general lack of knowledge about these mechanisms.

The national program “Digital Economy”, coordinated by the Minister of Digital Development, is part of the thirteen federal projects launched in May 2018 aimed at modernizing the Russian economy in the medium term.³⁰¹ The national artificial intelligence strategy is an integral part of this federal component.

Since February 2022, the international sanctions against Russia have triggered a double discourse among Russian leaders: on the one hand, the expression of “sovereign” urgency in the technological field; on the other hand, a tone of reassurance towards industry and national investors. Vladimir Putin has thus touched upon this dual issue on several occasions – it was at the St. Petersburg International Economic Forum (SPIEF), in June 2022, that this rhetoric was most clearly affirmed, with references to “development of [Russian] technological sovereignty”, continuation of the so-called “import substitution” policy (with a particular emphasis on artificial intelligence) and “promotion of patriotism [in business]”.³⁰²

Data Policy

Data policy in Russia is in line with the digital and information “sovereignty” agenda that the authorities have been pursuing for a decade. Personal data protection, governed by the July 2006 Law on Personal Data, became highly politicized at the time of the Edward Snowden revelations (2013). In the fall of 2014, the adoption of a federal law amended the 2006 law, which aims to

298. J. Nocetti, “Un outsider paradoxal. La Russie dans la course à l'intelligence artificielle”, *Études de l'Ifri*, December 2020, p. 23-29.

299. According to data from www.statista.com. Regarding the United Kingdom, see N. Flaherty, “UK Doubles Venture Capital Investment in Tech”, *eeNews Europe*, December 20, 2021, available at: www.eenewseurope.com.

300. “Enquête de marché sur les startups technologiques en Russie”, *Startup Barometer*, 2020, available at : www.lenta.generation-startup.ru.

301. Regarding the implementation of the project, see A. Lowry, “Russia's Digital Economy Program: An Effective Strategy for Digital Transformation?”, *The Palgrave Handbook of Digital Russia Studies*, Londres: Palgrave Mcmillan, 2020, p. 53-75.

302. V. Poutine's speech at SPIEF on June 17, 2022, available at: www.en.kremlin.ru.

limit the use of foreign servers for the collection, retention, processing, and storage of personal data of Russian citizens, and to facilitate state surveillance activities via the federal agency Roskomnadzor.³⁰³ After a series of criticisms from the domestic industry, the law, toned down in some of its provisions, went into effect in September 2015. In the following years, the political authorities tightened their grip on the issue of personal data, particularly on the grounds of strengthening the fight against terrorism. Starting with the “Yarovaya laws” of 2016, this same issue becomes closely linked to the relocation of data on Russian territory.³⁰⁴

Indeed, the issue of personal data protection for Russian citizens is becoming intertwined with that of state “sovereignty” and “security” at a time when the few windows for political expression in Russia are being exploited by opponent Alexei Navalny on social networks. The so-called “On a Sovereign Internet” law, adopted in December 2019³⁰⁵, confirms this trend that has been palpable since the beginning of the 2010 decade, steering data protection in the direction—uniquely—of a top-down approach and a “besieged-fortress” mindset. The main idea of the law on “digital sovereignty” is to allow Russia to have a single command post, from which the authorities could manage the flow of information in Russian cyberspace; this includes monitoring, limiting, or blocking these flows on all or part of the Russian Internet. The provisions of the law focus on two aspects: routing of Internet traffic and control of the domain name system (DNS). The authorities’ approach now goes beyond “control by law” and focuses on controlling the infrastructure through which Russian citizens’ digital data circulates³⁰⁶ – and thus curbing digital activism.

More recently, Russia’s expulsion from the Council of Europe on March 16, 2022, removed the country from the conventions and protocols concluded within the intergovernmental organization. In concrete terms, Russia no longer benefits from the adequacy decision of the European Union law in accordance with the GDPR, which provides safeguards so that the transfer of data from the EU to Russia respects certain standards of protection.

Digital Infrastructure

When it comes to digital infrastructure in Russia, the issue of 5G networks is of particular concern, as the strategic dimension of 5G networks comes up against the country’s many technological dependencies. While the

303. J. Nocetti, “Russia’s Dictatorship-of-the-law Approach to Internet Policy”, *Internet Policy Review*, Vol. 4, No. 4, November 2015.

304. T. Gomart, J. Nocetti and C. Tonon, “L’Europe, sujet ou objet de la géopolitique des données ?”, *Études de l’Ifri*, July 2018, p. 27-28.

305. The text of the law is available at: www.publication.pravo.gov.ru.

306. J. Nocetti, “La Russie en quête de son Internet souverain”, *La Revue des médias*, Institut national de l’audiovisuel, June 21, 2019.

world's leading economies are adopting 5G, Russia's transition in this sector remains modest.

Two governance issues help explain some of the blockages. The first is related to the reluctance of the security services and the military to allow certain telecommunications frequencies to be included in the commercialized 5G licenses. Indeed, the frequency band most used for 5G internationally (3.4-3.8 GHz) is, for historical reasons, mostly occupied by military networks, intelligence services and the space agency Roskosmos. The FSB (Federal Security Service, the counter-intelligence service), in particular, wants to impose Russian-developed encryption systems for the installation and certification of 5G base stations.³⁰⁷

The second – which stems from this restricted frequency band – sees the national regulator seeking to oblige operators to use only Russian-made equipment for the construction of the 5G network. The issue has been strongly criticized in industry circles, as a “Russian 5G” that would only be accessible to the few users of locally manufactured products would slow down the digitalization of the Russian economy and thus maintain its competitiveness – especially in a context of international sanctions. Private Russian operators also fear losing their market share and ultimately their independence from the state, which has already been undermined by the law establishing a “sovereign Internet”.

Among foreign equipment manufacturers, Huawei remains unavoidable in Russia, far ahead of Europe's Ericsson and Nokia, respectively second and third in the national mobile network market. Present since the second half of the 1990s on Russian soil, Huawei has intensified its efforts toward the country – and the post-Soviet space – since the signing in 2015 of a new agreement strengthening the strategic partnership between Moscow and Beijing.

Huawei has increased its presence due to the impact of U.S. sanctions targeting the company since May 2019. The Russian government's line is more wait-and-see on Huawei's participation in the national 5G network, but the risk assessment of the Kremlin is a priori less unfavorable than that of the West.³⁰⁸ In April 2021, Huawei and MTS (the first mobile operator in Russia) announced the activation of a 5G test network in 14 iconic locations in the Russian capital. Despite the desire to develop national technologies, the Russian authorities are (for now) accommodating this dependence on Chinese equipment.

However, the extension of international sanctions against Russia since February 2022 has slowed down or even stopped the 5G projects. Huawei has announced that it will no longer pass new contracts in Russia, and

^{307.} I. Tišina, “Kriptozašít i meč [The crypto protection and the sword]”, *Kommersant*, October 8, 2020, available at: www.kommersant.ru.

^{308.} J. Nocetti, “Un outsider paradoxal”, *op. cit.*

Ericsson and Nokia have withdrawn from the Russian market.³⁰⁹ The dual nature of 5G infrastructure would have weighed decisively in the choice of these companies, beyond the constraints of sanctions compliance.³¹⁰

Bilateral and Multilateral Links in the Digital Domain

Links with the United States, China and the EU in the Digital Domain

Russia's place in international technological competition even before the launch of Russia's invasion of Ukraine, coupled with the already obvious disputes with the U.S. and EU, is prompting Moscow to increase its cooperation with China. This trend has been growing since February 2022.

Hostility to the United States fully structures Russian digital policy.³¹¹ In the national strategic culture, the United States remains the hostile actor *par excellence* in the digital and cyber field, while at the same time constituting the point of reference and the indispensable interlocutor that should enable Russia to maintain its international standing. Except for the 2009-2011 sequence known as the "Reset", Moscow and Washington remain in opposition on all issues related to the digital field (applicability of international law to cyberspace, norms of behavior of States, etc.). The mental map of Russian decision-makers is marked by a deep obsidional complex in this area, with cyberspace – the infrastructure and above all the content produced and distributed there – representing the symbol of American hegemony and subversion.

As for the EU, the European sanctions following Russia's invasion of Ukraine have resulted in the partial or total withdrawal of most European technology players from the Russian market. The technological decoupling that has been taking place since the spring of 2022 between the Western and Russian ecosystems leaves no prospect of cooperation between the European Union and Moscow.

Ties with China are a major factor in the evolution of Russian technology policy. Beyond the close cooperation between Moscow and Beijing, the digital domain reveals a growing asymmetry between the two countries, driven by divergent approaches to the evolution of the international system and by economic factors specific to each country. This asymmetry, which works to Russia's disadvantage, does not prevent it from deepening its technological, digital and cyber cooperation with China.³¹²

309. V. Skobelev and I. Iouzbekova, "Huawei otpravil čast' sotrudnikov rossijskogo ofisa v otpusk na mesâc", *Forbes.ru*, April 8, 2022, available at: www.forbes.ru.

310. Interview with an industry expert, September 2022.

311. J. Nocetti, "Contest and Conquest": Russia and Global Internet Governance", *International Affairs*, Vol. 91, No. 1, January 2015.

312. J. Nocetti, "Un 'cyber-mariage' arrangé ? Réalités et implications de la coopération cyber entre la Russie et la Chine", *Études internationales*, Vol. 51, No. 2, 2020, p. 261-285.

Thus, on the sidelines of the opening of the Beijing Olympics, just before Moscow's invasion of Ukraine, a long Sino-Russian statement emphasized the upcoming strengthening of the bilateral technological partnership, from e-commerce to hosting in the cloud, through artificial intelligence.³¹³

Finally, the effect of Western technological sanctions in Russia deprives the country of electronic components for both its civilian and military industries. Moscow's desire for more substantial supplies of Chinese chips is subject to a polite reluctance on the part of Beijing, which is already having to deal with the consequences of American sanctions on the Chinese technology industry.³¹⁴

Participation in Multi-Stakeholder Initiatives

Russia's involvement in multilateral forums dedicated to digital technology is imbued with security considerations. The Russian proposals of international scope, as well as the formats of dialogue and the preferred themes, all reflect the primacy of the security factor over industrial and innovation issues, as well as the emphasis placed on the notion of "technological sovereignty" and, more traditionally, "information sovereignty".³¹⁵

It is thus not surprising that Moscow's preferred channel remains the United Nations (UN), primarily through its most political bodies. Since June 2019, Russia has carried the Open-Ended Working Group (OEWG), opposed to the Washington-backed Group of Governmental Experts (GGE); this divide reveals the strong, well-identified antagonisms about state behavior in cyberspace. The OEWG's work continues – two sessions are scheduled for 2023 – although the conflict in Ukraine is widening the political fault lines between Russia and Western countries that were already present when the group was created. In October 2019, Russia proposed the creation of an intergovernmental committee to draft the terms of a future treaty to combat cybercrime. The United States and EU countries voted against the Russian resolution, saying it carried risks of restricting freedom of expression.

Among the UN specialized agencies, the International Telecommunication Union (ITU) is perceived in Moscow as the most structuring forum to try to display the ongoing de-Westernization of the technological field, by influencing the development of technological standards in connectivity, Internet of Things or cybersecurity. However, Russian efforts to win the presidency of the organization, in September 2022, have met with

³¹³. Kremlin, "Joint Statement of the Russian Federation and the People's Republic of China on the International Relations Entering a New Era and the Global Sustainable Development", February 4, 2022, available at: www.en.kremlin.ru.

³¹⁴. Z. Sheftalovich and L. Cerulus, "The Chips Are Down: Putin Scrambles for High-Tech Parts As His Arsenal Goes Up in Smoke", *Politico*, September 5, 2022, available at: www.politico.eu.

³¹⁵. J. Nocetti, "La conception russe des enjeux de souveraineté numérique", in G. Le Floch and B. Bertrand (eds.), *La souveraineté numérique*, Brussels: Bruylant, 2023 (forthcoming).

widespread rejection – it is now headed by an American representative and Russia is no longer on the organization’s Council (a first since 1947).³¹⁶

Finally, the opposition to the United States and the assertion of “state sovereignty” finds an extension within the Shanghai Cooperation Organization (SCO), which represents a means for Russia to project its model of digital authoritarianism and to ensure that its security concerns are put on the agenda in Asia.

316. C. Goujard, “U.S. Defeats Russia to Head UN Telecoms Agency in Fight for Internet’s Future”, *Politico*, September 29, 2022, available at: www.politico.eu.

United Kingdom: Influential but Directionless

Zach Meyers

The UK remains influential but is an increasingly directionless, digital power. On January 31, 2020, the UK left the European Union. Since then, the UK's digital and technology policies have had little coherence, wracked by government indecision about whether and how to diverge from EU regulatory standards. Successive Conservative prime ministers have been eager to identify ways in which London could regulate better than Brussels. However, there remains countervailing pressure from business to minimize friction with the EU, which is still Britain's largest trading partner, and maintain a stable regulatory environment. Meanwhile, the Labour Party has consistently led the government in polling over 2022, though the party's digital policies are not well-defined. A general election is not due until January 2025.

Political upheaval has been a factor in the lack of coherent digital policies. Conservative prime minister Boris Johnson resigned on July 7, 2022, following a series of political scandals. His party elected Liz Truss who took office on September 5, 2022. Her budgetary policies upset financial markets, and she was replaced with Rishi Sunak on October 25, 2022. Johnson's government developed many strategies – covering areas like data, artificial intelligence, and digital competition – to develop the high-tech sectors of the economy. However, regulatory reforms to implement these strategies progressed slowly. Sunak was expected to give businesses more continuity and certainty, but he is also pushing ahead with new online safety, digital competition, and data laws demanded by many of his party's parliamentarians.

Technology and Digital Innovation Ecosystem

Strengths and Weaknesses of the UK's Ecosystem

One of the UK's digital strengths is the rapid growth of start-ups and, increasingly, their ability to achieve scale. Today, the UK ranks 4th in terms of the number of its tech companies valued at \$1 billion (bn) or more. It used to rank 3rd but was overtaken by India in 2022.³¹⁷ Most of this growth is focused on services, and IP-related activities like software and chip design, rather than manufacturing. Fintech (with payment firms Wise, Checkout.com, and Worldpay and digital banks Revolut, Starling, and Atom) has been a particular strength. Semiconductor designer Arm is also a

³¹⁷ D. Thomas, T. Bradshaw and N. Megaw, "Why Have We Not Grown Any Giant Companies? The UK's Attempt to Take On Silicon Valley", *Financial Times*, September 10, 2021; see also www.statista.com.

well-known British tech firm. Several factors contribute to this successful ecosystem, including the UK's strong financial services expertise, and the availability of deep capital markets which allow UK firms to remain private while scaling up.

The UK also has a strong space industry, generating an estimated £16.5 billion (about €18.6 billion) per year and with several global satellite operators based in the UK. A 2021 national space strategy made developing the satellite industry an economic and defense priority. Not all government interventions have been well-received. For example, the government invested £374 million (about €422 million) in OneWeb, a company providing low earth orbit satellites to deliver broadband services around the world, which has been criticized for its lack of clear rationale.³¹⁸

However, outside these sectors, the UK suffers from low levels of business investment and take-up of innovations, especially among more established firms. Research and development (R&D) intensity is lower than in comparable countries: in 2019, UK spending on R&D comprised 1.71% of GDP, whereas the OECD average was over 2.5%.³¹⁹ This has been exacerbated by Brexit, which has created uncertainty about trade barriers and regulatory stability, and worsened the UK's skills shortages by limiting immigration.³²⁰ Brexit has contributed to the UK's perennially low productivity, particularly in areas like manufacturing. These constraints mean UK start-ups often end up being acquired by larger foreign companies or listing overseas. For example, in 2016, Arm was sold to Japanese firm Softbank, which is currently considering floating the company in the U.S. rather than listing it on the London stock exchange.

The government hopes to make the UK more innovative by increasing public R&D funding and making it easier for highly skilled workers to move to the UK.³²¹ The government is also considering diverging from EU financial regulation to allow UK pension funds to allocate more capital to higher-risk investments. The Labour party instead wants to use the industrial strategy to help businesses commercialize and adopt technologies.

318. UK Parliament, House of Commons, Science and Technology Committee, "UK space strategy and UK satellite infrastructure", November 4, 2022.

319. OECD, "OECD Science, Technology and Innovation Scoreboard", *Oecd.org*, 2022, available at: www.oecd.org.

320. Z. Meyers and J. Springford, "UK Science and Technology after Brexit: How to fix it", *CER policy brief*, Centre for European Reform, November 28, 2022.

321. HM Government, "UK Innovation Strategy: Leading the future by creating it", *Gov.uk*, July 2021, available at: www.gov.uk; HM Government, "UK Digital Strategy", *Gov.uk*, June 2022, available at: www.gov.uk.

Toward More Regulation of the Tech Sector?

On the regulatory front, the government has for several years committed to implement a dedicated competition regime for digital platforms, which an expert panel commissioned by the government³²² recommended in March 2019.

The regime would subject big tech firms to individual “codes of conduct” to inhibit anti-competitive behavior, and could require some firms to provide data mobility or interoperability to promote competition.³²³ This regime would be more flexible and targeted than the EU’s Digital Markets Act, which has similar goals. Sunak will reportedly table a bill to implement the regime in February 2023. In the meantime, the UK competition authority has become more active in digital markets. It conducted several market studies to highlight the dominance of large U.S. tech companies like Alphabet (Google), Apple, and Meta (Facebook), and has several investigations underway. It controversially blocked Meta’s proposed acquisition of the small firm Giphy, partly on the basis that it could reduce potential future competition. The authority’s reasoning was mostly upheld on appeal.³²⁴

Sunak has prioritized an Online Safety Bill to regulate social media platforms, which in some respects is stricter than the EU’s Digital Services Act especially in relation to children’s safety and by exposing tech firms’ senior executives to potential criminal penalties. The government has repeatedly amended the bill to reduce its impact on freedom of speech.

Finally, a new foreign direct investment screening regime took effect in 2022. The reforms were largely motivated by the perceived need to keep the UK’s investment screening powers in line with those of the UK’s allies, rather than to signal a change in the UK’s openness. The regime allows the UK to review and intervene in transactions which may pose national security risks, with prior approval required for foreign takeovers in “sensitive sectors” such as artificial intelligence, data infrastructure, and satellite and space technologies. The tools apply both to acquisitions from the UK’s rivals, but also acquisitions from the UK’s allies – for example, it applied to the purchase of a minority stake in the UK’s largest telecommunications firm, BT, by a French investor.³²⁵ Labour party policy is potentially stricter and would aim to protect not just national security but the UK’s “sovereign capabilities”.

322. J. Furman et al, “Unlocking Digital Competition: Report of the Digital Competition Expert Panel”, *Gov.uk*, March 2019, available at: www.gov.uk.

323. The government is not pursuing changes to the merger regime recommended by the expert panel. HM Government, “A New Pro-competition Regime for Digital Markets – Government Response to Consultation”, *Gov.uk*, May 6, 2022, available at: www.gov.uk.

324. UK Competition Appeal Tribunal, *Meta Platforms Inc v Competition and Markets Authority*, Case No 1429/4/12/21, June 14, 2022.

325. A. Gross, R. Wright and J. Pickard, “UK Government to Probe Altice’s BT Stake”, *Financial Times*, May 26, 2022.

Data Policy

The UK retains the EU's General Data Protection Regulation (GDPR) in UK domestic law for now. Following the UK's departure from the EU, the EU and UK each decided that the other provided an adequate level of protection of personal data, protecting the free flow of personal data. However, given the UK's desire to tweak its data protection standards, the EU made its decision temporary: it would end after four years, unless the EU institutions decide otherwise.³²⁶

The government has nevertheless been exploring ways to reduce the perceived regulatory burden of GDPR, to promote innovation and economic growth. Johnson outlined the UK's strategy in June 2022,³²⁷ and the government tabled a Data Protection and Digital Information Bill in Parliament shortly thereafter. Some of the Bill's divergences from GDPR appear relatively benign; others are potentially more incendiary, such as increasing government influence over the UK's data protection authority. At the time of writing, Sunak's government had indicated it might revise the bill to pursue even sharper divergence from the EU. The government insists any reforms would provide no grounds for the EU to end the free flow of personal data; nevertheless, many MEPs and UK businesses remain concerned.³²⁸

Another important aspect of the government's data strategy is to strike its own agreements with foreign countries to secure seamless data flows – with the government identifying deals with Australia, Brazil, Colombia, Dubai, India, Indonesia, Kenya, Singapore, South Korea, and the U.S. as its priorities. If the UK in future strikes a deal for seamless transfers with a country which the EU does not consider to provide adequate data protection (which includes most of those in the UK's priority list), the EU will be concerned the UK could become a conduit for EU citizens' personal data to be sent to countries where it will be inadequately protected.

Finally, authorities' rights to access personal data are generally governed by strict legal requirements. However, there are broad exceptions in areas like national security. The European Court of Justice (ECJ) and European Court of Human Rights have repeatedly found that data collection by British national security agencies is unlawful, for example, because it allows mass collection of personal data.³²⁹

326. Commission Implementing Decision of 28.6.2021 pursuant to Regulation (EU) 2016/679 of the European Parliament and of the Council on the adequate protection of personal data by the United Kingdom.

327. HM Government, "Data: A New Direction – Government Response To Consultation", *Gov.uk*, June 23, 2022, available at: www.gov.uk.

328. V. Manancourt, "We Were Taken For Fools": MEPs Fume At UK Data Protection Snub", *Politico*, November 7, 2022.

329. S. Lowe and C. Mortera-Martinez, "Post-Brexit Data Transfers are Not a Done Deal", *CER bulletin article*, Centre for European Reform, March 29, 2021.

Digital Infrastructure

The telecommunications sector is supervised by an independent regulator, Ofcom. Despite Brexit, the UK implemented the EU's 2018 European Electronic Communications Code. However, negative impacts of Brexit remain. These include the reimposition of roaming charges in the EU by most major UK mobile operators. The EU mostly removed roaming fees in 2017.

Still, the UK enjoys a relatively competitive market for digital infrastructure. There are several major fixed-line and mobile networks, all of which are privately owned. The incumbent fixed-line provider is BT (previously British Telecom). BT must operate its network and retail divisions through separate companies, to provide a level playing field for BT's retail business and the UK's many independent communications firms which need access to BT's network to reach customers.

In recent years, the UK has used public subsidies and tax breaks to encourage the rollout of competing fiber networks. Ofcom has also changed its regulatory approach to incentivize more investment. As a result, BT has rolled out fiber extensively and it intends to upgrade 80% of UK premises to full-fiber connections by December 2026. Virgin Media O2, which operates a cable network covering more than half of the UK population, also plans to upgrade and extend its network. Independent companies are also rolling out full-fiber networks on a smaller scale. At the time of writing, 97% of UK premises had access to a broadband connection with speeds of at least 30Mbit/s and 70% had access to download speeds of at least 1Gbit/s.³³⁰

The UK has four national mobile networks, operated by BT/EE; Virgin Media O2 (a joint venture of Liberty Global and Spain's Telefónica); Three (an affiliate of Hong Kong's CK Hutchison); and Vodafone. Many "mobile virtual network operators" resell access to these networks. Three and BT/EE share significant parts of their mobile infrastructure, as do Virgin Media O2 and Vodafone. In 2016, the European Commission blocked Three's attempt to acquire O2 in the UK, alleging that reducing the number of networks to three would raise prices and reduce innovation. Since then, the Commission's decision was annulled by the EU's General Court.³³¹ Ofcom has since softened its stance on four-to-three mergers (though the UK's competition authority has the final say). There has since been speculation about Vodafone/Three tie-up.

99% of British premises have outdoor 4G access³³² and all the national mobile networks have now begun rolling out 5G: in December 2022, Ofcom estimated approximately 67-77% of UK premises had outdoor access to 5G.

330. Ofcom, "Connected Nations 2022", December 15, 2022, available at: www.ofcom.org.uk.

331. General Court, *CK Telecoms UK Investments Ltd v European Commission*, Case T-399/16, May 28, 2020. An appeal to the European Court of Justice is underway.

332. Ofcom, "Connected Nations 2022", *op cit.*

The UK government supports Open RAN – an initiative intended to increase competition in 5G provision by using open interfaces between different parts of mobile operators' access networks. It has expressed concerns that otherwise UK mobile operators will be “overly reliant on too few suppliers” (namely, Finnish company Nokia and Swedish supplier Ericsson), after they are required to remove Chinese firm Huawei's equipment from their 5G networks.³³³ The government has committed £250 million (about €282 million) to accelerate the technology and wants 35% of mobile traffic carried over Open RAN by 2030.

When it comes to cloud, the UK has the highest level of investment in data centers in Europe and UK businesses have amongst the world's highest levels of adoption of cloud services. However, the cloud computing market is highly concentrated: 81% of revenues in the market for public cloud infrastructure are generated by U.S. firms, Amazon, Microsoft, and Google. The combined market share of other players is in decline.³³⁴ The telecoms regulator, Ofcom, has commenced a market study in 2023 which will examine the strength of competition in cloud services.

Finally, in terms of international infrastructure, the UK has about 60 subsea telecommunications cables and their security is of increasing concern. Certain isolated parts of the UK with less redundancy, such as the Channel Islands and the Shetland Islands, have recently suffered communications outages from cable damage. The government recently commissioned two ships dedicated to monitoring and protecting UK cable infrastructure.

Bilateral and Multilateral Links in the Digital Domain

As of early 2023, the UK has a poor relationship with the EU in terms of digital cooperation. Largely, this is because of a dispute between the UK and EU about avoiding border checks on the island of Ireland. As a result, coordination between the two regimes has been limited. For example, the EU has not agreed on a Memorandum of Understanding with the UK's competition authority, which would bolster cooperation on cross-border digital competition investigations. The EU has also shown no interest in allowing the UK to participate in the EU-U.S. Trade and Technology Council (TTC). The UK has instead encouraged discussion of digital policy issues in more inclusive forums like the G7 and G20. For example, the UK presidency negotiated a set of Digital Trade Principles agreed by the G7 trade ministers in October 2021.³³⁵ Sunak has

333. HM Government “5G Supply Chain Diversification Strategy”, November 30, 2020.

334. Ofcom, “Ofcom to Probe Cloud, Messenger and Smart-Device Markets”, September 22, 2022, available at: www.ofcom.org.uk.

335. HM Government, “G7 Trade Ministers’ Digital Trade Principles”, Gov.uk, October 22, 2021, available at: www.gov.uk.

so far adopted a more conciliatory approach with the EU than his predecessors, which may improve prospects for digital coordination.

The UK's future relationship with China is uncertain. In 2021, the UK published a security and foreign policy strategy that proposed to "continue to pursue a positive trade and investment relationship with China, while ensuring our national security and values are protected".³³⁶ The UK has taken a more permissive approach than the U.S. towards China, by allowing Chinese firm Huawei equipment to remain in the UK's fiber networks albeit to a limited extent (Johnson had also wanted to allow Huawei a limited role in 5G networks, but relented after pressure from Washington and from fellow conservative parliamentarians). Sunak has so far referred to China as a "systemic challenge" rather than a threat, and has emphasized the need to engage China on global challenges, describing his approach as "robust pragmatism". However, Sunak is constrained by increasing pressure from the U.S. and his hawkish colleagues.³³⁷ Beijing was irked by the government's recent decision forcing a Chinese-owned firm to divest a UK chip-making plant. A parliamentary committee recently called for "tighter China-oriented restrictions" on trade in technology and data.³³⁸ Finally, the U.S. is encouraging Europe, including the UK, to adopt a hawkish approach and to help throttle China's tech capabilities. Given these factors, significant cooperation on digital matters seems unlikely.

The UK has also focused on developing links with the U.S. and other partners in the digital domain. For example, in 2021, the UK and U.S. signed a partnership to strengthen cooperation in areas like regulation of AI and data flows, and in 2022, they launched a little-reported "Comprehensive Dialogue on Technology and Data". However, a comprehensive trade deal with the U.S. – one of the greatest ambitions of those who supported the UK leaving the EU – remains improbable. The UK has also focused on securing trade deals with middle-tier economies such as those of Japan, Australia, Canada, New Zealand, and Singapore. These have included extensive commitments on digital trade, for example, to limit data onshoring requirements. A bipartisan parliamentary committee has criticized this bilateral approach as fragmented and inadequate to respond to China's authoritarian technology governance model.³³⁹

In the medium term, the UK will eventually have to forge closer relations with the EU given its importance as the UK's largest trading partner; their similar underlying values; the political volatility of the U.S.; and the need for a more coordinated counterbalance to growing Chinese influence in tech standards and governance.

336. HM Government, "Global Britain in a Competitive Age: The Integrated Review of Security, Defence, Development and Foreign Policy", *Gov.uk*, March 16, 2021, page 22.

337. C. Mason, "Rishi Sunak sets out China policy as Tory critics loom", *BBC News*, November 29, 2022.

338. UK Parliament, House of Commons, Foreign Affairs Committee, "Encoding Values: Putting Tech at the Heart of UK Foreign Policy", July 8, 2022.

339. *Ibid.*



27 rue de la Procession 75740 Paris cedex 15 – France

Ifri.org