PAKISTAN'S DIGITAL ECOSYSTEM

A DIAGNOSTIC REPORT

JULY 2025

ASIAN DEVELOPMENT BANK

ADB

PAKISTAN'S DIGITAL ECOSYSTEM

A DIAGNOSTIC REPORT

JULY 2025

ASIAN DEVELOPMENT BANK

ADB


Creative Commons Attribution 3.0 IGO license (CC BY 3.0 IGO)

6 ADB Avenue, Mandaluyong City, 1550 Metro Manila, Philippines
Tel +63 2 8632 4444; Fax +63 2 8636 2444
www.adb.org

ISBN 978-92-9277-359-5 (print); 978-92-9277-360-1 (PDF); 978-92-9277-361-8 (ebook)
Publication Stock No. SPR250278
DOI: http://dx.doi.org/10.22617/SPR250278

Note:
In this publication, "₹" refers to Indian rupees; "PRs" refers to Pakistan rupees; and "$" refers to United States dollars, unless otherwise stated.

Cover design by Mike Cortes.
Images in the chapter titles are from Shutterstock.

Contents

Tables, Figures, and Boxes

Tables

Figures

Boxes

Foreword

Pakistan stands at a pivotal crossroads in its digital journey. The rapid evolution of technology—marked by cloud computing, hybrid work models, and automation—has significantly transformed industries and public service delivery. While notable progress has been made, there remain opportunities for Pakistan to further accelerate its digital advancement and keep pace with regional and global advancements.

The potential for digital technology to drive socioeconomic transformation in Pakistan is immense. By embracing digital solutions, Pakistan can accelerate its development trajectory, unlocking new opportunities for economic growth, governance, and social inclusion. However, achieving this vision requires a robust and inclusive digital ecosystem—one that ensures seamless connectivity, secure and user-friendly digital services, an empowered workforce equipped with the skills to navigate the digital economy, and an adaptive digital society.

The Asian Development Bank (ADB) remains committed to supporting Pakistan in harnessing digital transformation as a catalyst for sustainable development. As part of our broader mission to nurture economic resilience and inclusive growth across Asia and the Pacific, we recognize that a strong digital foundation is essential for building a competitive economy, improving governance, and enhancing public service delivery. Through strategic investments, policy support, and collaboration with stakeholders, ADB aims to help Pakistan develop a resilient, future-ready digital ecosystem that benefits businesses, citizens, and institutions alike.

This report provides a comprehensive assessment of Pakistan's digital landscape, highlighting key challenges and opportunities. It underscores the importance of investing in resilient digital infrastructure, strengthening data governance, and enhancing cybersecurity frameworks. Furthermore, it emphasizes the critical role of digital government initiatives in nurturing efficiency, transparency, and citizen engagement.

With the right strategic focus and investment, Pakistan has the opportunity to harness the power of digital transformation to drive sustainable development, strengthen its economy, and improve the quality of life for its people. It is our hope that this report serves as a valuable resource for policymakers, stakeholders, and development partners in shaping the country's digital future.

Yevgeniy Zhukov
Director General, Central and West Asia Department
Asian Development Bank

Acknowledgments

In 2022, the Asian Development Bank (ADB) began the technical assistance (TA) project "Pakistan's Transformative Digital Future: Growth Strategy and Roadmap." This initiative aims to generate knowledge to inform Pakistan's transition toward a digitally empowered society and economy. It includes three sequential outputs: a comprehensive analysis of the country's digital ecosystem, a long-term strategic digital sector road map, and support for the knowledge and capacities of government officials on new internet-based business models.

This report is the first of these three outputs, and it aims to provide an overarching diagnosis and situational analysis for the transformative digital future of the country. It identifies key development issues relating to the digital sector to examine potential areas of support.

We would like to acknowledge with sincere appreciation the valuable assistance provided by the various federal and local development agencies of Pakistan.

We would also like to thank the country representatives and/or managers of development partners, professionals, experts, and other stakeholders who were consulted during the course of this work for their time and valuable input. The team is especially thankful to the Digital Development Unit team of ADB for their ongoing support and vital contributions. The project team is grateful to Yong Ye, country director, Pakistan Resident Mission, for providing overall guidance to the project.

The TA team acknowledges the contributions of the Sustainable Development Policy Institute to the consultations and the initial draft report.

The team also thanks the chapter authors Parvez Iftikhar, Osman Nasir, Jordanka Tomkova, and Mukhtar Paras Shah for their expert inputs during the finalization of the report. Noman Ali created the visualizations.

Special thanks are due to Nasruminallah Mian, senior programs officer, ADB and Khayyam Sohail Abbasi, manager implementation (TA-10060-PAK), for their integral roles within the TA team and their sustained support throughout the delivery of this output.

Abbreviations

ADB	Asian Development Bank
AI	artificial intelligence
ARPU	average revenue per user
BISP	Benazir Income Support Programme
CNIC	Computerized National Identity Card
COD	cash on delivery
CSO	civil society organization
EGDI	E-Government Development Index
EMI	electronic money institution
FBR	Federal Board of Revenue
FDI	foreign direct investment
FOC	fiber-optic cable
FTTH	fiber to the home
FY	fiscal year
G2C	government-to-citizen
GDP	gross domestic product
GSMA	Global System for Mobile Communications Association
GST	general sales tax
ICT	information and communication technology
IoT	Internet of Things
ISP	internet service provider
ITU	International Telecommunication Union
IXP	internet exchange point
KPI	key performance indicator
LEO	low earth orbit
LTE	Long-Term Evolution
MNO	mobile network operator
MoITT	Ministry of Information Technology and Telecommunication
NADRA	National Database and Registration Authority
NGO	nongovernment organization
NITB	National Information Technology Board
NTC	National Telecommunication Corporation

ODS	open data system
P2P	peer-to-peer
PECA	Prevention of Electronic Crimes Act
PIC	Pakistan Information Commission
PIF	Pakistan Innovation Fund
PITB	Punjab Information Technology Board
POS	point of sale
PPP	public–private partnership
PSX	Pakistan Stock Exchange
PTA	Pakistan Telecommunication Authority
PTCL	Pakistan Telecommunication Company Ltd.
PwC	PricewaterhouseCoopers
R&D	research and development
RDI	research development and innovation
RoW	right-of-way
SBP	State Bank of Pakistan
SDPI	Sustainable Development Policy Institute
SECP	Securities and Exchange Commission of Pakistan
SIM	subscriber identity module
SME	small and medium-sized enterprise
STEM	science, technology, engineering, and mathematics
TA	technical assistance
TIP	telecom infrastructure provider
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USF	Universal Services Fund
UX/UI	user experience/user interface

Executive Summary

Digital transformation holds the key for Pakistan to bypass traditional socioeconomic development stages and advance toward a new frontier. By harnessing digital technologies, the government can drive sustainable economic growth, increase the tax-to-gross domestic product (GDP) ratio, grow exports, boost foreign direct investment, enhance social services, and improve governance, all while reducing costs and increasing efficiency.

Digital transformation can accelerate productivity in all sectors, from agriculture to manufacturing. It can stimulate innovation, creating new business opportunities and jobs, including outside the information and communication technology and digital services sectors. Further, mobile banking and digital payment systems can boost financial inclusion, empowering the unbanked and fostering entrepreneurship. Adoption of digital technologies could attract foreign investment and position Pakistan competitively in the global market.

Socially, digital tools can democratize access to quality education and health care, reaching remote and underserved populations. E-learning platforms and telemedicine services can bridge educational and medical infrastructure gaps, ensuring broader access and better outcomes. E-governance initiatives streamline public services, enhance transparency, and foster greater citizen engagement.

Today, Pakistan's digital sector directly contributes 1.5% to Pakistan's nominal GDP, driving growth, innovation, and societal development; reducing disparities; and unlocking opportunities for societal advancement. The indirect contributions of digital technology to all the other sectors of the economy are also significant.

Pakistan is witnessing a transformation in its digital landscape driven by cloud-based systems, hybrid work environments, and process automation. One of the key drivers of Pakistan's digital transformation has been the rapid proliferation of mobile technology.

As a strategic legislative initiative, the Digital Nation Pakistan Bill 2024 was passed in January 2025. The Digital Nation Pakistan Act 2025, enacted on 29 January 2025, established the Pakistan Digital Authority to oversee digital governance, drive innovation, and ensure the secure and efficient deployment of digital technologies across all sectors.

The act also mandates the formation of the National Digital Commission (NDC), chaired by the Prime Minister and the four chief ministers, as the apex decision-making body responsible for setting Pakistan's strategic direction for digital transformation. The NDC will facilitate interprovincial coordination, oversee the implementation of digital policies at federal and provincial levels, and provide high-level oversight to align national and regional efforts. Through its mandate, the NDC aims to accelerate digital governance, enhance digital literacy, and foster technological advancements, positioning Pakistan as a competitive player in the global digital economy.

Chapter 1
The Diagnostic Framework

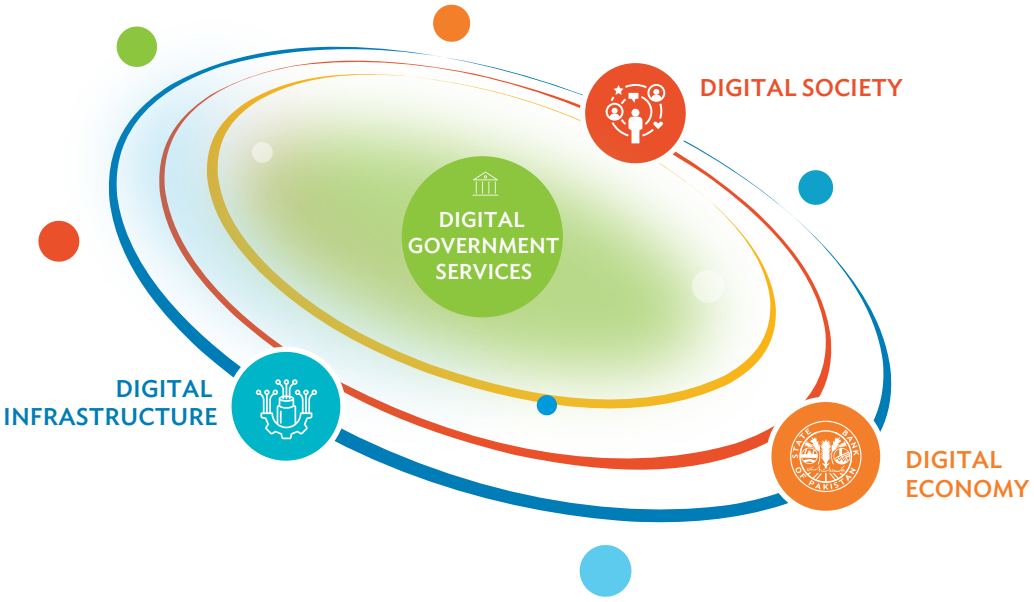
This report examines Pakistan's digital ecosystem and status, using global tools and indices to fit Pakistan's context. The report provides insights and actionable recommendations for the government, the private sector, professional associations, civil society organizations, academia, think tanks, and development partners.

The study is based on an extensive literature review, a comprehensive series of consultations with stakeholders, and a rapid provincial digital readiness assessment followed by a deep analytical aggregation of key findings.

The sections in this report are structured around four chapters (Figure 1):

- Chapter 2 zeroes in on digital infrastructure,
- Chapter 3 examines digital government,
- Chapter 4 examines the digital economy, and
- Chapter 5 explores digital society.

Figure 1: Diagnostic Framework



Source: ADB.

Each chapter also addresses enablers representing digital transformation processes. The enablers unlock potential and secure, speed up, and sustain successful digital transformation.

For this diagnostic work, five crosscutting enablers for Pakistan's digital transformation were identified:

(a) policies and regulatory and institutional frameworks;
(b) cybersecurity, data protection, and privacy;
(c) emerging technologies, such as artificial intelligence (AI) and the internet of things, applied drones, automation, and robotics;
(d) digital literacy and talent cultivation; and
(e) digital technologies for disaster risk reduction and climate resilience.

It must be noted that not all five enablers are valid for every chapter.

1.1 Digital Infrastructure

According to the International Telecom Union, every 10% increase in fixed broadband penetration in middle-income countries can accelerate gross domestic product (GDP) growth by 0.85%.[1] Pakistan's current broadband penetration, with 137 million subscriptions, is calculated as 56.5%. The penetration is entirely dependent on robust digital infrastructure.

Digital infrastructure on the ground can be divided into three "miles"—the first, middle, and last. All three rely heavily on fiber-optic cables. Unfortunately, fiber penetration in Pakistan is very low.

High capital investment; regulatory obstacles; costly and cumbersome right of way (RoW) arrangements; and high, unpredictable taxes hinder new investments in Pakistan's digital infrastructure. However, because of fierce competition among service providers, Pakistan has the world's lowest average revenue per user. It is good for the consumers, but the revenues of operators and telcos have been shrinking in real terms (e.g., United States [US] dollar). A long-standing foreign investor (Telenor) is exiting.

Of all broadband subscribers accessing the internet via wireless mobile, 97% do so in the last mile.[2] Therefore, the spectrum assumes the next highest priority after optic fibers. The scarcity of spectrum released by Pakistan is another challenge for service providers. Whenever the government releases—and auctions—space on the spectrum, its floor price is so high that telcos mostly stay away. Furthermore, the spectrum price is pegged to US dollars, leading to a further increase in the price in Pakistan rupees.

[1] R. Katz and J. Jung. 2021. Review of the Economic Impact of Broadband and Digitization through the COVID-19 Pandemic—Econometric Modelling. International Telecommunication Union (ITU). Switzerland. https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-EF.COV_ECO_IMPACT_B-2021-PDF-E.pdf.

[2] A. Saeed. 2024. Shift to Broadband Spikes Spectrum Demand in Pakistan. *Independent News Pakistan*. https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-EF.COV_ECO_IMPACT_B-2021-PDF-E.pdf.

The Telecom Policy 2015 was aimed at addressing these challenges. However, gaps exist between policy formulation and implementation due to sub-optimum monitoring and a lack of time-bound targets because of capacity challenges and a lack of institutional memory within the Ministry of Information Technology and Telecommunication (MoITT) caused by the complete reliance on short-term contract employees. An update of the 9-year-old telecom policy is also overdue.

Other challenges for digital infrastructure include power shortages and frequent internet shutdowns. Although the provinces charge a 19.5% general sales tax (GST) on broadband services,[3] they do not even help create demand for internet access, which could stimulate new private sector investments on the supply side.

Mobile internet coverage is available to over 80% of the population;[4] the rest live in geographically challenging areas. The Universal Service Fund (USF) was created to address the viability gap in such locations. It plays a crucial role in bridging the digital divide. However, despite having funds in its books lately, USF has been hampered by cash-flow issues. Surprisingly, USF also does not address the demand side, which could attract new investments on the supply side.

Even in the areas enjoying mobile internet coverage, the actual number of users is far fewer than the subscriptions (due to multiple subscriber identity module with every user). The low internet adoption is due to a lack of digital literacy/skills and socio cultural obstacles to access—especially women, with rural women facing additional barriers. The gender gap in mobile ownership in Pakistan (86% men vs 53% women) and in internet access (53% vs 33%) is significant. Women also face additional security concerns. The divide is exacerbated by the affordability issue of internet devices (e.g., smartphones).

Pakistan's adoption of new emerging communication technologies has been slow, leading to delayed transitions between technology generations, as happened at the time of the introduction of 3G. Decisive steps to address the above mentioned challenges can boost 4G adoption and lead to investments in 5G by privately held telcos.

Currently, the Pakistan Telecommunication Authority (PTA) is in the process of hiring an international consultant to help design and conduct an auction to sell spectrum for 5G technologies. Hopefully, the challenges faced by the digital infrastructure will soon be addressed.

1.2 Digital Government

Pakistan has made strides in digitalizing its public services, particularly online service delivery, but it lags behind many regional and global peers. Ranked 136th out of 193 countries in the United Nations' 2024 E-Government Development Index, Pakistan needs to enhance its telecommunications infrastructure, human capital development, and data governance.

[3] Pakistan Telecommunication Company Ltd. (PTCL). 2024. Taxes Applicable on PTCL Services. https://ptcl.com.pk/Home/PageDetail?ItemId=342&linkId=895.

[4] Pakistan Telecommunication Authority (PTA). 2023. *Annual Report 2023*. https://www.pta.gov.pk/assets/media/pta_annual_report_12022024.pdf.

A 2024 Rapid Provincial Digital Readiness Assessment by the Sustainable Development Policy Institute identified challenges and opportunities for provincial digital transformation, emphasizing the need for clear action plans, comprehensive digitalization, and advanced digital architecture. McKinsey Global Institute highlights that digital financial services alone could boost Pakistan's GDP by 7 percentage points and create around 4 million jobs. However, the 2023 Economic Survey of Pakistan notes that information and communication technology (ICT) is vital for future economic growth.

Key areas requiring attention for a more effective digital government include digital service design, data governance, cybersecurity, public sector digital skills, and citizen engagement. Between 2016 and 2023, around 40 federal ministries developed E-Office platforms, but the absence of universally adopted user experience standards remains an issue. The World Bank ranks Pakistan in category B on the Government Tech Maturity Index, while India, for example, ranks in category A.

The Digital Pakistan Policy (2018), Cloud First Policy (2022), and Cyber Security Policy (2021) form the backbone of Pakistan's digital governance framework.

These policies aim to integrate government databases, ensure secure ICT environments, and promote the use of cloud technologies. The Personal Data Protection Act, 2023[5] aims to regulate personal data management and establish a National Commission for Personal Data Protection.

Various government agencies support digital initiatives. The MoITT spearheads policy and strategic planning, while the PTA regulates telecom services. The National Information Technology Board (NITB) provides digital solutions and technical support across government departments.

Provincial bodies like the Punjab Information Technology Board and Khyber Pakhtunkhwa Information Technology Board have implemented significant e-government projects. National entities like the National Database and Registration Authority play a crucial role in identity management and e-governance, contributing to initiatives such as the Computerized National Identity Card (CNIC) and the Pakistan Online Visa System.

A tailored digital capacity-building framework is essential for civil servants, focusing on systems and design thinking, data-informed governance, and digital management and implementation. This includes fostering problem-solving, strategic planning, data literacy, privacy awareness, legal knowledge, AI basics, human-centered solutions, change management, agile methodologies, and digital leadership. Expanding digital literacy through public sector colleges, establishing ICT education, and modern ICT labs in schools can aid in this transformation. Additionally, creating ICT incubation centers can foster innovation.

Government-to-government and government-to-citizen services are progressing, with initiatives like the City of Islamabad app and Pakistan Citizen Portal enhancing service delivery. However, resistance to change among public officials, limited budget allocations, and lack of systematic digitalization across departments remain challenges. Public–private partnerships can help finance digital transformation, which requires sustained political leadership and favorable policies. Effective data governance is crucial, but current practices lack uniformity; a comprehensive data governance policy, data-sharing mechanisms, and open data practices are needed.

[5] Government of Pakistan. 2023. *Personal Data Protection Act.* https://senate.gov.pk/uploads/documents/1676274056_117.pdf.

Cybersecurity is vital for digital transformation, with Pakistan needing to improve its cyber infrastructure, awareness, and resilience. The National Cyber Security Policy and PTA's Cyber Security Strategy aim to address these issues, but a more comprehensive and inclusive approach is required.

Digital diplomacy leverages technology to advance foreign policy, engage global audiences, and attract investment. The Ministry of Foreign Affairs uses online tools to promote Pakistan's interests and engage with the diaspora. Showcasing Pakistan's potential and opportunities on digital platforms can also attract investment in green data centers and other sectors.

Pakistan's digital transformation requires a holistic approach, steady resource allocation, proactive data governance, enhanced cybersecurity measures, and effective use of digital diplomacy to achieve sustainable progress.

1.3 Digital Economy

The digital economy has created significant positive impacts on nearly all countries, and it has become the core measure of any nation's economic strength and vibrancy. The digital economy is the sum of the activities and ingress of technological advancements of a country in the domains of digital finance, e-commerce, digital businesses, digital workforce, digitalization of small and medium-sized enterprises (SMEs) and agriculture, export of digital services and products, and the maturity of its digital startup ecosystem.

Pakistan has shown initiative in various fields of the digital economy; however, it is far from making a difference in most of these domains. The key missing factor is the long-term continuity and the interconnectivity of these initiatives for the larger economy, for a long enough period, over a wide enough span, solving problems for a large enough captive audience. The inability stems from the very structural deficiencies of the governance and management of the country, which has plagued it in other sectors as well.

Pakistan has nearly all the required technological advancement available to its institutions. It is blessed with a digital-savvy generation to introduce the necessary reforms rapidly. Yet, it has lagged by nearly a decade in adopting solutions like a countrywide person-to-person and person-to-merchant payment platform, having implemented it between 2022 and 2024. The payment cards in circulation equate to just 24% of its population (and does not represent individual card ownership). In comparison, in October 2022, the same proportion in India was approximately 71%.

Pakistan spends much less on e-commerce than its neighbor India, $10.5 billion versus $115 billion—11 times less. The country has shown notable advancement in establishing digital businesses throughout its geographical spread, in more than 130 cities in 2021; however, tech companies carry just 3% of stock exchange market capitalization. This becomes evident in the digital businesses' impact on the country's GDP, which is 1.5% compared to India's 10.5%. Similarly, Pakistan's technology services exports of $2.6 billion compared to India's of $194 billion during FY2022–23 appear insignificant.

Over 3.1 million Pakistanis are enrolled in its universities, 471,000 of whom are enrolled in science, technology, engineering, and mathematics education, and 273,000 in ICT, computer science, and software engineering-related fields. Only 12% of the eligible population of 18–25 years are enrolled in universities. The South Asian average is 25%, with India at 32% and Iran at 57%.

Comparing the digitalization of SME and micro-SME sectors, Pakistan has just 109,000 points-of-sale (POS) implemented nationwide. Agricultural digitalization and precision farming allow 45% growth in per-acre yield and 57% growth in profitability of some staple crops.

Both the SME and agricultural sectors face limited financing. Banks in Pakistan offer just 4.2% and 3.6% of their total loan portfolios to these sectors, respectively. SMEs contribute 40% of the GDP, whereas the agriculture sector is 22.9%.

Pakistan's tech startup ecosystem received $365 million in venture capital funding during 2022. However, since the subsequent rise of United States Federal Reserve rates to a 40-year high, emerging markets have become riskier for venture capital. This has resulted in a significant reduction in the number of investments in Pakistani startups.

Pakistan ranks 125th on the Frontier Technologies Readiness Index out of 166 countries in 2023, with India and Sri Lanka scoring well above this ranking.

Pakistan has immense potential to do better on all these measures. Still, it needs a clear vision and a consistent strategy from the bureaucracy, politicians, and the state rather than the usual quick fixes and superficial successes that have hindered the country's digital advancement.

1.4 Digital Society

Seen globally, Pakistan's digital progress is mixed when compared with regional peers like India and Viet Nam. Pakistan ranks low in indicators such as the United Nations E-Participation Index and the Internet Inclusive Index.

Digital inclusion efforts that focus on providing digital access to women, low-income households, people in rural areas, people with disabilities, and older people are expected to transform society. Some organizations have successfully launched e-services, but confidence in data privacy and digital services needs to be fortified. In many cases, digital access is useless because of language issues, particularly in remote rural areas.

The digital divide in Pakistan goes far beyond disparities among ethnic minorities, socioeconomic groups, and the underprivileged. Social norms in Pakistan impose significant restrictions on women accessing the internet, who often have limited autonomy due to men's control over household decisions and low access to communication devices. Women and minorities cannot fully participate online because of cultural norms, abuse, and harassment.

The lack of good quality connectivity limits access to platforms and reduces productive engagement, in general. It impacts access to business opportunities, health care records, and leisure activities. Students, for example, also face challenges related to access, such as unreliable internet connectivity and limited availability of digital resources.

The digital sphere can potentially exacerbate social tensions and contribute to polarization. Freedom on the internet is grounded in Article 19 of the Universal Declaration of Human Rights, advocating for freedom of opinion and expression. While Article 14 of the Pakistani Constitution guarantees the right to privacy, the government regulates online spaces through the Prevention of Electronic Crime

Act, allowing extensive monitoring and content blocking. Disruptions in digital information access also occur during exigencies in the form of internet shutdowns. Nongovernment organizations, media, and judiciary advocate for digital rights. Internet speech regulations have exacerbated societal tensions, revealing its darker aspects.

"Open Data" initiatives can enhance government efficiency, empower citizens, and create economic opportunities, although Pakistan's openness needs improvement. Pakistan's low cybersecurity preparedness exacerbates these issues and impedes digital transformation.

Pakistan's government has not undertaken any serious initiatives to raise public trust and awareness about data privacy, misinformation, and safe technology use. Misinformation is a significant challenge, influencing public opinion and behavior, particularly in politically and religiously charged environments. Ethical concerns about emerging technologies such as AI and facial recognition highlight the need for transparent technology governance.

The rise of social media platforms as virtual communication spaces has transformed interpersonal connections in Pakistan. In 2023, approximately 72 million social media users were registered in Pakistan. Instant connectivity helps families (especially women) who live far apart share their moments, thoughts, and emotions. Many in Pakistan are deeply interested in politics and religion, which is a significant factor as any related false information can create grave issues.

Digital space has opened up new possibilities for social activism. Challenges related to human capital, networking, fundraising, and advocacy have become more responsive and result-oriented. Pakistan has about 45,000 active nonprofit organizations, with over 6 million members.

On the other hand, digital initiatives like e-courts, which deal with family law cases online, enhance access to justice through technology. This digital transformation can significantly improve legal access for disenfranchised groups.

A digital society in Pakistan can lead to the creation of services that focus on meeting the demands of both citizens and businesses. Citizens can continuously improve their skills, respond to changing challenges, and work more effectively across agencies, building stronger relationships with citizens and businesses.

The government has implemented policies, like the Digital Pakistan Policy 2018, to address challenges and promote digital inclusion and innovation.

Chapter 2
Digital Infrastructure

Key Diagnostic Findings

- There is an urgent need to expand the fiber-optic network in Pakistan to provide high-speed and reliable internet connectivity. The government should address the right-of-way (RoW) issues that impede the deployment of digital infrastructure and should create a conducive environment for the private sector to invest in fiber-optic networks that are open to all without any discrimination.
- Pakistan's digital infrastructure faces a major challenge from high taxation. Taxes on this sector, both federal and provincial, are some of the highest globally and regionally, and the tax policies tend not to be very consistent. The analog processes of tax authorities are not user-friendly and impose a hidden compliance burden on taxpayers. The cost of service provision exacerbates the digital divide, especially for women and marginalized groups, who face asymmetric cost and cultural barriers to accessing the internet.
- The telecom sector's spectrum allocation and pricing are inefficient and uncompetitive, limiting the quality and coverage of mobile services. The spectrum auction starting prices and commercial conditions need to be reasonable and attractive for operators. This would facilitate the timely and cost-effective launch of 5G technology and enable new applications and innovations in the digital economy.
- The telecom sector in Pakistan has experienced a decline in revenues and foreign investment, which reflects a very challenging business environment. A renewed focus is needed by the government on engaging with investors and industry stakeholders to address their concerns and provide incentives and facilitation to invest and operate in the country. This would also help to revive not only telecom sector but also every other sector, as telecom acts as an enabler for others. It would encourage investment and create more employment and growth opportunities.
- The provinces have a critical role to play in the development and utilization of digital infrastructure, as they are responsible for providing public services and collecting GST on broadband services. The provinces could help stimulate demand for internet-based services, such as fiber-optic broadband internet for schools and hospitals, especially in tier 2 and tier 3 cities and towns. This could also help to improve the quality and efficiency of provincial public services and enhance citizens' social and economic welfare.
- The Universal Service Fund (USF) is a valuable resource for expanding digital infrastructure in unserved areas of the country, and its proper use can stimulate more investments in such areas. The diversion of the fund for objectives other than those specified under the 1996 Pakistan Telecommunication (reorganization) Act violates the licensed rights of all telecom operators and contradicts the USF rules.
- The telecom sector lacks an influential association that can shape policy through dialogue, reliable research, or collaboration. The telecom sector is crucial for data communication, creation, and transmission, and for new technologies like 5G that can enable all other sectors to develop. However, the telecom operators, while often highlighting a difficult business climate, do not have a significant influence on strategic regulatory development despite being a high tax contributing segment.

Key Recommendations

- Establish a predictable policy framework that encourages private investment in digital public infrastructure. The rules and regulations that operationalize policies and regulate digital businesses need to support innovation and competition.
- Mandate a flat country-wide optimal RoW fee per meter and provide for a predictable rise over a longer period.
- Rationalize all digital infrastructure taxes, both direct and indirect, making them competitive against a basket of countries, and fix sector tax rates for at least 10 years.
- Fix future spectrum floor prices in consultation with stakeholders and de-link the prices from the US dollar.
- Provinces need to generate demand by subscribing to fiber broadband for schools and hospitals to boost digitalization in the education and health sectors, which are provincial subjects. With those "anchor customers," internet service providers (ISPs) will be able to invest in fiber connections for businesses and households.
- The government needs to prioritize early-stage catalytic investments in digital infrastructure projects as these investments are typically capital-intensive and have long payback periods. That would signal a strong commitment and would draw attention to the digital economy.
- Reform USF to channel its funds in ways that attract investors to unserved areas. This can be done by funding through telecom infrastructure providers instead of service providers, and by funding demand generation projects (such as the Smart Village Project and smartphones).
- USF investments need to be used to lay fiber optic up to all the Union Councils to take connectivity to rural areas.
- Promote local manufacturing of smartphones, as against "dumb" (2G) phones, through a well-conceived set of incentives for private sector and foreign direct investment (FDI).
- To enable smartphone exports, provide 3% research and development (R&D) allowance on exports of locally produced smartphones, as promised in the "Mobile Devices Local Manufacturing Policy 2020".
- Create a robust enabling legal and regulatory framework for development and implementation of public–private partnerships (PPPs) for digital infrastructure. Such programs must be restricted to "open access" digital infrastructure (i.e., the infrastructure so built must be available to all service providers without any discrimination).
- Expand internet access and device ownership for citizens, especially women; work with local actors and global partners to design tailored PPP programs; and provide low-cost (or easy installment-based) smartphone choices.

2.1 Overview

A stable digital infrastructure is essential for digital inclusion, economic growth, and global competitiveness. There have been some improvements in the country's digital infrastructure. As per the 2024 PTA Annual Report, Pakistan's (voice) telecom subscribers have grown by about 20% over the past 5 years, reaching 196 million by the end of 2023–2024 (Table 1). At the same time, broadband internet subscribers crossed 142 million, reflecting a 100% growth over the last 5 years.

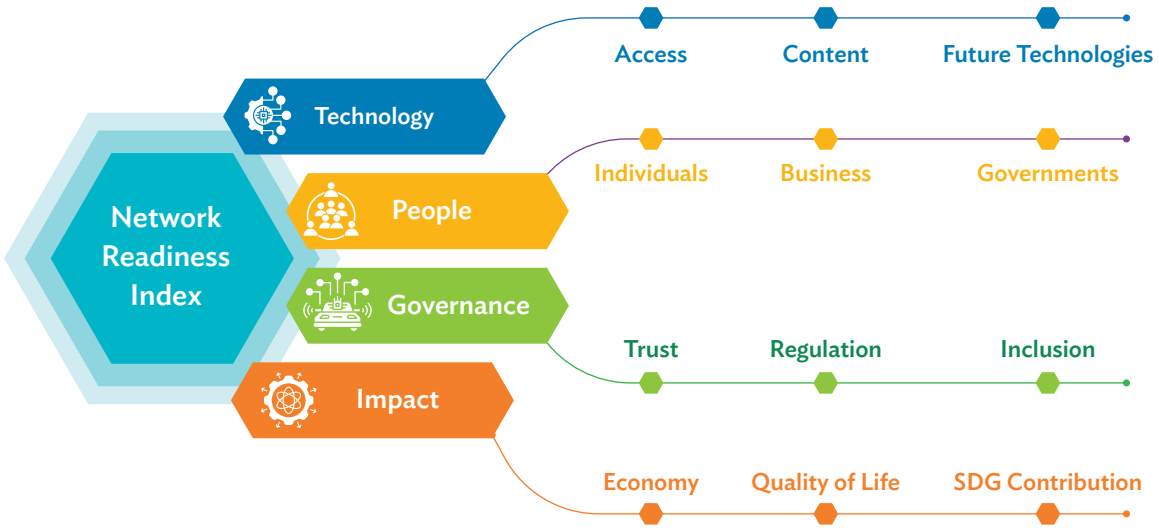
Table 1: Key Telecom Indicators for Pakistan

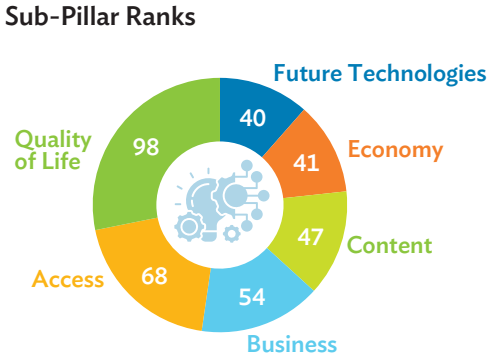
Indicator	Value
Telecom subscriptions (millions)	196
Broadband subscriptions (millions)	142.3
Fixed broadband subscriptions (millions)	3.6
Mobile broadband subscriptions (millions)	138.7
Broadband penetration, December 2024 (%)	58.4
Fixed broadband penetration, December 2024 (%)	1.3
Mobile broadband penetration, December 2023 (%)	54.8
Share of mobile broadband subscriptions, 2024 (%)	97.5
Share of fixed broadband subscriptions, 2024 (%)	2.5
Mobile broadband internet traffic per subscription, 2024 (GB)	93.9
Fixed broadband internet traffic per subscription, 2024 (GB)	3,366.7

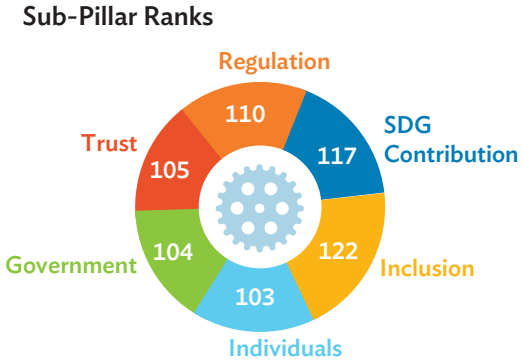
GB = gigabyte.
Source: Pakistan Telecommunication Authority Annual Report. 2024.

Internet access is not the same everywhere in Pakistan. Networks have improved more in urban areas, leaving rural areas behind. Regulations and infrastructure security are also uneven across the country. Service providers face challenges such as high taxes, low margins, and regulatory barriers, which limit their ability to reach more customers and offer a dependable and high-quality internet service (Figure 2).

Figure 2: Network Readiness Index, 2023







High scores: Innovation & Digital Economy	Low in Regulations, SDG Impact & Inclusion

SDG = Sustainable Development Goal.
Source: Portulans Institute. https://download.networkreadinessindex.org/reports/nri_2023.pdf.

In fiscal year (FY) 2023–24, Pakistan's telecom sector generated PRs955 billion in revenues, a 17% increase in Pakistan rupee terms from the previous year. In the last 5 years, the sector contributed PRs1.28 trillion to the national Treasury—PRs335 billion in FY2023–24 alone. Over the same 5 years, the total investments in Pakistan's telecom sector have been about $5.7 billion (footnote 4).

However, the Pakistan Economic Survey 2023–24 reported that the FDI in digital infrastructure has dropped from $1.67 billion in 2021–22 to $750 million in 2022–23.[6] It is not a surprise that a comparison of Pakistan's digital landscape with that of other countries does not show a very positive picture (Table 2).

A closer look at the indices reveals more insights; for example, examining one key index, i.e., the International Telecom Union (ITU) ICT Development Index 2023, shows that Pakistan's sub-index score on the population covered by 4G/Long-Term Evolution (LTE) is the lowest in the region (Figure 3).

Table 2: Pakistan's Global Information and Communications Technology Rankings

Index	Malaysia	Viet Nam	Sri Lanka	India	Bangladesh	Pakistan	Total No. of Economies
Network Readiness Index 2023	36	45	95	49	89	97	133
GSMA Mobile Connectivity 2022	52	63	93	88	122	134	170
ICT Development Index 2023	15	78	112	-	130	142	169
UNDESA E-Government Development Index 2022	53	86	95	10	111	150	193
The Economist Inclusive Internet Index 2022	34	46	59	50	64	79	100
UNDESA Telecommunication Infrastructure Index 2022	53	75	114	13	129	159	193
Global Cybersecurity Index 2020	5	25	83	10	53	79	182
B2C E-Commerce Index 2020	30	63	91	71	115	116	152

B2C = business-to-consumer, GSMA = Global System for Mobile Communications Association, ICT = information and communication technology, UNDESA = United Nations Department of Economic and Social Affairs.

Sources: GSMA; UNDESA; Economist; Network Readiness Index; B2C E-Commerce Index 2020; Global Cybersecurity Index; ICT Development Index; UNDESA E-Government Development Index.

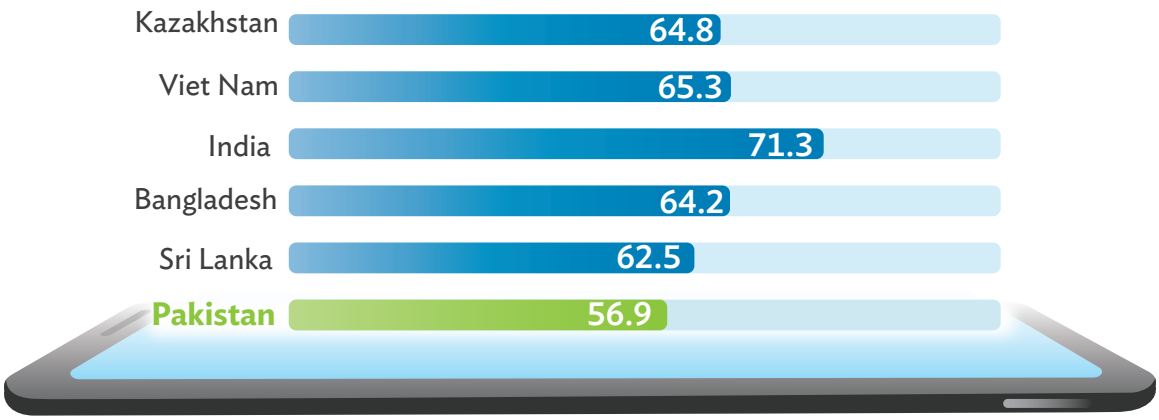
[6] Government of Pakistan, Finance Division. 2024. *Pakistan Economic Survey 2023–24*. https://finance.gov.pk/survey/chapter_24/Economic_Survey_2023_24.pdf.

Figure 3: Pakistan's 4G Coverage Compared with Other Countries in the Region

Source: ITU Data Hub.

Similarly, in the Global System for Mobile Communications Association (GSMA) Connectivity Index, the sub-index "Infrastructure" shows Pakistan having the lowest scores in the region (Figure 4).[7]

Figure 4: Pakistan's Infrastructure Sub-Index Score Compared with Other Countries in the Region



Source: Global System for Mobile Communications Association.

In the World Internet Development Report 2023, unveiled at the World Internet Conference in Wuzhen, People's Republic of China, Pakistan ranked 45th out of 52 countries. Among the six sub-indices of the report, Pakistan's lowest ranking (47th out of 52) is in ICT infrastructure.[8]

[7] GSMA. 2022. 2022—*GSMA Mobile Connectivity Index*. https://www.mobileconnectivityindex.com/connectivityIndex.html.

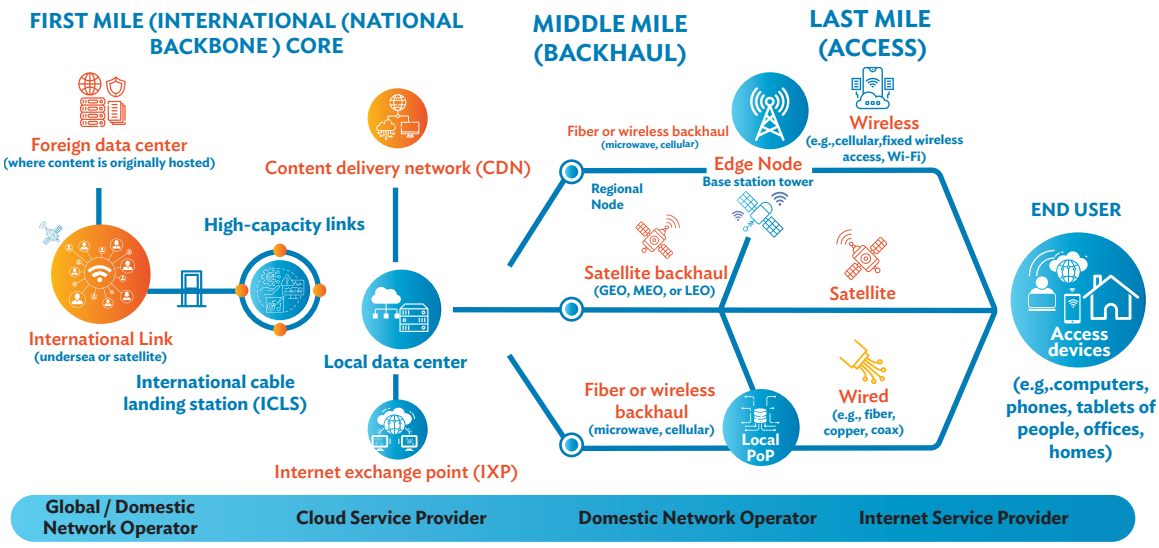
[8] *The Nation*. 2023. Pakistan Ranks 45th in World Internet Development Index. 9 November. https://www.nation.com.pk/09-Nov-2023/pakistan-ranks-45th-in-world-internet-development-index.

The above examples show how Pakistan's digital infrastructure is dragging down its overall digital rankings, which have significant implications for the government, private sector, and the country's economic performance. According to the Pakistan Economic Survey 2023–24, the ICT industry shrank by 3.02% due to a decline in telecommunication revenue (mainly spectrum fee) as well as a high Consumer Price Index deflator.[9]

For the purpose of this diagnostic report, the Chapter 2 is subdivided into the following three subchapters (Figure 5):

(a) The Three "Miles",
(b) Physical Digital Infrastructure, and
(c) The Digital Divide.

Figure 5: The Three "Miles" of Digital Infrastructure



Source: World Bank (WB) staff elaboration based on ITU (2020), from a January 2024 WB Policy Note "Better Internet for All Filipinos."

2.2 The Three "Miles" of Digital Infrastructure

The First Mile (International Connectivity)

The first mile refers to international connectivity. Nowadays, this connectivity is almost always over undersea or terrestrial fiber-optic cables (FOCs).

[9] Government of Pakistan, Finance Division. 2024. Pakistan Economic Survey 2023–24. https://finance.gov.pk/survey/chapter_24/1_growth.pdf.

Pakistan is well connected with the rest of the world via undersea cables. Six international undersea cables land in Pakistan and carry most of its data traffic (Table 3). Pakistan Telecommunication Company Ltd. (PTCL), Transworld, and Cybernet are the local operators of these international FOCs (mostly as consortium partners).

Table 3: International Undersea Fiber-Optic Cables Connecting Pakistan

Undersea Cable	Pakistan Operator	Capacity (Tbps)
TWA-1	Transworld Associates	1.48
SEA-ME-WE-4	PTCL	1.05
IMEWE	PTCL	1.92
SEA-ME-WE-5	Transworld Associates	1.40
AAE-1	PTCL	4.79
PEACE (Pakistan East Africa Cable Express)	Cybernet	1.60

Tbps = terabit per second.
Source: PTA.

In addition, four more undersea cables are expected to come into operation by the end of 2025 (Table 4).

Table 4: International Undersea Cables to Pakistan Under Construction

Cable	Pakistan Operator	Length (km)	Connecting
Africa-1	PTCL	10,000	Marseille, France, spanning six countries: Djibouti, Egypt, Kenya, Saudi Arabia, Sudan, United Arab Emirates
SEAMEWE-6	TWA	22,000	Singapore to Marseille, France, spanning 15 countries (including Pakistan)
2Africa	TWA	43,000	33 countries, mainly African
MGG-1	Cybernet		Pakistan and Oman

MGG-1 = Makran Gulf Gateway-1.
Sources: Ministry of Information Technology and Telecommunication; Pakistan Telecommunication Authority.

Some of Pakistan's international traffic is also carried overland (terrestrial links), consisting of 19 telecom links to neighboring countries, 9 microwave links, and 10 fiber-optic links.

International Satellite Connectivity

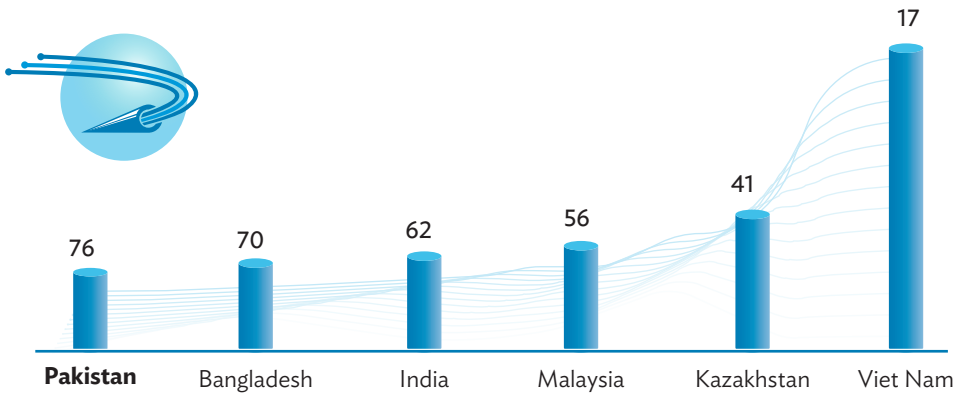
Pakistan began using geostationary Intelsat C band satellite services in the 1980s. Then, in 2011, Paksat-1R was launched. Paksat 1R's design life will expire in 2026, so Paksat MM1 is now being deployed.

International satellite connectivity is not just a relic of the past when it was the main mode of international connectivity; rather, it is also useful for other purposes, such as times when undersea fiber-optic cables are severed (Box 1).

Pakistan's international connectivity seems adequate; however, the proximity of all undersea cable-landing stations near Karachi could pose a risk to international connectivity security. A few landing stations away from Karachi (e.g., Gwadar) could be advisable.

Although Pakistan started deploying its first FOC networks (in the so-called "junction networks" in nine cites) very early, in 1991, currently, the FOC penetration in Pakistan is low. Pakistan ranks 76th out of 93 economies in Omdia's Fiber Development Index 2023 (Figure 6).[10]

Figure 6: Regional Countries Outpace Pakistan in Fiber-Optic Development



Source: Omdia. 2023.

Box 1: Fiber-Optic Cables

Fiber-optic cables (FOCs) are the backbone of the internet. FOCs are used in international undersea connections, domestic long-distance networks, metropolitan areas, and homes/premises/mobile towers.

As a broadband internet access technology, only FOCs provide an optimized, highly sustainable, future-proof service. This level of quality is essential for developing all kinds of digital services and applications.

OFC = optical fiber cable.
Source: Author.

[10] Omdia. 2023. *Fiber Development Index: 2023. 10 August*. https://omdia.tech.informa.com/om032629/fiber-development-index-2023.

Middle Mile or Domestic Long-Distance and Metro Connectivity

The domestic long-distance network connects cities and towns and various locations within large cities. In Pakistan, domestic long-distance networks have approximately 66,000 kilometers (km) of FOCs .

There are 21 Long-Distance International licensees. Out of these, only PTCL, Wateen, Multinet, Jazz, TWA, Cybernet, and the National Telecom Corporation (NTC) own FOCs. However, that could change as the new/renewed Long-Distance International license obligates the licensee to establish and maintain their own FOC network covering at least 1,500 km, within 6 years of the license date (footnote 4).

Thanks to the USF,[11] under the MoITT, FOCs have reached almost every *tehsil* (sub district) headquarters. So far, USF has subsidized 6,447 km of FOCs, connecting 56 hitherto unserved *tehsil* headquarters and 26 other remote small towns (mainly in Balochistan) where private sector telcos would not venture because of the absence of a business case. More about USF is given in the section on "Geographic Digital Divide."

Last Mile

There are two kinds of last-mile connectivity: fixed line and wireless mobile. The following is an overview of the current state of both types of infrastructure.

Fixed-Line Last Mile

Fiber to the home (FTTH) (also known as "fiber to the premises" or "fiber to the tower") brings FOCs directly to the users' homes or premises, ensuring end-to-end connectivity. This results in strong, dependable, and fast broadband.

It also creates positive effects across economic sectors, improving overall efficiency, generating employment, and boosting GDP growth. FTTH penetration is just 0.68% (or less than 10% of households), which is around one-third of the Asia and the Pacific average.[12] Therefore, the potential to fully use the internet's capabilities (which only FTTH can enable) is limited, preventing the development of a truly vibrant digital environment (Figure 7).

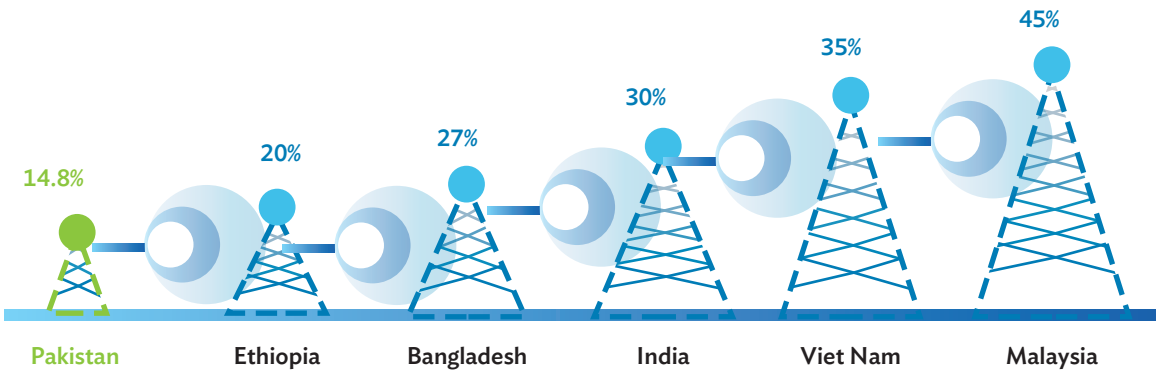
Pakistan's metro areas have about 90,000 km of FOCs, including FTTH networks. Nevertheless, FTTH networks only reach a paltry 1% of homes and businesses, while Viet Nam has 44.5% and Malaysia has 32.1%. Moreover, most FTTH deployments happen in the wealthy areas of the top 10 Tier-1 cities; many Tier-1 areas with lower income and most of the Tier-2/Tier-3 cities do not have FOCs, even though they are linked to the national FOC backbones. Most people in those areas depend on wireless mobile internet, which is not as reliable as FTTH.

---

[11] Universal Service Fund (USF) Pakistan. 2024. NG-OF NETWORK & SERVICES PROGRAM. https://www.usf.org.pk/programs/ng-of-network-services-program.

[12] PTA. 2024. Subscribers. https://www.pta.gov.pk/category/telecom-indicators/164#ftth-subscribers (accessed 5 September 2024).

Figure 7: Low Fiber Penetration Due to Limited Mobile Cell Connectivity



Sources: Author; PTA Annual Report. 2024.

It is not just the fixed networks where FOCs are important. The mobile broadband networks also depend on FOCs because, except for the "last mile" (i.e., from the tower to the mobile device), all connectivity is on FOCs. However, in Pakistan, only about 14.8% of cell sites are connected with FOCs for backhaul traffic (Figure 8), with the rest relying on microwave radio links.

Unlike FOCs, the capacity of a radio backhaul link is limited. The capacity of microwave radios used to be sufficient for voice telephony. However, with rapidly increasing data consumption, these radio links cause degradation in broadband quality. Therefore, with the rapid growth in internet usage and upcoming 5G launches, connecting cellular towers with FOCs has become vital.

GSMA forecasts that an average of 18,000 cell sites will be connected with fiber optics by 2025.[13]

Challenges to FTTH. There are several reasons for this lack of FOC penetration in the low-income localities of Tier-1 cities, and Tier-2 and Tier-3 cities overall.

(i) The FOC business is capital-intensive, with slow rates of return. The operational cost of FOCs is also high due to frequent cable cuts (thanks to road expansions, etc.). Financing products and blended risk mitigation strategies to reduce the cost of capital and risk perception could help, for example, by catalyzing financing with soft loans or grants in the case of middle- and last-mile FOCs.

(ii) RoW permissions are difficult and expensive, which discourages network growth and new entrants (Table 5). Recently, it has been decided that Pakistan Railways will charge a fixed RoW fee of up to PRs36 per km per year. It should be noted that this fee is only ₹1 per km for life in India.
There are no guidelines/codes for road/railway/city authorities to provide ducts under roads and rails to be used for FOCs. Legislation to have a uniform optimal country-wide rate could be helpful.

[13] J. Saunders and N. Marshall. 2018. Mobile Backhaul Options: Spectrum Analysis and Recommendations. GSMA. https://www.gsma.com/connectivity-for-good/spectrum/wp-content/uploads/2019/04/Mobile-Backhaul-Options.pdf.

(iii) There is little visible demand for FOCs. For example, there are no government plans to provide FOC connectivity to schools, hospitals, government offices, etc. The provincial governments may wish to look into this aspect.

(iv) There are no incentives for open-access infrastructure models where all ISPs can share the infrastructure belonging to a non-ISP. Hence, every ISP has to invest in its fiber optics. With open-access infrastructure, a maximum number of ISPs can share the same infrastructure.

Table 5: Right-of-Way Rates for Laying Digital Infrastructure in Pakistan

Item	India	Pakistan
Right-of-way fee for buried cables	₹1 per meter, only once	PRs35–60 per meter, every year
Mobile towers	₹10,000, only once	PRs240,000 per year
Below-the-surface boring	zero fee	PRs300–500 per meter
Use of street poles	₹100–300 per year	PRs240,000 per year

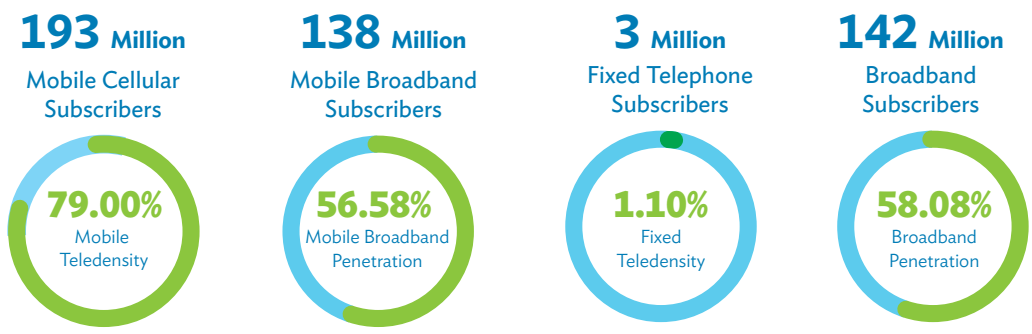
Sources: Pakistan Telecommunication Authority and author's own research.

Wireless Mobile Last Mile

The total number of cellular (telephony) subscribers is 193 million, with mobile penetration reaching almost 80% of the total population. However, only 129 million or 54% have mobile broadband internet subscriptions.[14] Meanwhile, Pakistan's telecom market ranks 8th in the world by number of subscriptions.[15]

As shown in Figure 8, most Pakistanis use broadband internet through wireless mobile last-mile connections. Although mobile broadband subscriptions have increased to 56.58%, the number of active mobile broadband users per 100 inhabitants is only 46.5%, i.e., about 112 million individuals use mobile internet. Of the 54,415 cellular mobile sites, 93% provide 4G service, which provides 4G coverage to 75.4% of the population (footnote 4).

Figure 8: Pakistan's Key Telecom Indicators



Source: Pakistan Telecommunication Authority. 2024.

[14] PTA. 2024. Telecom Indicators. https://www.pta.gov.pk/category/telecom-indicators (accessed 2 February 2024).

[15] Competition Commission of Pakistan. 2019. Market and Regulatory Assessment of Mobile Telecommunications in Pakistan. https://cc.gov.pk/assets/images/Downloads/assessment_studies/mobile_telecom_2019.pdf.

Fiber-to-the-home infrastructure sharing and deployment models. Sharing infrastructure is a good policy that could help ISPs overcome many of the challenges they face and make broadband access affordable for everyone.

It prevents network duplication and encourages efficient use of scarce resources. However, this does not happen by itself as the service providers are competitors and, therefore, lack trust. One possible option would be for ISPs to *outsource* infrastructure to neutral providers. That is the role that telecom infrastructure providers (TIPs) are supposed to play.

The business model adopted by TIPs is to lay FOCs and provide capacity to ISPs on an "open access," non discriminatory basis. TIPs also enable smaller players to compete in service provision. TIPs are handy where it is unviable for a single ISP to lay FOCs, such as in smaller cities (the unserved areas covered by USF are not under discussion here).

Various models of infrastructure outsourcing/sharing exist to accomplish deeper fiber penetration.

(i) **State-owned model:** A state-owned independent entity lays/owns FOCs and provides dark fibers (or wholesale capacity) to ISPs, as is prevalent in current and some former communist countries.
(ii) **Public sector incumbent model:** The incumbent operator acts as a TIP for all ISPs, who then rent out capacity, (e.g., in India, the state-owned incumbent BSNL). In Pakistan, PTCL cannot do it, as it competes with other ISPs.
(iii) **Group/consortium of fiber operator's model:** Some ISPs/investors form a consortium, where each ISP owns part of the FOC assets rather than investing in them separately or for a large area. Some ISPs in Karachi and Lahore have tried this model, but only to resolve the RoW issue in the most lucrative areas of the cities with the highest revenue potential.
(iv) **Neutral non-telco private investor model:** A private investor with no link to any ISP can fulfill the role of a neutral infrastructure provider who offers equal access to all the last-mile ISPs. For example, Google in Accra, Kampala, and Monrovia acts as a similar private non-telco passive infrastructure provider (Figure 9).[16]
(v) **Private infrastructure provider model:** The privately held licensed infrastructure providers lay/own FOCs and sell capacity to ISPs wholesale.

    This model is available in Pakistan but is not working on the ground. PTA has issued 46 such (TIP) licenses,[17] but so far, licensees have laid hardly any FOCs, nor are they under any legal obligation to do so. TIPs do not qualify for some of the telco-related tax concessions, as they are not considered "Telecom" entities. For example, TIPs cannot pay the same percentage of minimum withholding tax allowed for telcos.

[16] K. Wulff. 2013. Launching Project Link: A New Way to Bring Faster, More Reliable Internet Access to Uganda. *Google Africa Blog*. 20 November. https://africa.googleblog.com/2013/11/launching-project-link-new-way-to-bring_20.html.
[17] PTA. 2024. Telecommunication Infrastructure Provider (TIP) Licensees for Pakistan. https://www.pta.gov.pk/assets/media/sr14_list_tip_lic_pak_15-05-2024.pdf (accessed 10 September 2024).

For this "infrastructure provider" model to work, the TIPs will first have to overcome all the challenges explained in the previous subsection. In addition, finding investors ready to invest in locations that do not offer quick returns (Tier 2/3 cities; and underserved localities of large cities) is a big challenge. Therefore, TIPs will need the government's help in demand creation and seed funding.

(vi) **Public–private partnership model:** The government selects a private sector-licensed TIP ("concessionaire") through an open process (Box 2). The concessionaire lays FOCs in the earmarked locations and then leases out capacity to the last-mile ISPs (and any other users, such as banks, etc.).[18]

In the PPP model, the government supports by creating demand (purchasing FOC connections for schools, health care centers, and government offices); it thus acts as a passive enabler. Meanwhile, the private concessionaire provides expertise in constructing and managing FOC networks. The ISPs focus on service delivery, not infrastructure.

Figure 9: Example of Non-Telco Model

Source: Google, Project Loon. https://x.company/collection/loon/

[18] TIP evaluates the development and deployment of telecommunication infrastructure within a country. It includes metrics such as internet bandwidth per user, mobile and broadband subscriptions, and the overall accessibility of telecommunication services.

Box 2: Singapore's Model for Open Access Fiber Infrastructure

Singapore used to follow a reasonably good incumbent-led model. The underground buried fiber infrastructure belonged to the incumbent SingTel. Yet, the government felt that it was not "open" enough because several intending internet service providers or ISPs were not getting easy access to that infrastructure. Therefore, the government decided to create a neutral passive infrastructure provider.

In 2005, the government separated the existing fiber infrastructure from the provision of services. Then an open selection process was conducted to award a license for passive infrastructure (called NetCo) and a license for operations (OpCo) under a three-tier framework—the third tier being retail service providers or RSPs.

Singapore soon reached full fiber coverage and became the first country to offer 1 gigabit per second nationwide at affordable prices, confirming the strong business case fundamentals of a separate neutral passive infrastructure.

Source: Infocomm Media Development Authority of Singapore (IMDA). 2010. Singapore's Next Generation Nationwide Broadband Network. https://www.imda.gov.sg/-/media/Imda/Files/Community/Consumer-Education/Fibre-Broadband/IDA_INFOKIT.pdf.

The ownership of such an FOC network rests with a Special Purpose Vehicle. Either its revenue is shared with the government, or the concessionaire pays a fixed recurring amount for the duration.

Box 3: Sweden's Stokab Model

Although not strictly public-private partnership, but similar, Sweden follows one of the most successful models in the world, called Stokab. Established in 1994, Stokab is a private limited company owned by Stockholm City Council, which is fully independent in its operations. It owns nearly 10,000 kilometers of optical fiber cables that it has installed, almost all underground, connecting various parts of the city and its surroundings.

Stokab provides "open access" to unused strands of "dark fiber" connections between requested locations.

Stokab's customers are either retail internet service providers or ISPs; wholesale bandwidth sellers; or large users like local authorities, banks, etc.

Over 150 municipalities in Sweden and many cities in other European countries follow the Stokab model. A July 2020 study by Arthur Little reports that such open access fiber encourages new investments from traditionally non-telecom players. Typically, up to 80% of funding is now being obtained from such third-party non-telecom entities, bringing fresh capital to the telecom industry and providing much-needed funding relief to the telecom sector.

Source: Stokab; Arthur D. Little. Open Access Fiber.

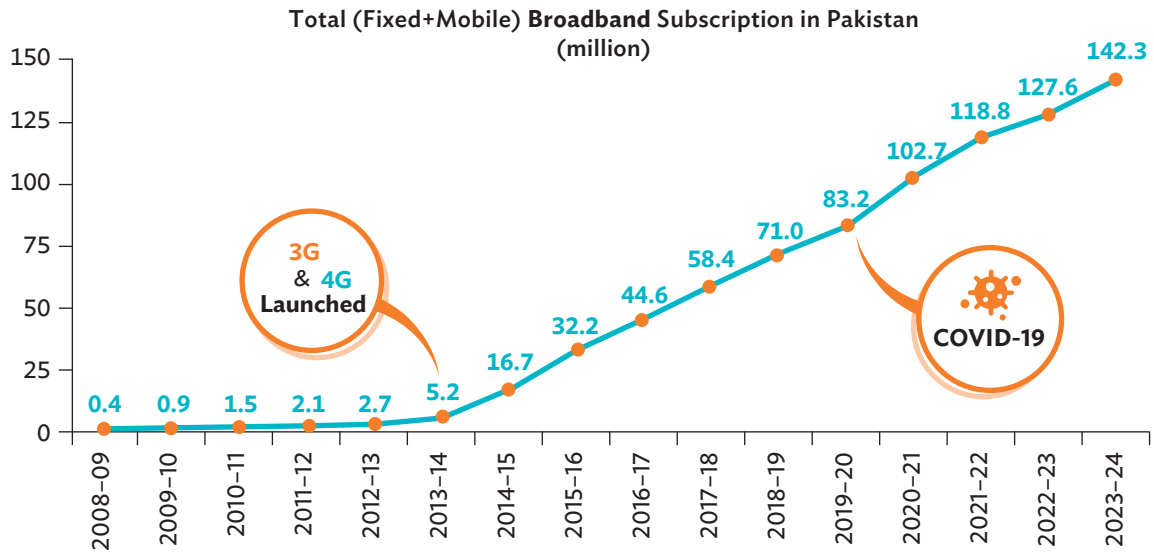
A cell site or a radio base station is the point with which the mobile device is connected wirelessly (Figure 10). On the other hand, the cell site is connected to the rest of the network (backhaul) over FOC or a microwave radio link. Cell sites mostly consist of towers or building tops (indoor cell sites are not covered in the discussion here).

Quality of service. In March 2024, PTA released the results of its Quality-of-Service Survey for cellular services. There are seven key performance indicators (KPIs) evaluated by the PTA in 17 Pakistani cities.[19]

The survey results found mobile operators improved network latency and webpage loading time compared to previous surveys. Operators employing advanced technologies like LTE Carrier Aggregation and Voice over LTE deliver better quality services. However, no mobile network operator (MNO) was found fully compliant in the Ookla Speed Test that measures user data download and upload throughput and round-trip time/latency.[20]

Relatively, Jazz was found to be "most compliant." Certain KPIs fall below licensed thresholds in certain areas, which means that there are deficiencies in achieving the *same level* of coverage for everyone.

Figure 10: Growth of Broadband Subscriptions in Pakistan, 2008–2024



Source: Pakistan Telecommunication Authority annual reports.

[19] PTA. 2024. PTA's QoS Survey Evaluates Cellular Services. https://www.pta.gov.pk/category/ptas-qos-survey-evaluates-cellular-services-1383623172-2024-07-04. (accessed 3 September 2024).

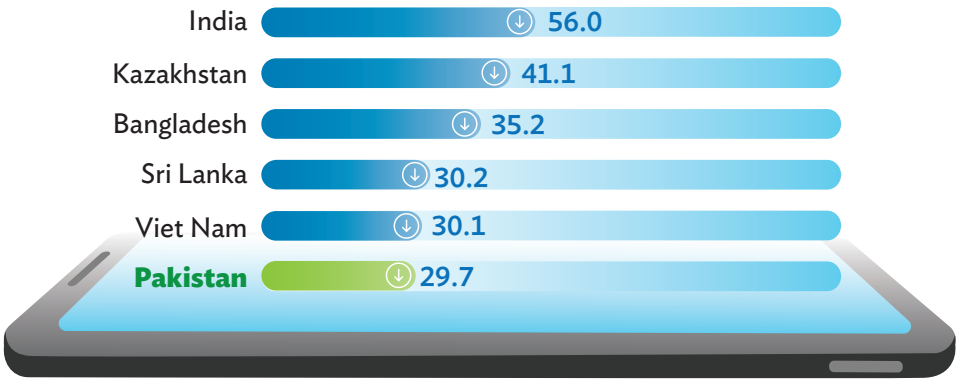
[20] Speedtest Global Index. https://www.speedtest.net/global-index/pakistan#mobile (accessed 11 March 2024).

Because of poor service quality, users (particularly the youth) in smaller cities find themselves at a disadvantage as far as digital inclusion is concerned. That is one of the reasons why only 13% of ICT companies operate outside the three main cities of Karachi, Lahore, and Islamabad.[21]

Mobile Connectivity Challenges

(a) Spectrum. According to GSMA, the spectrum available to Pakistan's mobile operators is one of the lowest in the world. In the meantime, other countries continue to push ahead, offering more spectrum to the mobile wireless ISPs .

Figure 11: Spectrum Sub-Index Based on the Spectrum Assigned to Mobile Operators



Source: Global System for Mobile Communications Association.

Since the beginning of 2021, three successive governments announced that they would organize spectrum auctions to sell a large amount of spectrum for 5G, but none of those announcements came to fruition (Table 6 and Box 4). It may be noted that the MNOs fear that with the release of more spectrum, they will be pressured to launch 5G services.

[21] Pakistan Software Houses Association. 2023. Unleashing the Potential of ICT & ITeS Sector. Policy paper. https://www.pasha.org.pk/wp-content/uploads/Budget-Recommendations-2023-by-P@SHA.pdf (accessed 30 August 2024).

Table 6: Timeline of Spectrum Auctions in Pakistan

Year	Band	Spectrum Offered (MHz)	Spectrum Sold (MHz)	Per MHz Base Price ($ million)	Remarks
2004	900/1,800	13.6	13.6	-	Bought by Telenor & Warid
2014	850	7.38	0	291	UNSOLD (was reserved for some new entrant)
	1,800	20	10	21 / MHz (210)	• 10 MHz sold to Zong at base price • 10 MHz remained unsold
	2,100	30	30	29.5 / MHz (295)	• 10 MHZ sold to Jazz • 10 MHZ sold to Zong • 5 MHZ sold to Ufone • 5 MHZ sold to Telenor
2016	850	10	10	39.5 / MHz (395)	Bought by Telenor (single bidder)
2017	1,800	10	10	29.5 / MHz (295)	Bought by Jazz (single bidder)
2021	1,800	12.8	9	31/MHz	• 9 MHz sold to Ufone at base price • 3.8 MHz remained unsold
	2,100	15	0		Unsold

Mhz = megahertz.
Source: Author.

However, they contend that, with the lowest-in-the-world average revenue per user (ARPU), exorbitantly high taxes, low adoption of 4G/smartphones, and multiple other outstanding sector issues, it will be extremely challenging to convince their parent companies to invest in 5G roll out in Pakistan.

The government holds a huge amount of spectrum ready to be released at short notice. From 700 MHz band to 3,500 MHz band, more than 600 MHz spectrum can be made available.[22] Compared to the ITU's recommendation of 840 MHz for mobile broadband internet,[23] the MNOs in Pakistan have only 274 MHz of spectrum. The government's priority seems to be to obtain a higher spectrum price than acknowledging its current and future contribution to the economy.[24]

[22] For those interested in technical details, this can be done by allocating the 700MHz band for mobile services, repurposing spectrum in the 1,950MHz–1,980MHz/2,140MHz–2,170MHz range, reassigning and renewing licenses for 900MHz and 1,800MHz spectrum, and allocating previously unassigned spectrum.

[23] The World Bank. 2021. 5G Readiness Plan for Pakistan (Final Draft), https://moitt.gov.pk/SiteImage/Misc/files/World%20Bank-%20TA%20Advisory-%205G%20Readiness%20Plan%20for%20Pakistan.pdf

[24] Various sources including i) ITU: Spectrum Auction and the Case Study from Pakistan, https://www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Documents/Events/2015/March-DigitalEconomy/Session3-2_Syed_Ismail_Shah_1.pdf; and ii) PTA: Spectrum Auction in Pakistan 2021, https://www.pta.gov.pk/category/spectrum-auction-in-pakistan-2020-21-1073285265-2023-05-30

(b) Power outages. Energy costs make up a significant part of running tower sites. Power outages are not a new phenomenon and have caused many internet service disruptions. Energy price hikes driven by the rising cost of fuel have also negatively impacted profitability and the outlook does not show signs of improvement. In January 2023, widespread power outages in Pakistan deactivated numerous mobile phone towers, potentially leading to a complete telecommunications blackout in certain regions.[25]

The power sector regulator, NEPRA, does not recognize telecom as an "industry"; therefore, the MNOs pay higher commercial tariffs rather than the justified lower industrial tariffs.

(c) Internet shutdowns. Ostensibly, security reasons have been a great cause of harm, not only for the MNOs, but also for the thousands of individuals and businesses who depend on internet-based platforms. They include knowledge workers, professionals working from home, small businesses run from homes over the internet (e-commerce), home (especially food) delivery operatives, and ordinary people relying on the internet access for various activities such as education, transport, navigation by using internet maps, etc.

Cellular infrastructure sharing. Sharing space on mobile towers or ducts avoids constructing new towers. Consequently, it reduces capital expenditure, increases network coverage, enhances competition, and lowers consumer prices. Cumbersome and costly RoW issues faced by FOC owners also add to the woes of cellular site owners; for example, a "Sky Tax" is also applied for cell sites in some localities.[26]

There is no spectrum sharing and trading framework to optimize frequency resource utilization. If one MNO can spare some of its spectrum at a location where another is struggling due to lack of spectrum, there is no mechanism that the rare national resource, spectrum, can be shared or traded. This means lost opportunities to maximize spectrum efficiency, reduce costs, improve service quality, foster competition, and contribute to the environmental goals in the telecom sector.

Each time, the sale price of the previous spectrum auction is fixed as the floor price of the next auction. Additionally, the price is pegged to the US dollar. Thus, due to the devaluation of Pakistan rupee, the base price in PRs climbs even higher. MNOs earn revenues in Pakistan rupees; therefore, it makes little sense to demand the price of a locally available "commodity" in equivalent US dollars.

Similarly, the 2,500 MHz band spectrum, which was available with the pay-TV operator Southern Network (but not being used optimally), has been reclaimed and is now available for mobile services such as 5G.[27]

---

[25] Reuters. 2023. Thousands of Mobile Phone Towers Go Offline in Pakistan after Power Outage. *Business Recorder*. 23 January. https://www.brecorder.com/news/40221921/thousands-of-mobile-phone-towers-go-offline-in-pakistan-after-power-outage (accessed 3 September 2024).

[26] Lahore Cantonment Board Letter No. 5003/BTS/Telenor/D06510 dated 24 Jan 2020; Quetta Cantonment Board Letter No. Tax/Tower/3561, dated 10 March 2020.

[27] The Express Tribune. 2023. SIFC Key to Economic Stability, Says IT Minister. 17 December. https://tribune.com.pk/story/2450252/sifc-key-to-economic-stability-says-it-minister.

Box 4: History of Spectrum Auctions In Pakistan

The first spectrum auction in Pakistan was held in 2004. It was a huge success, as two new players—Warid and Telenor—bought the entire offered spectrum and launched two country-wide Global System for Mobile Communications networks.

There was a decade-long hiatus before the next auction took place in 2014. This auction offered a spectrum for 3G and 4G technologies. However, despite the spectrum scarcity, large chunks of the offered spectrum remained unsold. This was because of some unrealistic terms and conditions, as well as the higher starting prices.

The following two spectrum auctions (2016 and 2017) were held to sell[a] the unsold spectrum of 2014. Both times, there were single bids, and only the most desperate ones bought the offered spectrum at the floor prices; there was no "bidding" as such.

In 2021, another spectrum auction was held. This too was rather unsuccessful; again, the industry found that the base price and the terms and/or conditions did not support their business cases. Only one mobile network operator bought some spectrum, as it needed a minimal spectrum to survive.

[a] "Selling" spectrum means giving right to use for a certain period, typically 15 years at a price.
Sources: Pakistan Telecommunication Authority and author's own research.

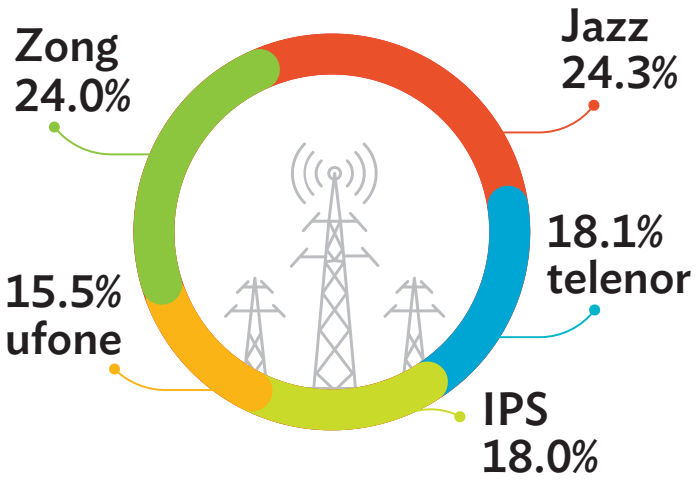
The history of infrastructure sharing by mobile operators in Pakistan has been suboptimal. For the first 15 years, every mobile operator constructed cell sites. That is why one often sees the unsightly four to five towers standing beside each other. In recent years, operators have allowed licensed tower companies to construct towers and rent space. Therefore, most new cellular sites are now being built not by the operators but by these infrastructure providers or tower companies, which is how it is done in most of the world. However, tower companies still own less than 10% of towers,[28] which points to a lack of collaboration between telecom operators, regulatory bodies, and infrastructure providers.

Cellular infrastructure challenges. Ideally, operators should offload even their existing tower assets to infrastructure providers, with the efficient use of resources enabling them to focus on (and invest in) their core business of providing mobile broadband (Figure 12). This could not be adopted so far due to a lack of policy/regulation incentives. Clear policy frameworks, effective regulation, and technological innovations can support tower sharing and improve service delivery.

The acquisition of Telenor by e&, formerly known as Etisalat Group, United Arab Emirates, could lead to consolidation of the telecom tower sites of the two companies, improving the prospects of sustainable infrastructure sharing.

[28] VIS Credit Rating Company Limited. 2024. Rating Report: Tower Power (Private Limited). https://docs.vis.com.pk/RatingReports/OP_01090601002_00010906.pdf.

Figure 12: Cellular Infrastructure Percentages in Pakistan



Source: PTA Annual Report 2024.

2.3 Physical Digital Infrastructure

Data Centers

Data centers are designed as physical computing networks and secure storage devices that enable the sharing of applications and data. They include servers, storage systems, routers, switches, application delivery devices, firewalls, etc. Their ability to provide secure, scalable, and efficient infrastructure ensures that governments and businesses can optimize technology to innovate, stay competitive, and stay current. As the demand and generation of data exponentially increases, data centers are becoming even more important.

Depending on the source, there are 22 to 24 data centers in Pakistan. These belong to, among others, PTCL, Multinet, Supernet, Cybernet, and Vision Telecom. None of them is owned by a big international firm. Of these, 15 are certified, as given in "Network World" and the Data Center Catalog.

More data centers are under construction in the private sector. Pakistan's data center market is projected to reach $0.79 billion, compared to $2.16 billion in Viet Nam and $8.65 billion in India.[29]

Internet Exchange Points

Internet exchange points (IXPs) are essential components of digital physical infrastructure. An IXP is a physical location through which internet infrastructure companies such as ISPs and content delivery networks connect with each other.

[29] Statista. 2024. Data Center—Worldwide | Statista Market Forecast. 20 August. https://www.statista.com/outlook/tmo/data-center/worldwide.

IXPs are carrier-neutral, serving all competing carriers equally, providing shorter routes to each other and the data stored within the country. This improves the cost and quality of service, including improved latency. An IXP also facilitates local cloud providers by reducing costs and improving performance.

IXPs also bring data from abroad at a low cost. They attract primary content and cloud service providers who like to keep copies of their content in the country. These content copies are kept on content delivery network servers. A content delivery network co-located with an IXP can optimize the path through which data flows within the network. IXPs are more useful for smaller ISPs, as the bigger ones can afford to install content delivery networks at their premises.

There are only three IXPs in Pakistan: Islamabad, Lahore, and Karachi, all owned by the regulator, PTA. Islamabad IXP, set up on Higher Education Commission (HEC) premises, was the first. In April 2015, PTA took the lead in reaching a consensus among all stakeholders, including APNIC and ISOC. The IXP in Karachi is also housed in HEC premises, whereas the last one, opened in Lahore in August 2023, is located on Punjab ICT Board (PITB) premises.

PTCL also started its Internet Exchange located in its data center in Karachi in collaboration with the German company De-CIX. But Pakistan still lacks any major carrier-neutral data center operator (such as Equinix, Digital Realty, Azure, Oracle, Google Cloud, and Amazon Web Services). There is currently no report of any new IXP being in the planning stage.

Data Center and Internet Exchange Point Challenges

One crucial shared problem, and possibly a major factor for data centers, is the instability of electric power. Below are some specific challenges for the two.

Data centers in Pakistan often struggle with outdated infrastructure and inefficient power management and mostly need significant upgrades. Concerns regarding security, energy efficiency, and the reliability of fiber-optic connectivity have hindered large investments in data centers. Cybersecurity concerns for data centers also loom as security regulations and awareness lag behind international standards. Another concerning factor is insufficient spatial dispersion of data centers.

An ITU report highlights several challenges for IXPs in Pakistan, including stakeholder trust issues, venue selection, infrastructure costs, a tendency to host sites abroad, and a lack of local content in native languages.[30]

Internet of Things

PTA released the Draft Licensing Framework for Terrestrial Internet of Things (IoT) Services in 2022. It is encouraging to see that under the new framework, 13 licenses have been issued to IoT service providers by PTA.[31] Currently, the popular IoT applications in Pakistan include solar-powered home solutions providing power to off-grid rural and urban households, on-board diagnostics devices for fleet management, and IoT solutions integrated with vehicle insurance to prevent theft.

[30] International Telecommunication Union (ITU). 2015. Pakistan Response on IXP. https://www.itu.int/en/Lists/consultation2015/Attachments/30/Pakistan%20Response%20on%20IXP.pdf

[31] List Of LPWAN IOT Licenses, PTA, https://pta.gov.pk/assets/media/list_lpwan_iot_lic_16-05-2023.pdf.

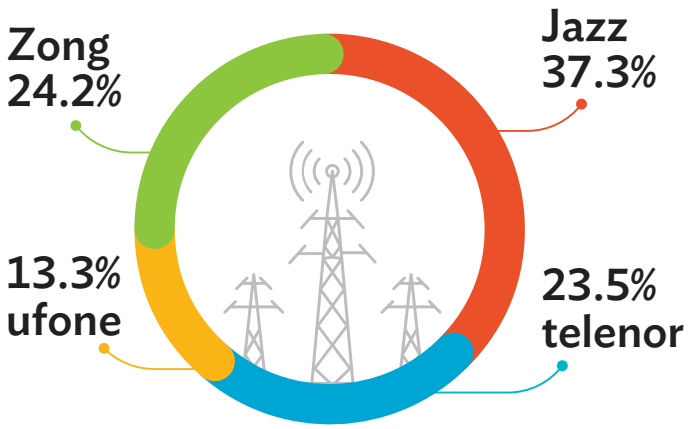
Some upcoming applications are advanced metering infrastructure with automated meter readings, smart energy-saving solutions, health care solutions, smart cattle farms, smart grids, and connected agriculture. In the meantime, mobile operators are also offering IoT services on their licensed frequencies.

2.4 Telecommunication Market Dynamics

Pakistan's telecommunication market size is estimated at $4.52 billion in 2024 and is expected to reach $5.32 billion by 2029, growing at a compound annual growth rate of 3.28% during 2024–2029.[32]

The telecom market is moderately fragmented. Major players include PTCL and the four MNOs: Pakistan Mobile Communications Limited (Jazz), Telenor Pakistan Limited,[33] Pakistan Telecommunication Mobile Limited (Ufone), and CMPak (Zong). PTCL wholly owns Ufone, and one of the MNOs will merge into PTCL/Ufone. The market also hosts other ISPs and fixed-line local-loop service providers (Figure 13).

Figure 13: Cellular Market Share in Pakistan



Source: PTA Annual Report 2024.

Pakistan's telecom market is fiercely competitive with ongoing price wars, often fueled by predatory tactics. Therefore, it has one of the lowest ARPU in the world at around $0.80 in contrast to the global average of $8.00. Similarly, the price of data transmission is $0.12 per gigabyte, the sixth lowest in the world. Price wars leave little room for infrastructure investment and network upgrades.[34]

[32] Pakistan Telecom Market (2023-2028). Mordor Intelligence. https://www.mordorintelligence.com/industry-reports/pakistan-telecom-market (accessed 21 August 2024).

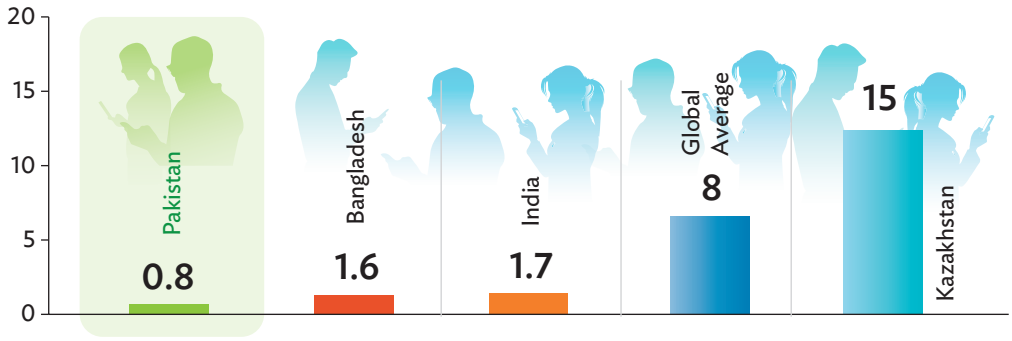
[33] Pakistan Telecommunication Company Ltd.—a listed operating company of the e& Group (e&) in Pakistan—announced acquisition of Telenor Pakistan in December 2023.

[34] Pakistan Telecommunication Authority (PTA). 2022. Annual Report 2022. https://www.pta.gov.pk/assets/media/pta_annual_report_2022_10012023.pdf (accessed 19 February 2024).

This has resulted in congested networks, unreliable connections, and compromised user experience. It also affects the financial health of its players; Telenor's exit from Pakistan is a recent case that is indicative of the restiveness of the industry. This also does not augur well for the much-anticipated launch of 5G technology.

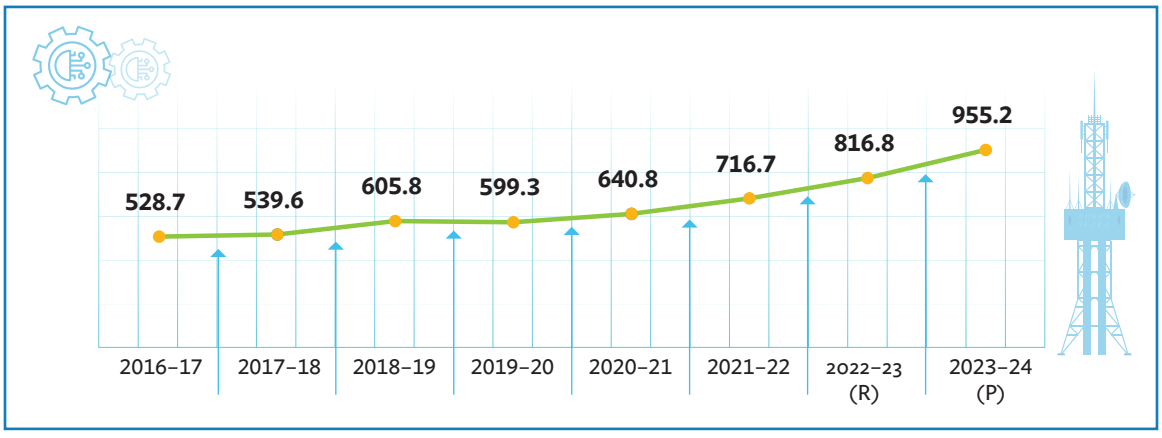
Although Pakistan Telecom revenues are shown to be rising in Pakistan rupees, in real (or US dollar) terms, they have, remarkably, been declining over the last 5 years (Figures 14–16).

Figure 14: Pakistan's Mobile Average Revenue Per User ($)



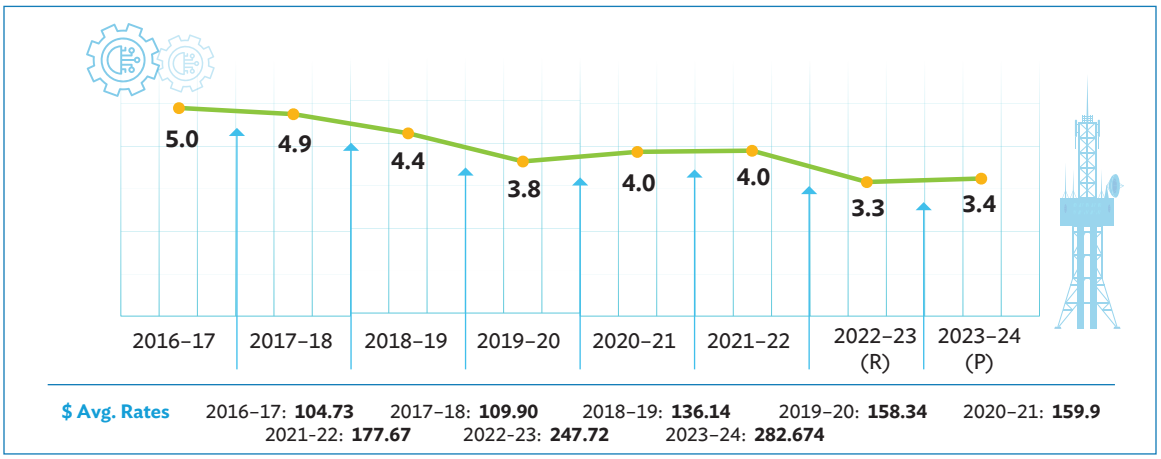
Source: G. Abbas. 2023. Pakistan's revenue per telecom User 10 times less than the global average: SBP. Pakistan Today. 24 October. https:/profit.pakistantoday.com.pk/2023/10/24/pakistans-revenue-per-telecom-user-10-times-less-than-theglobal-average-sbp/.

Figure 15: Pakistan Telecom Revenues Over the Years (PRs billion)



R = revised, P = provisional.
Sources: Pakistan Telecommunication Authority and author's own research.

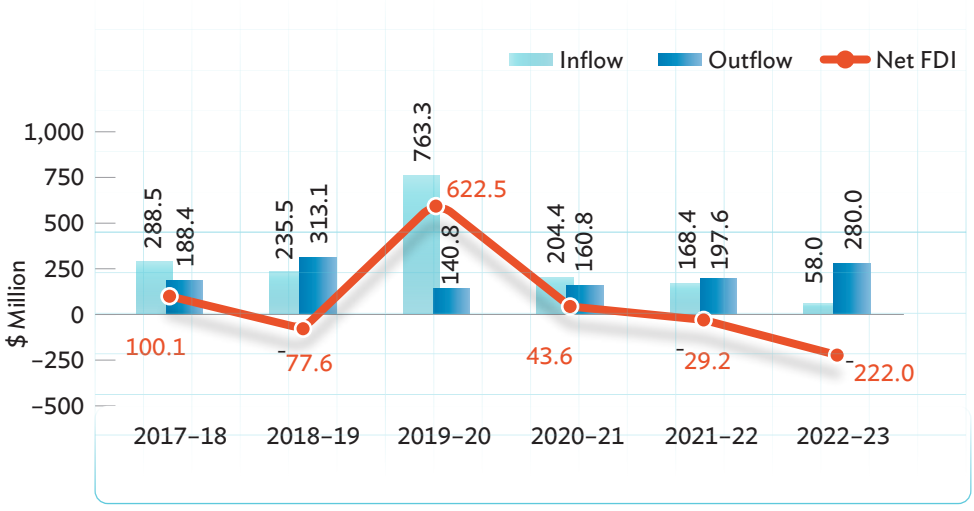
Figure 16: Pakistan Telecom Revenues Over the Years, $ billion



R = revised, p = provisional.
Sources: Pakistan Telecommunication Authority and author's own research.

Declining revenues and continued political instability have resulted in the country's lowest net foreign direct investment in digital infrastructure and network upgrades in history (Figure 17).

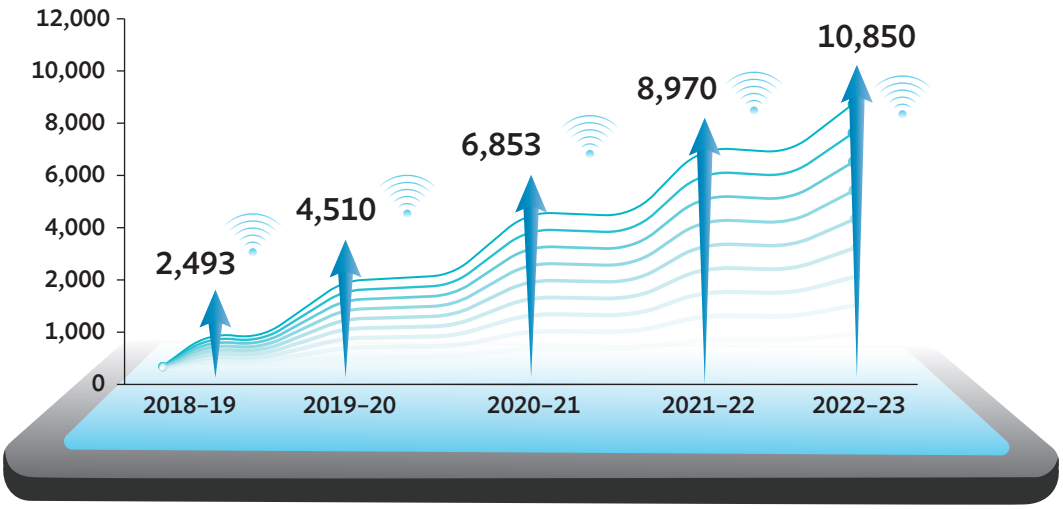
Figure 17: Pakistan's Net Foreign Direct Investment Records



FDI = foreign direct investment.
Source: Pakistan Telecommunication Authority.

On the other hand, popular appetite for data has grown (Figure 18). Telecom revenues are coming more from data than voice. A decade ago, 100% of revenues came from voice only; currently, 65% come from data.

Figure 18: Rapid Growth in Pakistan's Internet Data Consumption (Petabytes)



Source: Pakistan Telecommunication Authority.

This indicates the dilemma that, on one hand, the new investments have shrunk due to a myriad of factors (low ARPU, bad economic situation, etc.), while, on the other hand, growing data consumption demands new investments in network upgrades and expansions.

2.5 Digital Divide

Affordability and digital literacy exacerbate compounded urban-rural digital divides. While urban citizens can access broadband connectivity, many remote rural regions lack the resources to access the online world.

Even in cases where access is available, the affordability of internet devices is a significant barrier, excluding those with lower incomes. Disparities in digital literacy widen this divide, particularly among women and rural communities.

Bridging the digital divide demands tackling infrastructure availability, affordability, digital literacy, and sociocultural barriers, ensuring equitable access to the transformative power of technology for all Pakistanis.

Geographic Divide

Pakistan's digital landscape exhibits deep geographic disparities in access and usage. Rural areas, where over 60% of the population resides, have lower internet connectivity than cities. Rural-urban divides also exist across mobile ownership and speeds highlighting uneven infrastructure distribution in terms of both quantity and quality.

Lack of business cases discourages privately owned telcos from extending their services to sparsely populated regions, resulting in unserved or underserved communities. Geographical obstacles, such as mountainous terrain and expansive deserts, further complicate the expansion of network coverage. Many of these areas also face infrastructure challenges such as proper roads, electricity, backhaul networks, security problems, and harsh weather, among others.

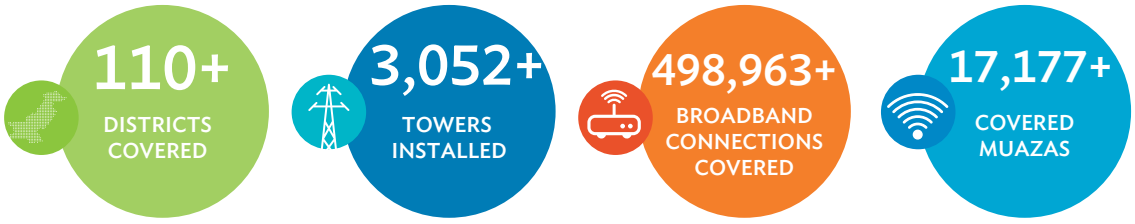
One way of confronting this issue is to bridge the viability gap of the service providers in such geographically challenging areas. This is done through the USF (footnote 13).

Universal Service Fund Pakistan

Pakistan's USF experience has been better than most developing countries and is recognized as such by international bodies like the World Bank. In Pakistan, a not-for-profit company (under the Companies Act) was created to disburse the subsidies to the licensees openly and transparently.

The amount of subsidy and the recipient is decided through open reverse auctions. The company is governed by an independent board that ensures quick decision-making and implementation of its decisions (Figure 19).

Figure 19: Accomplishments of Universal Service Fund Pakistan



Source: Universal Service Fund.

USF Pakistan has been working, together with private sector licensed telcos, to provide voice and data services in the unserved areas of the country (Box 5). With USF getting FOC installed in rural areas, the government can launch digital inclusion schemes to modernize agriculture, provide education and skills (particularly to rural youth), empower rural women, provide banking and financial services where no bank branches exist, and so on.

Box 5: Universal Service Fund

A consequence of the telecom sector deregulation was that citizens living in remote, rural, and sparsely populated areas were deprived of access to information and communication technology (ICT) because the privately owned service providers found no "business case" in those areas. ICT is now universally seen as a fundamental human right and is considered an obligation of the state. Therefore, a solution was found to overcome the challenge, and it was decided to create a fund which would be used to subsidize and/or compensate ICT service providers in unserved areas.

Primarily, the Universal Service Fund (USF) is funded through a fixed percentage levied on all licensed telecom service providers as part of their license obligations. The fund comprises obligatory contributions (1.5% of gross adjusted revenue) by the licensed telcos; the USF gets no funding or subsidy from the government.

In this way, the USF subsidizes ICT services to unserved or underserved areas, allowing licensed telcos to provide services on typical commercial or competitive terms. The subsidies and their recipients are determined through reverse auctions. USF typically subsidizes basic telephony, broadband internet, and backhaul infrastructure.

To implement USF policies through subsidies to qualifying licensed telcos, USFCo—a not-for-profit company registered under the Companies Act—was formed in 2006. The company has an independent board of directors that includes an equal number of directors from the government/public and the private sector.

In one form or another, something akin to USF has been implemented in more than 70 countries. However, the challenge in many countries has been that the funds remain underutilized due to inefficient public sector disbursement systems, lack of confidence in the private sector, and lack of transparency by the USF/governments.

Source: Authors.

Universal Service Fund Challenges

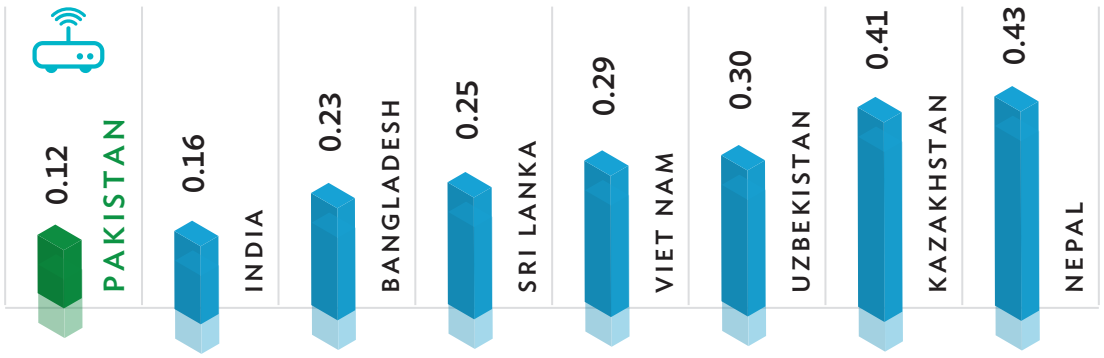
Currently, USF Pakistan does not provide funds for demand-creation programs. These could incentivize the telcos to invest in those areas to provide services, which is exactly in line with the objectives of USF. At the time of writing this report, USF has reportedly become cash-starved despite having enough funds in its books.

According to a rule promulgated 6 years after the formation of USFCo, all its receipts are deposited in Pakistan's National Consolidated Fund. It is from there that USF has to draw its funds. Enough funds are not always available while has the process of accessing the funds placed an additional layer of approval, so to speak, in terms of time spent.

Affordability Divide

Although taxes contribute around 30% to mobile internet usage costs in Pakistan (among the highest globally), the average price per gigabyte of data amounts to $0.12 (Figure 20). This is around 3% of the average person's monthly income, less than in comparable or peer economies. Therefore, the services are considered relatively affordable.[35]

Figure 20: Pakistan Offers Affordable Mobile Broadband Data
*Cost of 1 GB Data - Mobile Broadband 2023 ($) *



GB = gigabyte.
Source: cable.co.uk.

However, the main obstacle to affordability is the price of devices that connect to the internet. The most common device for internet access in the developing world is a smartphone, and most Pakistanis cannot buy one.

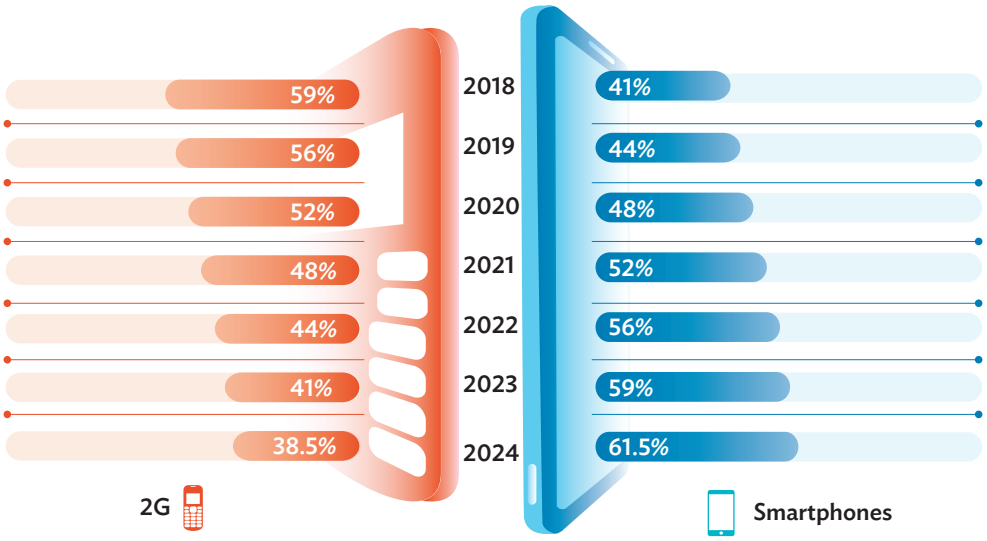
MNOs want to sell smartphones to their customers on easy payments. However, they have no way to stop defaulters who take the phone and switch to other networks. PTA, currently, considers it a conflict between competitors and has no regulatory tool to support the industry.

As per PTA, 60% of mobile devices on the Pakistan network are smartphones, which is still less than the 2-year-old South Asian average of 62% (as reported by GSMA) (Figure 21).[36]

[35] Best Broadband Deals. 2018. Worldwide Mobile Data Pricing League | Cost of 1GB in 230 Countries. https://www.cable.co.uk/mobiles/worldwide-data-pricing/ (accessed 23 September 2024).

[36] Total Mobile Devices on Pakistan Network. Mobile Device Manufacturing, Telecom Indicators. PTA. 2024. https://www.pta.gov.pk/category/telecom-indicators/171 (accessed 5 September 2024); GSMA. 2022. The State of Mobile Internet Connectivity 2022. October 2022. https://www.gsma.com/r/wp-content/uploads/2022/12/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf (accessed 11 September 2024).

Figure 21: Comparison of Manufactured Phones in Pakistan



Source: PTA Annual Report 2024.

After launching the Mobile Device Manufacturing Policy 2020, 35 companies started locally manufacturing/assembling mobile devices in Pakistan.[37] Most locally assembled/manufactured phones are still ordinary (2G)[38] phones, instead of smartphones. To boost local production of smartphones, the industry has advised that the government may offer financing options that de-risk loans for low-income individuals.

Local manufacturers were promised a 3% R&D allowance on their exports. So far, the government has not formalized a process for that. Fulfilling that promise will also incentivize smartphone manufacturing.

Digital Divide

This section covers only the digital skills for setting up and running digital infrastructure components. Other chapters deal with the digital literacy and skills that digital service and application users may need.

For the skills required to install, test, commission, operate, and maintain the physical digital infrastructure systems, the technical manpower can be found locally. Many trained and skilled experts sell their expertise, based on their acquired skills, in other countries, either remotely or by migrating. Several local and foreign companies have their (Pakistani) experts based in Pakistan, from which they

[37] *Dawn*. 2024. TECNO Presents 'Make in Pakistan' Documentary Highlighting the Journey of Pakistan's Mobile Industry. 22 May. https://www.dawn.com/news/1835001.

[38] Denotes second-generation technology. 2G phones are feature phones that can only be used for making voice calls and sending short text messages.

sell expert services in other countries. The "ICT and ICT-Enabled Services (ITeS)" export figures announced regularly by the State Bank of Pakistan include these services categorized as "Telecom Services."

Socioeconomic Gender Divide

Global indices show that the widest digital divide in the region between men and women exists in Pakistan (Table 7).

Table 7: Regional Comparison of Gender Digital Divide

Index	Indicator	Pakistan	India	Bangladesh
GSMA Mobile Gender Gap Report 2023	Mobile ownership	35%	11%	84%
	Mobile internet	38%	40%	43%
EIU Inclusive Internet Index	Access to the internet	67.5%	25.6%	13.2%
	Mobile phone access	44.7%	14.3%	18.6%
World Economic Forum	Global Gender Gap Index (rank out of 146)	142	127	59

EIU = Economist Intelligence Unit, GSMA = Global System for Mobile Communications Association.

Sources: N. Jeffrie. 2023. *The Mobile Gender Gap Report 2023*. London: GSMA. https://www.gsma.com/r/wp-content/uploads/2023/07/The-Mobile-Gender-Gap-Report-2023.pdf; Economist Impact. 2022. Inclusive Internet Index. https://impact.economist.com/projects/inclusive-internet-index/; World Economic Forum (WEF). 2023. *Global Gender Gap Report 2023*. Geneva: WEF. https://www3.weforum.org/docs/WEF_GGGR_2023.pdf.

GSMA's 2023 Mobile Gender Gap Report reports that women in Pakistan are 35% less likely to own a mobile phone than men (52% against 81%) and 38% less likely to access mobile internet (Figure 22).[39]

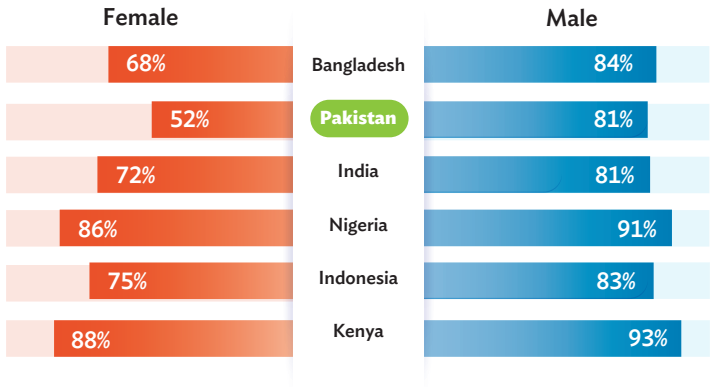
However, it has to be kept in mind that most women in Pakistan use mobile devices and services registered in the names of male family members. This makes it challenging to ascertain the actual number of females with internet access.

Some of the barriers responsible for the large gender digital divide are:

- lack of family approval (which was the top-reported barrier till 2019, now ranks 2nd);
- online harassment impacting women disproportionately (5% of women express concerns about unwanted calls and messages, against 3% of men);
- 2% of women expressing worries about the theft or misuse of their identity or private information whereas men do not share similar concerns;
- digital skills gaps (women make up only 14% of ICT graduates);
- computer literacy seeing a 35% gender gap, showing women's marginalization; and
- rural women facing additional barriers spanning skills, cultural constraints, security concerns and cost challenges.

[39] N. Jeffrie. 2023. *The Mobile Gender Gap Report 2023*. London: GSMA. https://www.gsma.com/r/wp-content/uploads/2023/07/The-Mobile-Gender-Gap-Report-2023.pdf.

Figure 22: Pakistan's Gender Gap in Mobile Phone Ownership



Source: Global System for Mobile Communications Association.

Because of the importance of the topic, these and several other gender-related barriers are also discussed in other chapters of this report.

2.6 Enablers for Digital Infrastructure

Policy and Regulatory Framework

The Telecom Reorganization Act 1996 and the 2006 amendments laid the legal foundations of the modern Pakistan telecommunications regulatory framework. At the federal level, the Telecom Deregulation Policy 2003, Mobile Cellular Policy 2004, Broadband Policy 2004, and USF Policy 2006 contributed to a rapid expansion of digital infrastructure.

These legislations and policies were followed by relevant rules, regulations, and guidelines that helped implement those policies.

The next policy announced in the digital infrastructure domain was the Telecom Policy 2015 (after a gap of almost 10 years). It was quite a comprehensive policy document but was undermined by lack of implementation. Today, almost 9 years later, several regulatory frameworks are still waiting to be formulated or approved, such as:

- infrastructure sharing, both passive and active;
- spectrum trading and sharing;
- Guidelines for Outside Plant code;[40] and
- advisory code for provision of ducts in new roads/railways/footpaths.

[40] "Outside plant" is the term for the physical components needed to set up, maintain, and manage telecom networks outside the switching centers.

Since no time-bound targets were given in the policy, some frameworks were finalized after years of delay, such as the National Spectrum Refarming Framework.

In 2021, MoITT started work on a National Broadband Policy 2021 to align all its other policies with the fast-changing digital ecosystem. This policy was to replace/update the 2015 Telecom Policy. Despite the World Bank's technical assistance, this policy could not be formulated.

In October 2020, a policy directive on RoW was issued. It was an effort to resolve the long-standing RoW issue for digital physical infrastructure. However, the directive failed to resolve the issue as it could not supersede the authority of the rent-seeking RoW owners such as railways, the Defense Housing Authority, cantonments, etc.

In between, three other relevant policies were announced to support development of digital infrastructure: the Mobile Device Manufacturing Policy 2020 and the Cloud First Policy 2022 (for the public sector). The IoT Licensing Framework was also very important, after which 14 companies acquired IoT licenses quickly.

The Telecommunication (Re-Organization) Act, 1996 had indicated the possibility of creating the Telecommunication Appellate Tribunal, which the government has recently set up. The industry and the regulator have been involved in several legal disputes over different regulatory matters; the tribunal can help to resolve cases more efficiently and effectively and ease the pressure on the High Courts across Pakistan that deal with telecom sector cases.

A quick and fair settlement of conflicts over rules and compliance can be one of the important factors that supports a positive environment that can encourage foreign and local private investment in the digital infrastructure.

Role of the Provinces

Overall, the role of provinces in encouraging and developing digital infrastructure has been rather dismal. Every province charges a regressive sales tax of 19.5% on internet service usage which is higher than any other service. Besides not investing in digital public infrastructure, the provinces hardly spend anything on the demand side of the internet, such as providing internet to all government offices, schools, and health care centers.

- The 2018 Punjab ICT Policy promises digital infrastructure such as broadband internet across the province, but nothing has been done. The PITB aims to foster shared use of ICT resources, establish a centralized Punjab Data Center for public sector applications, and implement an ROW policy to support broadband expansion province-wide. These initiatives remain in the planning stage; that said, PITB, since 1999, has led the way on technological progress in reshaping the landscape of governance and service delivery in Punjab and there is much that other provinces can learn from their journey.
- The Sindh Digital Technology Board has been established in 2022 by an act of the Sindh assembly and the organization is currently in the process of being set up. The Digitizing Education Sector program and the introduction of the Sindh Cloud First Policy reflect the Sindh government's desire to digitalization and digital service delivery.

- The Khyber Pakhtunkhwa Digital Policy 2018–2023 envisaged civil infrastructure works and projects that provide broadband conduit deployment to reduce the cost of fiber deployment. However, nothing has been done in practice.
- The Balochistan Digital Roadmap 2030, by the Science and ICT Department, aims to achieve comprehensive digital coverage across all Balochistan districts and major towns. With an internet penetration rate of approximately 25%, well below the national average, Balochistan's connectivity challenges are exacerbated by its rugged terrain and vast geographical distances. The Balochistan Digital Policy 2020–2021 promised high speed internet and support for establishing ICT parks.

Policy Challenges

As mentioned above, there are large gaps between the last comprehensive Telecom Policy 2015 and its implementation. There are three main reasons:

(i) The implementation of a policy needs its corresponding regulatory framework. As given in the 2015 policy, several frameworks were to be devised by the PTA. Some of those (as mentioned in the previous section) have remained incomplete (or unapproved) even today.

(ii) MoITT faces capacity challenges in implementing its policies. The key technical officials of MoITT are hired on a 3-year contract basis, extendable twice by 1 year each. Thus, at any given time, one or the other official's contract is either expired or about to expire; the long and cumbersome hiring process invariably starts too late, this has implications of its own. The turnover on the side of key government generalist positions is also high owing to frequent postings and transfers. Consequently, there is little continuity in work streams, and key initiatives sometimes get delayed inordinately or remain inconclusive due to the lack of institutional memory and commitment. One notes that the ministry itself remains undigitalized.

The emoluments for the contract employees are in management position scales that lag far behind those of the private sector in the ICT space. Thus, many qualified persons do not even apply. There is no formal mechanism for acquiring manpower from affiliated organizations (PTA, NTC, Frequency Allocation Board). This could create a pool of experienced professionals for assignments in MoITT and these organizations.

(iii) The implementation of the policies also faces hurdles in the form of coordination challenges across federating units. The uneven distribution of skilled personnel and resources across provinces creates institutional capacity and governance gaps, hindering the effective implementation of digital initiatives.

2.6.2 Information communication technology taxation policies

Since telecom infrastructure requires long-term investments, taxation policies matter significantly. However, Pakistan is among those countries where ICT sector-specific taxes are not only among the highest in the world but are also unpredictable (Figure 23). Tax rates change sometimes more than once during the same year without prior notice.

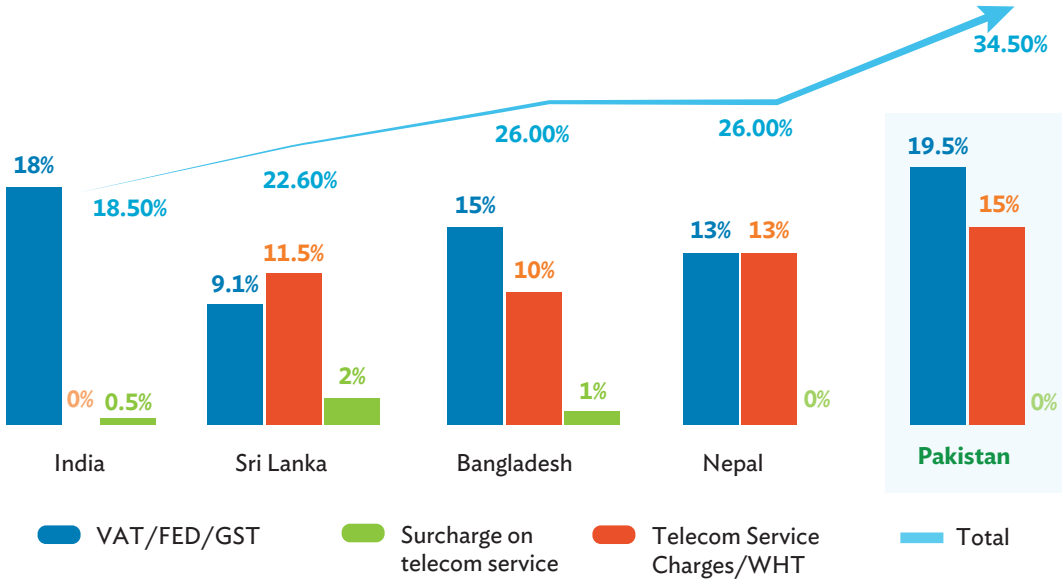
This, understandably, proves to be a big disincentive for investors. The main challenges concerning ICT taxation policies are discussed below. ICT taxes are currently levied at every conceivable point:

- Import taxes: For most imported items, telcos pay custom duty, additional custom duty, regulatory duty, sales tax, additional sales tax, excise duty, and advance income tax at different rates.
- Often, the Customs Classification Committees consist of appraisers with limited or no technical background. Telcos routinely upgrade their systems and technologies, but when these officials are not competent enough to follow rapid developments, they "play safe" and put the goods in higher Harmonized System Codes.
- Corporate taxes: Telecom companies must pay the *higher* of the following:
  - 39% Corporate Tax including 10% super tax, on *taxable income.*
  - 17% Alternate Corporate Tax on *accounting profit*. This does not allow for depreciation to be deducted before the tax is applied, thus removing at least one incentive, albeit a significant one, for the companies to make heavy capital investments.
  - 1.25% Minimum Corporate Tax on *turnover.*
  - 4% Minimum Withholding Tax instead of "adjustable tax" on *revenue, including* the sales tax amount. This makes the deduction 4.78% of revenue. If a company is at a loss, it increases the losses even more.
- 2% of revenue USF/R&D levies.
- 0.5% of revenue Annual License Fees.
- 15% of base tariff on internet usage as Advance Tax.
- 19.5% provincial sales taxes (Federal Excise Duty in Capital Territory).
- Workers Welfare Fund and Workers Profit Participation Fund differ in different provinces, a big challenge for trans-provincial entities such as telcos.

Some tax incentives for businesses like telcos were withdrawn in recent years:

- The "First year" tax allowance for new investments (23-A of the Income Tax Ordinance) was withdrawn in 2021. This allowance was important for the telcos as their expansions take years and they always suffer losses in the initial years.
- Initial depreciation granted on international undersea cables outside Pakistan territory was also withdrawn in 2021.

Figure 23: Pakistan Leads the Region with Highest Information and Communication Technology Taxes



FED = federal excise duty, GST = general service tax, VAT = value-added tax, WHT = withholding tax.
Source: Author.

2.6.3 Pakistan Telecom Institutional Framework

In Pakistan, the Telecom Institutional Framework is close to ideal, as policy formulation, regulation, and operations are separated. MoITT has parliamentary oversight, even if only advisory. The regulator, PTA, is independent and does not report to MoITT. Instead, the PTA reports to the Cabinet Division.

The Frequency Allocation Board, responsible for allocating frequencies to telcos and other users, is another independent entity with its own board of directors chaired by the MoITT secretary. It includes representatives from the Cabinet Division; PTA; PEMRA; and the ministries of defense, interior, and information and broadcasting.

The operators are all private sector players duly licensed by the regulator. All big operators are either wholly owned by foreign investors, or (as in the case of PTCL + Ufone) the foreign investor has complete management control despite minority shareholding.

Institutional Framework Challenges

Despite ICT tools and digital technologies now being seen as key enablers of all sectors in the future economy and the important strategic focus of governments, MoITT is still seen as lacking strategic importance in the federal government structure.

The Constitution of Pakistan includes "telephones, wireless, broadcasting and other like forms of communication" in the federal legislative list;[41] however, MoITT has limited wherewithal to coordinate with the provincial governments on a national digitalization agenda, leading policies and initiatives to face limitations from siloed planning and execution.

In many countries, FOC networks are increasingly treated as utilities. Yet, in Pakistan, the provincial (or metropolitan) governments have not taken any initiative in facilitating fiber-optic penetration, let alone treating them as utilities.

With the capacity gaps identified above, MoITT is not well placed to embark upon any digital transformation program with a "whole-of-government" approach.

Emerging Technologies and Future-Proofing

Pakistan has had a history of slow adoption of new communication technologies. In the 1970s, Pakistan Telecom (then the T&T department) did not switch from electromechanical to *analog* electronic technology. Consequently, in the mid-1980s, T&T had to leap over one technology generation directly to *digital* technology. Similarly, while many countries commercially launched 3G mobile cellular technology by the end of 2002, 3G was introduced in Pakistan in 2014.

In the 3G rollout, there was no government spending involved; the government merely focused on earning hard currency in dollars through spectrum sale. A similar approach is being witnessed now with the planned 5G technology. As of January 2024, 261 operators in 101 countries have launched commercial 5G services. However, the Pakistan government still needs to boost 4G, leading to 5G.

In March 2021, the required steps were spelled out by a team assisted by the World Bank consultants.[42] The 5G Readiness Plan for Pakistan, prepared then, is available from MoITT.

A bold new strategy is needed to make large amount of spectrum available to the operators at affordable prices. At the time of writing, a ministerial committee has been set up to decide—and then monitor—the next steps to be taken. The committee's first direction to PTA to appoint a consultant and prepare for a spectrum auction is currently under way.

Low-earth orbit (LEO) satellite technology has now become available globally. While Starlink, a top global LEO operator, has been in discussions with the PTA to get a license to operate in the country, it has reportedly yet to fulfill all terms, conditions, and codal formalities as per policy directions of the government.[43] LEO satellite services require very little infrastructure on the ground, requiring just the so-called "gateways" for delivering services throughout the country. Affordability, however, remains a concern, at least in the short term.

41 The Constitution of the Islamic Republic of Pakistan. n.d. Vol. Legislative Lists, Fourth Schedule, [Article 70 (4)]. https://na.gov.pk/uploads/documents/1333523681_951.pdf.

42 The team included Scott Minehane and the author.

43 T. Amin. 2023. MoITT Not Yet Ready to Launch Starlink Internet Services. *Business Recorder*. September 11. https://www.brecorder.com/news/40262506.

Chapter 3
Digital Government

Key Diagnostic Findings

- Pakistan faces challenges in implementing e-government initiatives because of the absence of a long-term strategy and a policy framework that ensures continuity, policy evaluation, data-driven monitoring, system integration, data management, and cybersecurity.
- The institutional governance framework for the ICT sector lacks coherence and coordination, thus preventing adequate responsiveness to evolving sectoral needs.
- Comprehensive investment programs for digital public infrastructure are missing. Such programs could foster private sector interaction and mobilize private sector talent and investments.
- Public financial management systems and processes at national and subnational government levels are suboptimal and not integrated. Missed opportunities are particularly notable in revenue collection, public expenditure operations, and the integration and processing of digital payments across the government.
- The National Database and Registration Authority (NADRA) Computerized National Identity Card provides an important foundation for inclusive and efficient access to digital services. However, as it stands, NADRA's back-end integration and interoperability with a wider set of ministries and government agencies, including revenue/tax and key service delivery organizations, is limited or nonexistent.
- Pakistan's public service delivery is largely paper-based and non-machine-readable, limiting the efficiency, accessibility, and transparency of government operations. The lack of evidence-based tracking of disparate digitalization efforts further undermines strategic monitoring, planning and effective resource allocation.
- It is challenging to assess any digital transformation within key line ministries and agencies due to lack of available strategic plans, service catalogs, status audits, and data trails. ICT and digital initiatives tend to be fragmented, individual-driven, or duplicated in silos and present missed opportunities for collaboration and innovation. Online services where offered, e.g., online visas provided by the Ministry of Foreign Affairs, lack customer-centric design.
- Government data protection policies and practices are in the early stage of discussion and planning. The Personal Data Protection Act 2023 was presented in the Senate on 13 February 2023.
- Govtech solutions, policy evaluations, and government decisions could benefit greatly from a proactive data-driven approach; there are, however, no standards or guidance for classifying, publishing, and reusing data within government and publicly.
- The government's low level of digital adoption and the digital skill gaps within the civil service and the public sector at large is probably a mutual cause-and-effect relationship. There is a need for modular e-government developments both at the federal and provincial level to demonstrate usefulness and success. Key regulators need a better appreciation of e-commerce, the new digital economy, and the internet businesses that operate in that space.
- Provincial and subprovincial governments can be important drivers of digital transformation in Pakistan. While diverse provincial initiatives are being undertaken, strategic action plans and systematic monitoring are lagging. Moreover, at the district and subdistrict level, digital enablement examples are either missing or limited and remain dependent on individual initiative.

- Cybersecurity is primarily understood as a state security matter rather than a crosscutting issue that can support ecosystem development. Although there have been reported instances of government and private business websites (or data) being hacked, the overall level of cybersecurity awareness remains low.
- Comprehensive public–private partnership (PPP) investment programs remain unexplored for building and improving digital public infrastructure and phased last-mile connectivity, which constrains connectivity.
- There is a lack of effective national coordination and interprovincial collaboration on the digital agenda, which could be improved to share best practices, implementation experience, and successful use cases or even effective and capable resources.
- Enhanced international collaboration and regional cooperation would support knowledge exchange and bring technical assistance and expertise to develop and implement digital infrastructure, services, and policies. International collaboration could also facilitate the exchange of best practices, the alignment of common standards, and the promotion of innovation.

Key Recommendations

- Conduct an audit of the Digital Pakistan Policy 2018 to identify completed milestones and key gaps, including legislative or regulatory requirements.
- Develop and implement evidence-based provincial digital transformation road maps in alignment with the long-term national vision; consider co-financing for provincial digital transformation projects.
- Prioritize the digitalization and platformization of high-impact, high-demand, and high-volume public services, such as tax/revenue administration, pension and social payments, health, education, and the judicial system, and ensure that they are accessible on mobile devices and convenient and user-centric.
- Allocate public sector development funds strategically to match the changing needs of the digital sector to achieve the government's long-term vision and digital strategy.
- Encourage private investment and resources by establishing a strong legal and regulatory PPP framework for developing and executing projects that deliver digital public infrastructure for providing m-enabled public services.
- Establish a data governance framework that defines the principles, standards, policies, and procedures for data sharing, interoperability, quality, security, privacy, and ethics across public sector entities, and create a data portal that enables data discovery, access, and reuse by public and private stakeholders.
- To boost citizens' inclusive and efficient access to public services, NADRA should facilitate seamless integration/interoperability of its database with a wider range of public service systems/databases at national, provincial and local level (e.g., Directorate General of Immigration and Passports, and provincial/district social welfare departments) through a secure data exchange layer. This could improve access to services such as social payments and loan approvals by leveraging machine learning and AI-based solutions to enhance efficiency and response time in conducting credit scoring and risk assessments. Estonia's X-road,

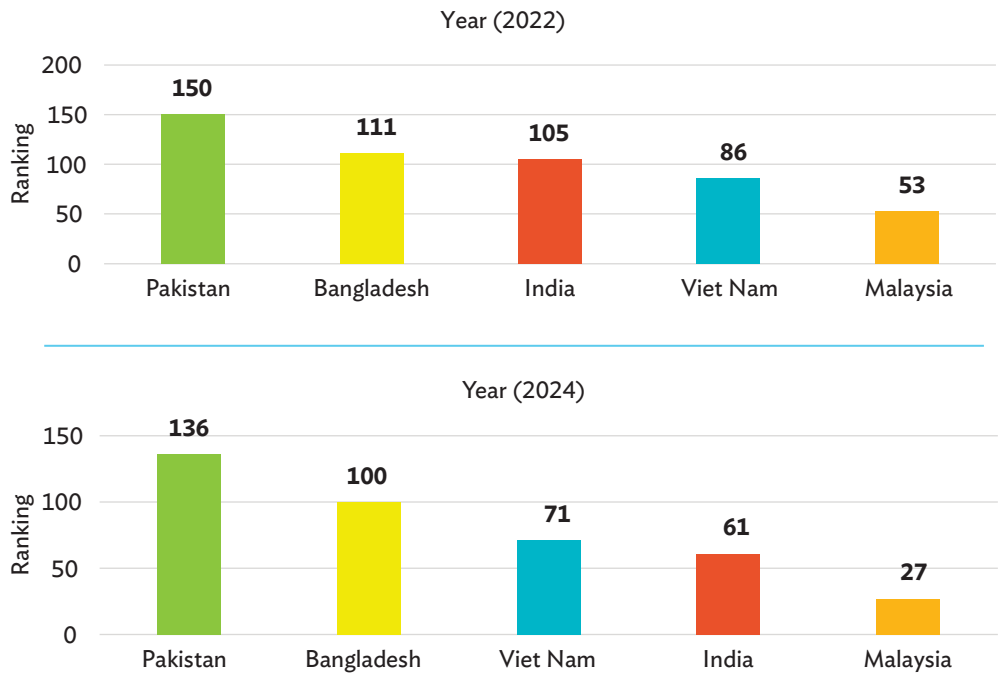
India's Adhaar, Singapore's SingPass, and Denmark's NemID can serve as useful examples to learn from.

- Create an e-government fund that can mobilize public and private resources and provide financing and incentives for digital government platform projects, viability gap funding for PPPs, digital inclusion, and literacy initiatives.
- Establish a lead agency at the federal level with a strong mandate to spearhead digital transformation in the government. The institutional and coordination capacity of MoITT can be improved to collaborate better with provincial ICT departments and foster regular policy dialogue among the provinces and with other relevant stakeholders on strategic digital initiatives.
- Create a modular and adaptable e-learning platform for public servants to enhance digital skills and learn digital tools for being effective in their roles; such a portal could enable mandatory continuous learning, supporting professional growth through performance incentives.
- Implement a holistic and proactive approach to cyber resilience, and adopt regulatory measures, awareness campaigns, training programs, and secure by default practices for all govtech applications at all levels of government.
- Create an AI regulatory sandbox to foster testing and experimentation with AI solutions in the public sector and to help establish regulatory precedents and guidelines for their effective and ethical integration.
- The federal government needs to establish and maintain international partnerships with nongovernment stakeholders and leading private sector companies, and leverage their expertise, experience, and best practices for digital transformation of the government.

3.1 Overview

Pakistan has made some progress in digitalizing its public services, especially in the online service delivery domain, but it still lags behind many of its peers in the region and globally. The UN's E-Government Development Index (EGDI) for 2024 currently ranks Pakistan 136th out of 193 countries, indicating the need for improvement in telecommunications infrastructure, human capital development, and data governance (Figure 24). Yet, McKinsey Global Institute reports that Pakistan can experience an increase in its GDP by a cumulative 7 percentage points (roughly $36 billion) and create around 4 million new jobs by increasing the use of digital financial services alone. The 2024 Economic Survey of Pakistan also presents Pakistan's ICT Sector Profile as one of the strongest economic enablers for growth in the coming years.

Figure 24: United Nations E-Government Development Index 2022 and 2024 Regional Comparison



To enable the projected economic growth, a more efficient business and user-friendly digital government is needed. Analytical findings offered in this section suggest that Pakistan needs to address several key areas to continue digitalizing its public sector effectively. These include user-friendly digital service design and management, data governance and integration of data analytics, cloud migration and AI-based solutions, cybersecurity, digital skills for social inclusion, and engagement.

A Rapid Provincial Digital Readiness Assessment conducted by the Sustainable Development Policy Institute (SDPI) in 2024 also revealed key challenges and opportunities for digital transformation at the provincial level, such as the need for clear action plans, consolidated service catalogs, end-to-end digitalization, advanced digital architecture, e-procurement, and open-source software. This section of the report thus provides an overview of the current policy and institutional frameworks, practices and challenges in Pakistan's public sector, as recommendations for digital transformation, drawing on global and regional examples and lessons learned.

Between 2016 and 2023, around 41 ministries and 100 departments in the federal government developed their E-Office platforms.[44] However, there is a notable absence of universally adopted standards on prioritizing user experience. Criteria governing the design, development, management, and evaluation of services are either disjointed or insufficient. Reflecting these shortcomings, the World Bank places Pakistan in category B in the Government Tech Maturity Index as compared to India, which is in category A.

As mentioned, the UN's EGDI 2022 places Pakistan at the end tail of global e-government rankings. These are important given the comprehensive nature of the EGDI, which evaluates countries' e-government development across various dimensions including online services,[45] telecommunications infrastructure,[46] and human capital.[47]

The 2022 EGDI sub-index on online services' relatively higher score reflects progress in Pakistan's online government services, yet the telecommunications infrastructure and human capital sub-indices indicate urgent needs for improvement in telecommunications infrastructure and human capital development, respectively.[48]

3.2 Digital Government Architecture

Policy Framework

Digital government architecture is a set of principles, standards, and guidelines that define how digital technologies and services are designed, developed, and delivered in the public sector.

It can be utilized as a blueprint to facilitate digital transformation, improve public service quality, and enable interoperability with efficient reuse of digital components across government entities (Table 8).

The 2018 Digital Pakistan Policy is the leading sectoral policy that outlines a framework to align the expanding digital ecosystem with socioeconomic development within the country (Figure 25). The Digital Pakistan Policy prioritizes innovative delivery of public services through ICT. This initiative aims to facilitate the integration of government databases and software systems, enabling sharing of essential data and knowledge within the public sector and with citizens through e-government service portals (Table 8). Section 10 of the policy corresponds to digital government by focusing on six priority areas:

[44] *Dawn*. 2022. E-office System Introduced in 40 ministries, divisions: NITB. 6 June. https://www.dawn.com/news/1693300 (accessed 23 September 2024).

[45] OSI measures the quality, relevance, and availability of a government's online services. It assesses how effectively government information and services are provided to citizens through digital platforms.

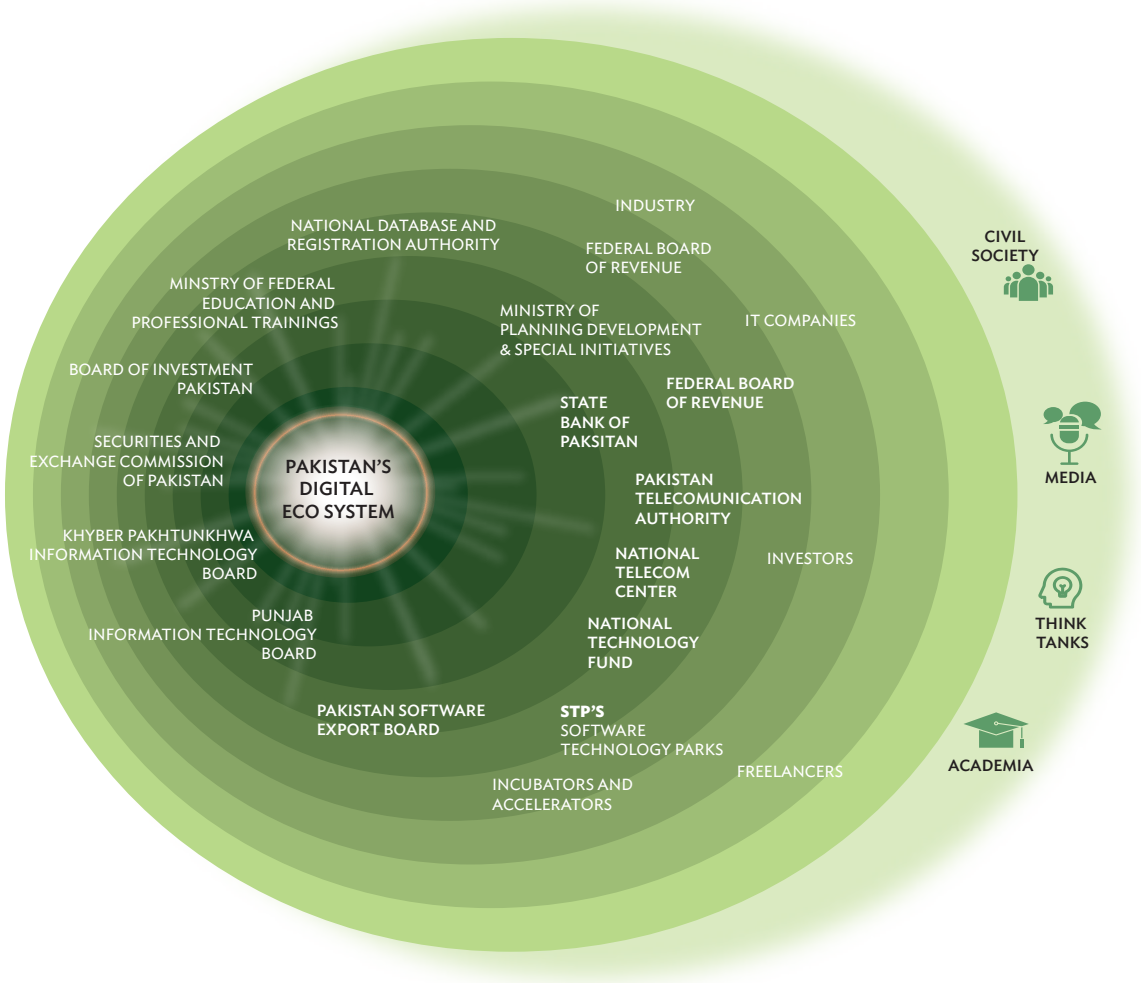
[46] TII evaluates the development and deployment of telecommunication infrastructure within a country. It includes metrics such as internet bandwidth per user, mobile and broadband subscriptions, and the overall accessibility of telecommunication services.

[47] HCI assesses the capacity and capabilities of a country's human resources to utilize and benefit from ICT. It considers factors such as education levels, literacy rates, and ICT training opportunities.

[48] ProPakistani. 2023. Pakistan Ranks Much Lower Than India in E-Governance. https://propakistani.pk/2023/06/05/pakistan-ranks-much-lower-than-india-in-e-governance/ (accessed 8 February 2024).

(i) enabling delivery of public services to citizens through innovative use of ICT;
(ii) establishing holistic enterprise architecture through the creation of data center clusters at essential sites.
(iii) enabling implementation of e-procurement in all areas of the public;
(iv) enabling efficient governance-focused platforms for identity/transaction management, payment mechanisms, digital documentation, etc;
(v) encouraging placement of dedicated ICT human resources in government organizations for ownership, change management and successful implementation of e-government initiatives/ programs; and
(vi) establishing G-Cloud to integrate different databases and to provide a resilient and secure ICT environment.

Figure 25: Pakistan's Digital Ecosystem



Source: Asian Development Bank.

Table 8: E-Government Capabilities: Regional Comparison[a]

	Indicator	Pakistan	India	Bangladesh	Viet Nam
1	Population (million)	251	1450	173	100
2	Income Value GNI Per Capita USD	1580	1820	1470	2170
3	EGDI (Index / Rank)	136/0.5096	97/0.6678	100/0.6570	71/0.7709
4	E-Participation Index (Index/Rank)	0.4932/88	0.6575/61	0.6164/70	06027/72
5	Online Service Index	0.7042	0.8184	0.7374	0.7081
6	Telecommunication Infrastructure Index	0.4745	0.5700	0.6501	0.8780
7	Human Capital Index	0.3500	0.5834	0.6149	0.7267
8	Internet Penetration (million users)	116	806	77.7	79.8

EGDI = E-Government Development Index, GNI = gross national income, USD = United States dollars.

[a] International indices like EGDI and GTMI, used globally to rank countries.

Source:World Bank. n.d."Govtech Maturity Index (GTMI) Data Dashboard." https://www.worldbank.org/en/data/interactive/2022/10/21/govtech-maturity-index-gtmi-data-dashboard.

The Pakistan Cloud First Policy, as well as the National Cyber Security Policy 2021, are also key initiatives for Pakistan's digital transformation.[49] While the former requires all federal public service entities to use the cloud for digital services, data, and new technology investments, the latter aims to ensure a secure and resilient ICT environment, which is vital for the digital government agenda (Figure 26).

The 2023 Personal Data Protection Act regulates the collection, processing, use, disclosure, and transfer of personal data.[50] It also seeks to create a National Commission for Personal Data Protection as an independent body to safeguard private data and address grievances related to data privacy.

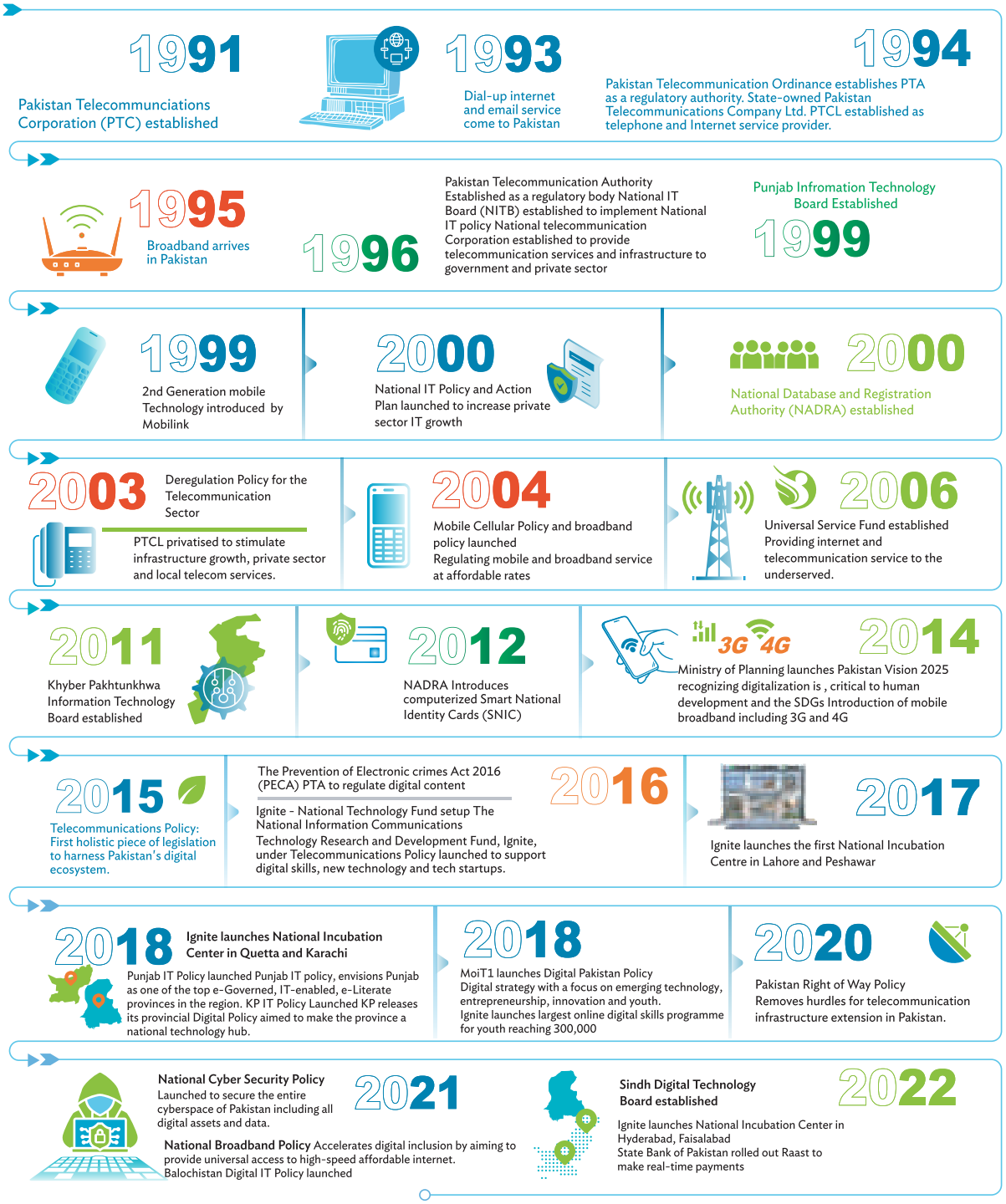
MoITT has also prepared a Draft National Artificial Intelligence Policy,[51] which is in the early stages of consultation. Proposed institutional advancements include the (i) Presidential Initiative for Artificial Intelligence & Computing; (ii) Center for Artificial Intelligence and Computing; (iii) National Center of Artificial Intelligence; and (iv) Sino-Pak Center for Artificial Intelligence. The policy framework is envisaged to provide a complete AI-enabling ecosystem in Pakistan, covering all aspects of awareness, skill development, standardization, and ethical use. One of its key commitments is to establish the National AI fund as a perpetual and central fund to support the proposed interventions.

[49] Pakistan Cloud First Policy. 2022. https://moitt.gov.pk/SiteImage/Misc/files/Pakistan%20Cloud%20First%20Policy-Final-25-02-2022.pdf; National Cyber Security Policy. 2021. https://moitt.gov.pk/SiteImage/Misc/files/National%20Cyber%20Security%20Policy%202021%20Final.pdf.

[50] Government of Pakistan. 2023. Personal Data Protection Act. https://senate.gov.pk/uploads/documents/1676274056_117.pdf.

[51] Government of Pakistan. 2023. Draft National Artificial Intelligence Policy. https://moitt.gov.pk/SiteImage/Misc/files/National%20AI%20Policy%20Consultation%20Draft%20V1.pdf

Figure 26: Pakistan's E-Governance Milestones



Source: Asian Development Bank.

Institutional Framework

Federal and provincial government agencies with supervisory, regulatory, or support functions that currently make up the institutional framework within Pakistan's digital ecosystem include the following:

The Ministry of Information Technology and Telecommunication (MoITT) is a Cabinet-level ministry of the Government of Pakistan; the ministry's vision is "Empowering the People of Pakistan through seamless access to accurate information and reliable services by means of ICT applications and telecom platforms; and establishing a knowledge-based economy."

The ministry is responsible for initiating and coordinating policy making, strategic planning and legislation processes on digital matters in close collaboration with provincial governments, private sector, civil society, and international partners.

MOITT owns, maintains, facilitates, and coordinates the development and implementation of the digital government strategy but it does not have an official mandate to transform other government agencies. In practice, however, MOITT's role to steer and implement the digital agenda within sectors, line ministries, and subnationally has been limited. This has implications for intergovernmental steering, coordination, and implementation of digital initiatives in the public sector. This has largely been due to the MOITT's limited budget and lack of clear implementation mechanisms as stipulated in the Digital Pakistan Policy 2018.[52]

The Pakistan Telecommunication Authority (PTA) has the mandate to regulate the telecommunication services, assure a competitive level playing field, and protect interest of the service users. The Frequency Allocation Board safeguards and monitors the national spectrum to ensure its optimum utilization across Pakistan.

The National Information Technology Board (NITB), previously called the "Pakistan Computer Bureau and the Electronic Government Directorate," is responsible for developing and deploying digital solutions for government by ensuring service quality, data protection, and data and information availability for end users. The NITB provides resources and technical consulting services to all government departments and ministries. These cover enterprise resource planning, web hosting, software application & development, data center architect & disaster recovery, among others.

The National Telecom Corporation, established in 1991, enables the hosting of diverse applications, including an e-procurement system across more than 43 departments, thereby supporting this digital transformation.[53] Conceived to address the challenges of movement of paper-based files with resultant delays in efficiency, the E-Office application replaces manual handling of files with an agile and secure electronic system.[54] This digital workplace solution, which allows for the updating, sharing, and secure storage of files, enhances internal efficiencies and addresses issues such as file theft and loss. The system also makes regular backups of the robust disaster recovery systems.

---

52 A. Asghar. 2024. Digital Government Policy. Telephone conversation, 7 February.

53 *Pakistan Observer*. 2024. NITB Successfully Implemented E-Office in All Ministries. https://pakobserver.net/nitb-successfully-implemented-e-office-in-all-ministries/ (accessed 8 February 2024).

54 NITB. n.d.. E-Governance Programs. https://nitb.gov.pk/Detail/OWNkMGExNzctOWNhYS00YmU5LTlmZjQtYTU4YTk3OGQwZjFl

According to its website, since its establishment in 2014, NITB has implemented over 180 digital projects. It has also developed five e-government training modules, but it is neither clear nor apparent how government agencies are putting these projects into practice. Government agencies are also encouraged to use various management information systems (e.g., CMIS, e-Procurement, HRMIS, Tax MIS, Trade Facilitation, Education and Health MIS, Land management MIS, etc.). Yet, minimum standards for enterprise architecture and guidelines on business process reengineering for simplifying and digitalizing government services (e.g., ISO 9000 certification) are neither readily available nor is there any evidence that these are being implemented. Moreover, a coherent approach and uniform standards across government agencies are not present.

NADRA of Pakistan is a leading agency in the country's digital transformation journey, providing innovative and inclusive solutions for identity management, e-governance, and data analytics. NADRA has made significant contributions to the digitalization of public services, enhancing the efficiency and security of government operations and facilitating user-friendly service delivery. NADRA's flagship project is the smart Computerized National Identity Card (CNIC), which has become a foundational document for identity verification and access to a variety of public and private services. NADRA has issued over 100 million CNICs, covering over 90% of women in Pakistan, and has also developed biometric verification systems for subscriber identity module (SIM) card registration and banking transactions.[55] NADRA has also launched the smart National Identity Card for Overseas Pakistanis, providing a secure form of identification for Pakistani citizens living abroad.

NADRA has also been instrumental in developing and deploying e-governance solutions for various government departments, streamlining government processes, improving transparency, and facilitating efficient public service delivery. Some of its notable contributions include:

(i) technical support to the Pakistan Single Window system, which integrates customs and government agencies for trade facilitation;
(ii) the Pakistan Online Visa System, which simplifies visa application and processing for foreigners;
(iii) the Benazir Income Support Programme (BISP), which provides biometric verification for cash transfer programs aimed at supporting low-income families;
(iv) the COVID-19 Vaccination Management platform, which manages the registration, tracking, and certification of vaccination drives; and
(v) the Digital Identity for Refugees project.

The Pakistan Software Export Board (PSEB) supports and markets Pakistan's ICT Industry locally and internationally. It helps the ICT industry with projects and programs for infrastructure, human capital, company capability, global marketing, strategy and research, and innovation and technologies and is the custodian of the country's flagship "Tech Destination Pakistan," portal which focuses on creating linkages between Pakistan's ICT industry and the Pakistani diaspora.

The Ignite National Technology Fund, funded by the federal government via prescribed contributions from the relevant PTA licensees operating in the telecommunications domain and administered by MoITT, has set up National Incubation Centers in major cities, supporting and mentoring startups,

[55] National Database & Registration Authority (NADRA). 2022. NADRA Vehemently Rejects the Misconstrued Opinion of Dawn's Author about NADRA's Role. February. https://www.nadra.gov.pk/nadra-vehemently-rejects-the-misconstrued-opinion-of-dawns-author-about-nadras-role/ (accessed 13 September 2024).

and offering its flagship DigiSkills.pk program, with current enrollments of more than 4.5 million Pakistanis in digital skills training programs.[56] It has backed R&D projects in emerging technologies, hosted hackathons to promote innovation, and partnered with international organizations to improve global market access for Pakistani startups. Moreover, the fund has also been running capacity-building programs to strengthen technical and entrepreneurial skills.

The Federal Board of Revenue (FBR) is the government agency in charge of implementing and managing the collection of federal taxes, including income tax, sales tax, customs duties, federal excise duty and any regulatory duties. Interestingly, for Pakistan, the taxation system and digital sector present a mutual challenges-opportunity relationship that is a key factor for Pakistan's digital economy. On the one hand, it is complex, has a high tax-rate structure, lacks substantial clarity, and places compliance burdens on digital enterprises; on the other hand, it offers opportunities through reform interventions to digitize, simplify, incentivize, and modernize the federal tax administration system for facilitating the digital economy. There is also a need for policies that balance revenue generation with the digital economy's expansion.

The Intellectual Property Organization of Pakistan is an independent agency under the Commerce Ministry that manages intellectual property in Pakistan. It oversees and coordinates all government systems to protect and strengthen intellectual property. It also guides the federal government on intellectual property policy and enforces rights through intellectual property rights enforcement agencies, i.e., the police, the Federal Investigation Agency, and Pakistan customs.

Weak enforcement mechanisms, lack of resources, limited institutional capacity, and ineffective legal frameworks that are not aligned with international standards are among the key factors that have constrained the intellectual property protection regime from being more robust. Additionally, and ironically, the rise of digital platforms and e-commerce has increased the complexity of tracking and enforcing intellectual property regulations.[57]

The Cyber Governance Policy Committee was constituted in the wake of the Cyber Security Policy to implement cyber-resilience in government; while the National Center for Cyber Security, established in 2018, deals with cybercrime. The Electronic Certification Accreditation Council, established in 2002 as an autonomous federal-level body, provides services for accreditation and certification related to the ICT sector. The Public Procurement Regulatory Authority adopts and mainstreams government electronic procurement systems and procedures.

Key Institutional Actors at the Provincial Level

Apart from national-level stakeholders, provincial governments play a catalytic role in implementing digital government and in bringing it closer to the people and businesses.

PITB is a key player in advancing digital transformation in Punjab province, Pakistan. PITB oversees the implementation of various e-government projects across different sectors, such as health, education, agriculture, law and order, and citizen services. PITB aims to enhance operational efficiency, transparency, and accessibility of government processes and services through the use of ICT.

[56] DigiSkills Training Program | Free Online Training in Pakistan. https://digiskills.pk/ (accessed 22 August 2024).

[57] ProPakistani. 2023. Pakistan Ranks Much Lower Than India in E-Governance. https://propakistani.pk/2023/06/05/pakistan-ranks-much-lower-than-india-in-e-governance/ (accessed 8 February 2024); NITB. n.d. E-Governance Programs. https://nitb.gov.pk/Detail/OWNkMGExNzctOWNhYS00YmU5LTlmZjQtYTU4YTk3OGQwZjFl

PITB has developed and deployed several innovative solutions that leverage AI, data analytics, biometrics, and online platforms to address societal challenges and improve governance. For instance, PITB has launched the Smart Punjab initiative, which uses AI and data analytics to tackle issues ranging from health care to traffic management. PITB has also introduced a Biometric Attendance System for health facilities, a Complaint Management System for police stations, an e-Vaccs app for immunization records, an eLearn platform for remote learning, and a Kissan Card for farmers, among many other projects.

PITB has also been able to extend its expertise and support to other federating units and national projects, such as the automation of the Hajj process, the development of a monitoring and evaluation system for the National Accountability Bureau, and the provision of data centers, office automation systems, training sessions, data warehousing, and tech support services for various government offices.

The Khyber Pakhtunkhwa Information Technology Board has made significant strides in promoting digitalization, fostering innovation, and enhancing ICT infrastructure in the province. The board has implemented a range of projects and programs that have benefited various sectors, such as education, health, agriculture, and governance, as well as the general public and the ICT industry. Youth Employment Program, Durshal (Innovation Labs), Citizen Facilitation Centers, and Digital Literacy Centers are some of the leading initiatives.

The Government of Sindh passed the 2022 Digital Technology Board Act, and the Information Technology Department is in the process of establishing Sindh Digital Technology Board. The "e-Services Sindh" mobile app is a key part of Sindh's e-governance strategy. It is a joint project between the Board of Revenue Sindh and the Industries Department. It digitizes important records, such as land and industrial records, to make business operations more efficient and transparent in the province. The app makes it easier to access digitized land records and submit online applications for certificates and permissions. The Sindh Schools Information and Management System lets teachers apply, transfer and appoint online without visiting government offices.

The Government of Balochistan (Science & Information Technology Department) approved the Balochistan Digital Policy 2021 to provide e-governance and digital services to the public and affordable internet. Digital development in the province is in its early planning stage.

Rapid Provincial Digital Readiness Assessment

While an overview of the diverse digital projects being implemented at provincial level is available, comprehensive data on provincial, district, and local level digital readiness are not. Where it exists, it is too fragmented to provide a comprehensive picture.

Therefore, to fill in this gap, using a structured survey questionnaire, the SDPI team rolled out a rapid provincial digital assessment of Balochistan, Sindh, and Punjab. The assessment was rolled out between December 2023 and January 2024 where the SDPI team reached out to 60 different provincial government departments with a 58% response rate.[58] The sample included both ICT and non-ICT departments. Among these, 16 valid responses were from provincial non-ICT departments, while eight responses represented ICT-relevant entities. The survey results provide a rapid overview of ongoing initiatives where provincial governments are using digital technologies for specific outcomes.

[58] Questionnaire is available on request.

The following is a synopsis of the rapid assessment's results:

(i) Digital transformation policies are in place and gaining importance but action plans with KPIs are missing. When it comes to policymaking, all five provinces surveyed reported having a digital transformation strategy in place but only one province reported having a corresponding action plan. The absence of strategic plans with clear benchmarks, KPIs, and recurrent budgets makes policy implementation, monitoring, and accountability more challenging to assess. These trends, however, are similarly observed at the national level.

(ii) Eighty-five percent of provinces admitted that they do not have an e-Services Act and 71% do not have a service catalog. E-services laws are important in that they typically outline service definitions and conditions for delivery including the service strategy, service offering, service and product catalogs, service design and development processes, maintenance of services, and compliance and accountability measures. The subset service catalogs then list categories of services to be delivered digitally. Both are essential for the clear structuring of digital services, their development, their subsequent management and progress tracking. As noted, these are absent in nearly all provinces.

(iii) When it comes to the rollout of digital services, the majority of the services have not been digitalized end-to-end. End-to-end digitalization of service means that the entire business process and associated interaction with the client(s) is digitalized where the client or end user does not have to physically visit any offices nor fill out any paper forms. As mobile penetration is rapidly increasing in Pakistan, it is encouraging to see that 57% of the departments are already offering convenient services delivered though mobile apps. Integrated public service portals to better serve citizens, businesses and government are also on the rise and available in 67% of the provinces.

(iv) The greatest gaps are in the more advanced digital architecture such as platform-based integration of services supported by cloud-based interoperability solutions and government enterprise architecture frameworks. The latter are only available in one province while only 33% of the responding provincial departments utilize some form of a government service bus platform to enhance their back-end integration. Interoperability solutions are critical for making data sharing inside and between different government agencies more efficient and seamless. It requires establishing Categorized Regulatory Frameworks for Effective Data Sharing that comprise the implementation of hierarchical regulatory structures to administer and govern data-sharing practices. A goal is to promote the adoption of anonymization techniques and proxy methodologies to ensure the secure sharing of sensitive data. Strategic planning in the digitalization of services and in the reengineering of their business processes is practiced only among 43% of the responding departments.

(v) Some other observations from the results of the survey include:
- Positive trends include 71% of departments having an integrated financial management information system in place; 57% have a supported treasury single account to automate payments and bank reconciliations.
- Lagging or missing links including the following:
  - » Fifty-seven percent do not have an operational tax system/online portal with operational e-filing service and only 29% have an e-payment portal for e-services.
  - » No department has reported having an open-source software policy/action plan in place; further, application programming interfaces management policy is in place only among 14%.
  - » Fifty-seven percent do not have a tax management information system.

- » Seventy-one percent are lacking a human resources management information system with a self-service portal, and only 57% have a linked payroll system.
- » Fifty percent do not have a digitized social insurance system for pension-related and other social programs.
- » Forty-three percent do not have e-procurement portal and 86% do not have searchable repository of ICT contracts available in open data format(s).
- » Low usage (14%) of voice-based solutions in customer relationship management for digital inclusion for those who are yet unable to use digital public services.

(vi) Data governance is still nascent country-wide, with no or minimum data governance frameworks and standards in place. Eighty-five percent of respondents reported that they have no established practice of using data catalogs or data asset repositories, and they lack clarity on national and provincial policy imperatives related to data governance, likely due to the fact that they do not exist, nor do they have compliance mechanisms for ensuring data quality and architecture standards. Regular reviews, audits, and monitoring for improving the quality and management of data are only practiced among 38% of departments. As for data storage, respondents reported using local ISP servers but several mentioned ongoing plans for establishing provincial data centers in the near future. Overall, when asked to self-assess their data quality management maturity, integrity, and security, the majority rated themselves as moderately low. Open data regimes are also nascent, with only 25% having an open data policy for publishing and sharing datasets with the public and only the State Bank of Pakistan (SBP) having a dedicated Easy Data portal.

(vii) Data governance departments differ in each province. In the Punjab and Sindh provinces, it is the local ICT boards that are responsible for managing data, while, in others, it is statistical cells, planning and development departments, or diverse departments pitch in with different roles. It was great to hear that most provinces are beginning to launch applied data analytics or data visualization projects such as the Multiple Indicator Cluster Survey and child labor survey, or the Easy Data Portal launched by the SBP where users can download and plot over 2.27 million data points of economic data. This suggests that government-wide standardization, incentives, and sensitization related to data management is greatly needed.

(viii) Cybersecurity readiness in the public sector is increasing but is still low. Policy-wise, 43% respondents claimed that they have not had policy discussions on cybersecurity aspects yet, 43% have discussed them but have not codified them into formal policies, while only 14% have drafted policies on cybersecurity but are waiting for them to be formally adopted. Without policy direction, the vast majority (86%) of government departments do not have cybersecurity action plans nor a dedicated cybersecurity policy for critical infrastructure.

(ix) Respondents claim to be most concerned about the low staff awareness about cybersecurity and low cyber-hygiene culture within their institutions. They were less worried about external cyberattacks or online criminal activity since cybersecurity incidents are still rare. Budgeting for cybersecurity is included in annual plans in nearly one-third of the provinces, but more than two-thirds of provinces do not have a consistent way of financing cyber security initiatives. Staffing is an additional challenge as presently 86% of departments do not have a dedicated team for cybersecurity. Operationally, while encryption of backups and/or external media (hard drives, etc.) is commonly practiced, more than half of respondents claimed that their departments do not have contingency plans in place in case of emergency situations. When it comes to skills, while some trainings are provided to dedicated staff and senior leadership, in general, upskilling and training of staff could significantly improve; indeed, 71% admitted that

they do not provide any cybersecurity training at all. Public awareness campaigns to enhance cyber-resilience and cyber-hygiene are also not practiced. Similarly, as with cybersecurity, data protection and privacy measures, which are becoming important as government, businesses, and people increasingly migrate online, are in their early stages of development.

(x) This is illustrated by 86% of responding government departments not having: 1) data protection and privacy policies, 2) regulatory measures for data breach incidents related to private sector actors, and 3) a designated in-house department or trained staff dealing with the issue (less than half have conducted public awareness campaigns on data protection).

Overall, to advance effective implementation of cybersecurity measures at the provincial level, more commitment to policymaking and capacity building of staff is needed. Promotion of cloud-based solutions for data storage as well as improved budgets for cybersecurity measures, digital infrastructure, and internet connectivity are other envisaged priorities. On the data protection side, rollout of relevant training to upskill or hire relevant professionals, dedicated budgets, and introduction of overall policies with corresponding data protection systems and procedures need to be implemented in the near future.

(xi) There is high appetite for the integration and optimization of advanced technologies. It is evident that government departments are managing diverse digital realities and challenges. Budgets are evidently scarce. Hence, it could be assumed that integration of advanced technologies would not be among the top priorities for government departments. Yet, our diagnostic results show that the opposite is true. Eighty-six percent of respondents noted that integrating emerging technologies for their provinces' digital transformation is highly important and 14% suggested that it is moderately important. Despite the scarcity of resources, many departments are also already experimenting with AI applications (29%), IoT (29%), drones (29%), and blockchain and big data analytics (14%). In doing so, government departments collaborate with a diverse array of actors which include universities, the private sector, and startups. These insights thus show that there is great appetite within the public sector for the optimization of advanced technologies. The remaining challenge is formalizing the approach of institutionalization as the vast majority (86%) of provincial departments do not have an explicit strategy on the topic yet. Other barriers include the lack of dedicated budgets, digital infrastructure, and skilled staff. These realities were claimed by all (100%) respondents while nearly half (57%) noted that a low understanding still prompts inadequate demand for the topic's prioritization. Among respondents, AI and big data analytics (86%) and IoT (72%) were identified as the most relevant for the current needs of the public sector.

(xii) Online information provision prevails while interactive civic engagement digital tools are used less. By international standards, employment of civic engagement tools is critical to government's role as service provider, to ensuring its accountability, transparency, and in its building of trust with taxpayers. Online transparency and accountability vis-à-vis the public is ensured through measures such as interactive provision of information through social media sites. Leading digital platforms, such as Facebook and X (formerly Twitter) (86%), frequently integrate citizen feedback mechanisms (71%) related to various services. Furthermore, a significant proportion (57%) of digital service development prioritizes user-centered design principles, incorporating user experience and user interface (UX/UI) methodologies. More interactive civic engagement tools such as online right to petitioning, participatory budgeting, civic polls, e-voting, provision of inputs during policymaking, and citizen report cards are used to a lesser extent; nonetheless, they still are, which is encouraging. As shown in other countries, this trend may increase as people gain more internet access and become more digitally skilled. Survey responses also show that tailored approaches are being ensured when reaching out to

different demographic groups. For youth, social media campaigns are proactively being used while more traditional outreach channels such as radio and TV continue to be used when reaching out to more vulnerable populations. Using a multi-channel approach in government outreach points to good international practice that promotes blending of online and offline tools so as to not to leave anyone behind. Lastly, dedicated programs for reducing the gender digital divide are woven into provincial government's Equal opportunity for all programs, as well as 30% of interventions specifically targeting women.[59] The baselines, adequacy, and impact of these measures, however, would need to be more scrutinized.

- In Punjab, efforts are underway to implement a speedy and transparent application and allotment system by digital connectivity with the building control function. Additionally, web-based services are being utilized to enhance education delivery experience, including teacher training and student engagement.
- In Khyber Pakhtunkhwa, the focus is on digitizing vehicle registration, property taxation, and real estate registration through the provincial Excise & Taxation Department.
- Sindh is prioritizing automation to reduce manual file load in government departments.
- Meanwhile, in Balochistan, digital connectivity initiatives are aimed at uptake of health and water, sanitation, and hygiene interventions.

(xiii) Provincial governments are adopting various methods to enhance digital services development and improve user experience.

- In Punjab, efforts include the utilization of user feedback mechanisms such as website feedback forms, surveys, and social media engagement, along with public and private consultations to gather direct feedback from users and engage industry stakeholders.
- Similarly, Khyber Pakhtunkhwa is focusing on market research strategies such as user testing, prototyping, and surveys to identify user insights and preferences.
- Sindh is utilizing a combination of user feedback mechanisms and public consultations to improve digital user experience and gather direct feedback from citizens. More than 100 departments in Sindh have started working on E-Office systems.
- Meanwhile, in Balochistan, efforts are underway to leverage user feedback mechanisms such as surveys and user service centers to gather feedback and enhance digital services development.

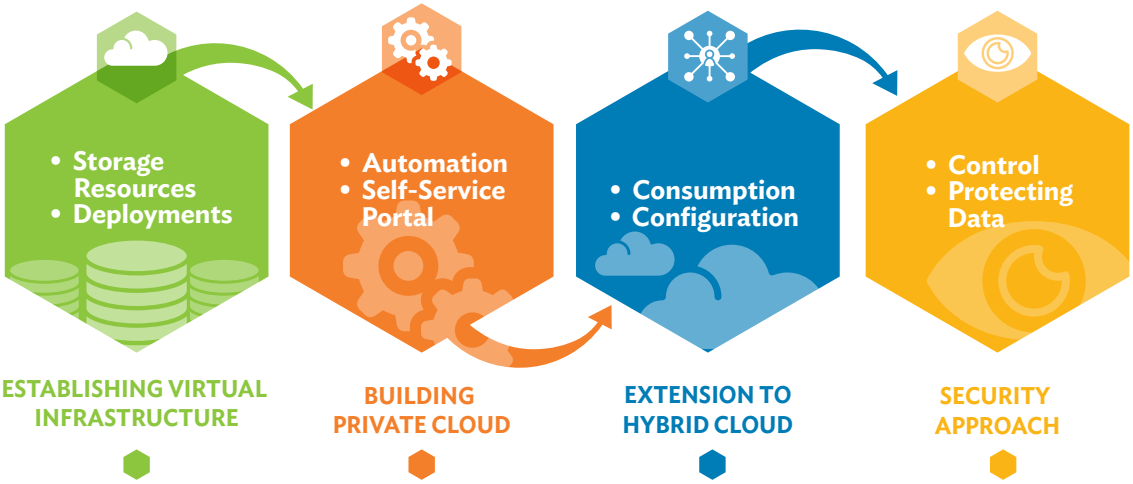
(xiv) Each government department faces its own set of challenges when it comes to adopting digital technologies.

- Punjab struggles with the availability of necessary digital infrastructure, particularly in the southern parts.
- Khyber Pakhtunkhwa encounters challenges related to digital literacy and an unpredictable security environment in the western parts.
- Sindh confronts operational and financial considerations, alongside concerns about cybersecurity and data privacy in government departments.
- Balochistan confronts challenges related to digital literacy, as well as budget constraints and limited infrastructure.

(xv) The top four challenges identified by provincial departments in the implementation of digital services are shown in Figure 27.

[59] Author's own research.

Figure 27: Four Key Challenges for Provinces in Digital Service Delivery



Source: Team Survey 2024.

Adoption of Emerging Technologies

With the current rapid pace of technological innovation and with citizens' and businesses' increasing expectations from public institutions, adoption of new technologies is a must. This trend will only accelerate in the future. Data-driven personalization and integration of services, IoT-based smart-city solutions known to boost urban efficiency and mobility, e-payment mobile applications for government services, or telemedicine advancements in health care provision are all examples of emerging technologies that improved public sector efficiency and user centricity. Global practice shows that governments which have proactively integrated and optimized emerging technologies (Estonia, the Republic of Korea, Singapore, United Arab Emirates, etc.) made significant public savings, increased efficiency, and augmented user experience for their users and businesses (for instance, during COVID-19 disruptions).

Pakistan's vast ICT talent pool offers a significant opportunity for developing homegrown digital solutions. While capitalizing on the export value of local talent is important, Pakistan needs to also think how to effectively incentivize and leverage the local talent to produce ICT solutions for public good. There are plenty of good examples already (Box 6), but in the near future, the growth of public, urban, and social innovations should be proactively supported through targeted government programs.

Box 6: Examples of Public Sector Innovation at National and Provincial Level

- Geographic information system (GIS)-driven Urban Services under Female Leadership—Punjab Province. The Urban Unit of Punjab has applied innovative use of technologies in urban planning, infrastructure development, and data-driven governance. Its various projects and initiatives focus on urban management and service delivery through sophisticated application of data analytics in Punjab.

  Among its key achievements are the use of GIS and high-precision spatial data in social protection targeting after the dire 2023 floods for city planning, in urban infrastructure development, land use, and resource and disaster management. Value-adding projects for urban planning have been implemented in Lahore, Faisalabad, and Multan. Use of spatial data was particular useful in the Punjab Spatial Strategy, a strategic framework that guides urban and regional development in Punjab. A particularly notable feature of the unit is that its executive and technical staff is predominantly female.

- The Benazir Income Support Programme's proactive use of data analytics for informed decision and effective targeting of beneficiaries for social payments.

- The Government of Punjab's blockchain-based land record management pilot initiative aims to ensure secure and immutable record keeping and ongoing land transaction tracking.

Source: Authors.

Digital Skills and Talent for the Public Sector

Pakistan faces a significant challenge in enhancing the digital skills and competencies of its public sector human resources who are the key to delivering efficient and effective public services and fostering innovation.

According to a recent survey by the World Bank, only 38% of civil servants in Pakistan reported having basic or intermediate digital skills, and 62% reported having no or low digital skills. The survey also revealed gaps in the availability and quality of digital skills training and assessment, as well as in the institutional and policy environment for digital skills development.[60]

There is a need for a customized digital capacity-building framework for the decision-making civil servants and the public sector at large that emphasizes the following three competence areas:

- **UX/UI-based systems through applied design thinking.** This would focus on development of user journeys, identification of user problem and pain points and subsequent resolution, as well as development of visual touchpoints and aesthetic, user-friendly interface design features.

[60] The World Bank. 2023. Project Information Document (PID), Pakistan: Digital Economy Enhancement Project (P174402). Report No: PIDA31211. 17 January. https://documents1.worldbank.org/curated/en/099455001172320746/pdf/P174402045311c010b4e10ea4415c52d4a.pdf.

- **Data-informed governance.** This would enable government officials to use data efficiently. To respond to the current needs, they would need to have various competencies in data management and analytics (working with AI and applied large language models); how to effectively manage open data, privacy, and security protocols; and how to stay on top of evolving legal and regulatory frameworks through regulatory sandboxing and legislative adjustments.
- **Cloud computing and migration change management.** Cloud technologies refer to the ability to access software applications, data storage, servers, networking, analytics, and intelligence, over the internet instead of using physical servers located in an office. For government institutions, this means phasing out legacy systems and migrating to them to the cloud. This requires knowing how to manage cloud-based platforms—hybrid and multi-cloud adoption, how to procure cloud-based services (e.g., Amazon Web Services Lambda and Azure), edge computing, how to develop software applications and services in house that can interact with each other and exchange data with the help of APIs or more advanced skills such as containers and Kubernetes orchestration, which are needed for building, deploying, and scaling applications to facilitate portability across different cloud environments.

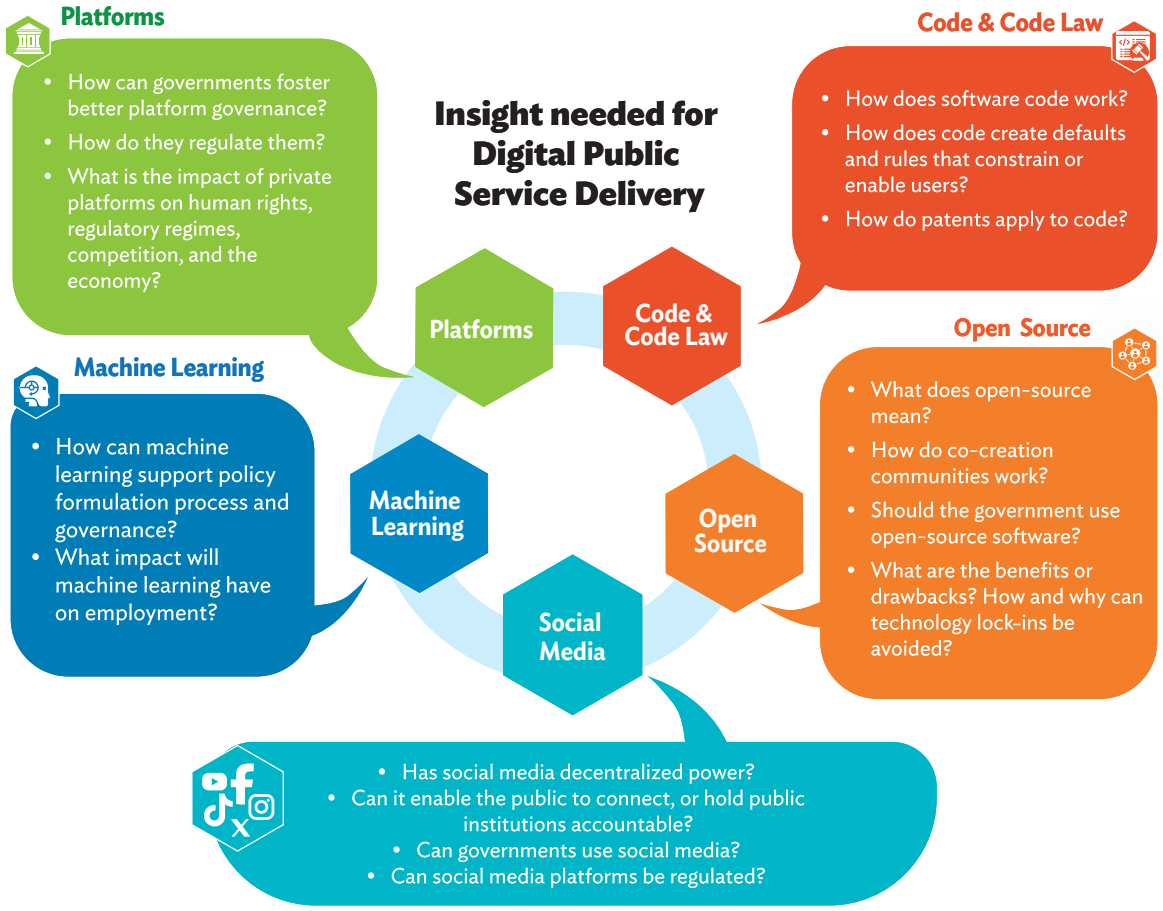
Digital literacy for everyone needs to be advanced through programs tailored to specific digital needs of different social groups. While there are standard digital literacy skills that need to be mastered by all for basic digital on-boarding, different social segments such as women, rural populations, farmers, and the unemployed or underemployed may have different digital needs. Moreover, as digital technologies advance, the required digital competencies also advance in parallel. Here, the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the European Commission have identified five areas of digital competence[61] required to effectively navigate and use for the pursuit of their basic needs. These are

- information and data literacy;
- communication and collaboration through digital technologies, (e.g., managing one's digital presence, identity, and reputation);
- digital content creation—creating and editing digital content;
- safety referring to the protection of devices, content, personal data, and privacy in digital environments; and
- problem-solving related to situations in digital environments, and to keep up to date with digital evolution.

Hence, after attaining basic digital literacy training, citizens should be encouraged to attain digital competence either through basic education channels or through targeted government professional development and continuing education programs (Figure 28).

[61] R. Szanter and E. Matuska. 2024. Development and Certification of Digital Competences in European Union Countries in Project-Based Learning Initiatives. *Journal of Modern Science.* 56 (2). pp. 371–96.

Figure 28: How Civil Servants Can Remain "Digitally Current"



Sources: ADB; KSG. 2023. Towards Digital Platforms and Public Purpose. Summary Report for the Democracy and Internet Governance Initiative. Shorenstein Center on Media, Politics and Public Policy. https://shorensteincenter.org/wp-content/uploads/2023/07/DIGI-Final-Report_July5_2023.pdf.

Digital training courses can be outsourced to certified private or public training institutions, including public colleges and universities for the development of ICT education and services. For more advanced digital competences, a new education architecture built around research, innovation, and entrepreneurship could assist Pakistan in digital transformation. It is time for the education authorities to capitalize on existing assets by determining their ICT requirements in each local government with tailored design of ICT education through public sector colleges.[62] As part of such initiatives, ICT could be declared a compulsory subject in college-level educational curricula.

To this effect, the Ministry of Federal Education and Professional Training has recently declared its plan to set up modern ICT labs in schools across Islamabad, aiming to provide youth with the most current skills and boost their employability prospects. Such initiatives could be expanded. ICT incubation centers could also be established in colleges and universities to foster creativity and innovation.

[62] M. Azfar. 2023. Prospects of Digitalization in Public Sector. Telephonic Conversation, 17 March.

3.3 Digital Services and Urban Development

The current government-to-government digital services in play in Pakistan include E-Office developed by PITB and NITB, eID developed by NADRA as well as the numerous public sector websites and portals. On the government-to-citizen (G2C) side, numerous one-stop-shop portal initiatives have sprouted, while NITB claims to have developed 180 digital projects since its establishment in 2014 (Figure 29).[63]

These include digital G2C solutions such as the National Job Portal, Economic Affairs Division's Nongovernment Organization (NGO) Portal, the Complaint Portal and Mobile App for Overseas Pakistanis, or the City of Islamabad app, which offers 40-plus government services, including government taxes or payments. Some civil society organizations have made progress in moving toward integrated portals or web interfaces for service delivery.

Figure 29: Digital Projects and Services Developed by National Information Technology Board Since 2014

Source: National Information Technology Board.

A wide variety of services by NADRA also fall under G2C, while government-to-business services, the digitalization of taxation services, and arrangement of licenses, permits, and certificates are other good examples. The government launched the Pakistan Citizen Portal in 2018 for complaints against government departments. It provided a smartphone app that worked well initially but the momentum was lost due to lack of sustainability. The portal was declared the second-best government mobile application in the world at the World Government Summit in 2019.

63 National Information Technology Board. https://www.nitb.gov.pk/ (accessed 23 September 2024).

Some of the notable initiatives of the FBR in digitalization include the introduction of online tax filing and payment systems, the automation of various tax-related processes, the improvement of transparency and accountability in tax administration, and the launch of the online taxpayer facilitation portal. The FBR website has a significant amount of information that is of interest to its stakeholders. End-to-end digitalization of FBR has the potential to bring efficiency to the organization and help in broadening of the tax base.

Despite these advancements, strategic and comprehensive plans for the development of digital services are notably missing across public sector institutions. While Pakistan has improved on its online services over time and scores slightly higher than the subregional and regional averages on the UN's 2022 Online Service Index, it is still below the world average. Where Pakistan appears to score particularly high on the content provision and institutional framework, it scores lower on the provision of services, e-participation, and technology rankings. These figures suggest significant room for future improvement.

Among the top barriers to intragovernment digitalization in Pakistan is public sector organizations' resistance to change. Many public officials perceive digitalization of their work as a threat to their roles and authority. The social construct of public administration presents officials as custodians of authority who enjoy a lot of discretion in their workplace; public office holders anticipate that their role and authority will diminish after digitalization.[64] The recent digitalization of land records by the Government of Punjab, for example, resulted in protests and severe resistance from the official record holders of the legacy revenue system. However, such resistance has not been uncommon in other countries undergoing digitalization; active outreach, tailored incentive measures, and sensitization campaigns on digital dividends were key to mitigating this barrier.

PPPs have globally proven to be useful mechanisms for financing digital transformation in the public sector. Progress in offering digitalized services, being capital-intensive, would require private sector capital and expertise in carefully drafted PPP contracts. Research suggests that strong political leadership, pro-active dialogue between government and private sector, mutual alignment of priorities and actions, favorable policy environment and incentives, as well as effective organizational capacity are prerequisites for successful PPPs.[65]

Budget allocations to the ICT sector have been limited. Digital transformation of government systems and processes is an extensive undertaking. It requires an ambitious vision; committed efforts; holistic; multi-track approach and steady allocation of resources. Similarly, PRs131 million was allocated for FY2023–24.

MOITT's budget for the execution of the Digital Pakistan Policy and devolved allocations to ministries and provincial governments has been limited. The Federal Budget allocated PRs228 million in FY2022–23 for the Digital Pakistan Project, Phase-I and plans to allocate PRs131 million in FY2023–24. This budget mainly pays for staff and other running costs and is insignificant for financing any real

[64] N. Qaiser, and H. Ahmad. 2010. E-Government Challenges in Pakistan. *Global Journal of Management and Business Research.* 10 (2010).

[65] M. Opara, and P. Rouse. 2019. The Perceived Efficacy of Public–Private Partnerships: A Study from Canada. *Critical Perspectives on Accounting*. 58. pp. 77–99.

investment in digital transformation. For 2024–25, PRs23 billion was allocated for USF, whereas PRs3.96 billion was approved for Ignite.

Apart from MOITT's budget, other important resources made available by the Government of Pakistan include USF and Ignite. The licensed telecom operators and service providers contribute 1.5% and 0.5% for USF and Ignite, respectively. In 2022–23, PRs8.2 billion were placed in the USF. The R&D Fund and Ignite Start-up Program received PRs2.7 billion in FY2022–23.

While certainly needed, both funds operate in limited geographical areas with a limited scope. Moreover, not all the funds end up being used for intended purposes. Although the amounts are shown in the books of the two funds, the federal government transfers large parts of cash amounts to the Federal Consolidated Fund for "safe keeping."

Digital technologies can support disaster risk reduction. Pakistan is prone to various types of disasters including epidemics, financial crises, and disasters due to natural hazards. Given the rapidly increasing impact of climate change, climatic disasters are occurring at a higher frequency, making disaster preparedness, mitigation, and recovery even more difficult and essential. *Pakistan's climate adaptation financing requirements range between $7 billion and $14 billion annually.*[66] With the acceleration of green tech and the disaster risk reduction agenda, Pakistan could attract this financing by defining that its future investments would be related to climate-aligned digital initiatives.

Pakistan has so far implemented an early warning system for disaster identification and classification, where the National Disaster Management Authority has a processing center to classify and organize aggregated data into a monitoring dashboard for enabling disaster response and decision-making. Pakistan has also taken the lead in restructuring its Proactive Disaster Management System. Through the integration of technology and innovative methodologies, Pakistan seeks to strengthen its resilience and readiness. This evolution is centered around the National Emergencies Operation Center located at the National Disaster Management Authority headquarters.

BISP—Pakistan's national social safety net program—has a digital enrollment mechanism for beneficiaries and disbursement of social welfare aid during crises. However, a multichannel mechanism/G2C payment solution that is independent of BISP is essential for disbursement of social welfare aid during crises. A bottom-up sharing platform for real-time aggregation of data from the different tiers of government, private sector, academia, communities, and individuals during disaster response is a necessity.

Advanced technologies such as satellite imagery, remote sensors, and mobile communication networks can provide many opportunities for enhancing early warning systems. This could involve integrating multiple data sources to improve accuracy, developing mobile applications for receiving alerts, and deploying community-based warning systems in high-risk areas. To increase Pakistan's climate resilience, more investments and public awareness building programs need to be made without delay.

[66] ADB. 2017. *Climate Change Profile of Pakistan.* https://www.adb.org/sites/default/files/publication/357876/climate-change-profile-pakistan.pdf.

Presence of Government on the Web

In Pakistan, government websites serve as important channels for delivering information and services to the public, especially in areas such as identity, taxation, and land administration. However, these websites often fall short of meeting user expectations and needs due to factors such as low user-friendliness, frequent technical issues, irrelevant or inaccurate information, and lack of interactivity and service integration. Over 200 government services are now available online, with digital identity management through NADRA covering 120 million CNICs.

Some federal agencies and provincial departments have made progress in enhancing their ability to use internet platforms. However, local governments usually do not have the experience and skills or even the awareness to design and convert their current services into e-services. Municipal administrations in large cities like Lahore or Karachi and the capital Islamabad have developed channels of online engagement with citizens with varying degrees of development.

There are around 33 ministries comprising about 40 divisions in the Federal Government of Pakistan. The four provincial governments consist of around 500 departments. All the federal government ministries and provincial departments have electronic interfaces and electronic gateways.[67] Ministries and departments in the federal government have started using electronic communication.

Continued paper-based government administration and service delivery. Though there are notable advancements that have been made, most government services at all levels are still paper-based. The exact figures are unknown since documented planning, data collection, and progress monitoring related to digital services is not systematically conducted. It is noted that catalogs of public services, enterprise architecture, and business process reengineering plans are not readily available across government agencies. The extent to which or how UX/UI factor into the design of targeted digital services is also undocumented, hence unclear.

Provincial Initiatives

While the federal government has the power to make laws and rules for wireless communication and telecom, ICT is a devolved subject under the 18th Amendment, 2010. Provinces can make their own policies, laws, and regulations for ICT within their domains.

3.4 Data Governance

Effective data governance is an essential part of modern government and seamless service delivery. Data management processes ensure the quality, integrity, and security of data assets within government organizations. If utilized proactively and effectively, data can become a driver of public sector efficiency, innovation, and informed decision-making.[68] Pakistan does not have uniform practices to collect, process, store, and reuse data on a continuous and sustainable basis.

---

[67] MOITT. 2024. Pakistan National ICT Industry Development White Paper. Ministry of Information Technology & Telecommunication (MOITT). https://moitt.gov.pk/SiteImage/Misc/files/Pakistan%20National%20ICT%20Industry%20Whitepaper.pdf.

[68] W. Halim, A. Upadhyay, and C. Coflan. 2022. Data Access and Protection Laws in Pakistan: A Technical Review. Helpdesk Response No. 44. EdTech Hub. https://doi.org/10.53832/edtechhub.0098

While the Personal Data Protection Act, 2023 was presented in the Senate of Pakistan on 13 February 2023, a comprehensive data governance policy that is proactively implemented across the government does not exist. Government has not yet defined standards for data classification and their (re)usage across ministries, while mechanisms for data sharing, integration, and analysis to support efficient digitalization efforts remain limited, with many still being paper-based. For example, data linked to National Identification, Taxpayer's ID, Business Registry, Land Database, and Non-Movable Assets registries such as driver's license and vehicle registration, though digitally available within respective agencies, are not shared electronically across agencies. This has negative implications for efficient government-to-government interoperability and the launch of more complex digital services.

Similarly, 85% of provincial departments surveyed[69] reported that they have no established practice of using cataloged data repositories and lack clarity on national and provincial data governance guidelines. Regular data audits for improving the quality and management of data are practiced only among 38% of departments. As for data storage, local ISP servers are most common, while provincial data centers are planned in the future. Most of the provincial departments self-assessed themselves as moderately low on their current data management readiness and security capacity. Data center developments remain fragmented and at a low scale.

Open data policies and practice in the public sector are equally nascent where only 25% provincial departments report having an open data policy for publishing and sharing datasets with the public. Nevertheless, examples of good early practices outside the government are growing. NTC has designed and built a Class "A", the first-ever tier-3-compliant data center in Pakistan. The Open Data Pakistan portal is curated by the National Center for Big Data and Cloud Computing, Lahore University of Management Sciences, while the Higher Education Commission (HEC) hosts 1,092 datasets supplied by 22 reputable organizations.

At the provincial level, the Khyber Pakhtunkhwa Open Data Portal[70] and the Ehsaas District Development Portal Data4Pakistan,[71] which provide public access to 120 development policy indicators and spatial interactive poverty estimates for every district in Pakistan, are excellent examples of collaborative efforts among researchers, policymakers, communities, and businesses to promote and use open data. The State Bank of Pakistan's interactive Data Portal Easy Data[72] focuses on financial and economic datasets (2.36 million data points).

According to a PITB study, around 2.5 quintillion bytes of data are generated annually, for which space 40 trillion gigabytes is required on a sustainable basis. Innovative solutions for big data analytics and Master Data Management Systems are required in the public sector to consolidate and deploy data for specific purposes.[73]

In Pakistan, a new Government Data Office is required to be set up, with the mandate for data classification and categorization based on availability of new technology, sensitivity, usage, and

[69] Rapid Provincial Digital Ecosystem Assessment conducted as part of the ADB Digital Ecosystem Diagnostic by the Sustainable Development Policy Institute (2024).
[70] KP OpenData Portal. 2015. https://opendata.kp.gov.pk/ (accessed 5 March 2025).
[71] Ehsaas District Development Portal. 2020. https://opendata.com.pk/ (accessed 5 March 2025).
[72] SBP EasyData. https://easydata.sbp.org.pk/ (accessed 5 March 2025).
[73] PITB. 2024. Master Data Management System in Punjab. Government of Punjab.

value. All public sector entities must calculate the rate of investment in data management initiatives by quantifying benefits, and promote the use of AI and big data to implement mechanisms and public services.

3.5 Cybersecurity

Cybersecurity is a crosscutting enabler for Pakistan's digital transformation. Cybersecurity is essential for digital transformation because it makes the shift to digital processes more secure. It defends enterprise data, systems, and networks from cyberattacks, which can lead to major problems, slowdowns, and data leaks.

The cybercrime laws in Pakistan have evolved gradually. The initial step was taken with the introduction of the 2002 Electronic Transactions Ordinance, which focused on facilitating electronic transactions and recognizing electronic documents. This was followed by the 2004 Electronic Crimes Act, addressing various cybercrimes such as cyberstalking, electronic fraud, and cyberterrorism, among others. Subsequently, the 2007 Prevention of Electronic Crimes Ordinance was promulgated, but it was limited in scope and thus underwent several changes through Presidential directives.

Efforts to enhance cybersecurity included initiatives like the Seven Points Action Plan proposed by the Senate Committee on Defence and Defence Production, and the inclusion of online radicalization in the National Action Plan announced in December 2014. The 2016 Prevention of Electronic Crimes Act and the 2021 National Cyber Security Policy are two key legislations that govern cybersecurity in Pakistan. The government has set up the Cyber Governance Policy Committee to implement the policy at the national level, determine a strategy in a timely manner, and take timely action.

PTA has also developed a Cyber Security Strategy for 2023–2028; however, its application is limited to the telecom sector. The Ministry of Interior and its affiliated bodies are tasked with cybercrime investigation and internal security, while the Ministry of Defence and its relevant authorities administer cybersecurity matters pertaining to national defense. This management structure has changed over time, but it still lacks clarity and legal regulation in many cases.

According to the cybersecurity 2021 Global Index Report, Pakistan's overall score is 64.88 out of 100.[74] Pakistan's vulnerability to cyberthreats makes it difficult for the adoption of digital government modes and practices for the general public.[75] Cyberthreats in Pakistan increased by 17% in 2023 as compared to 2022.[76] Around 25% of users in Pakistan were affected by online threats. Attacks using banking malware have risen by 59%. A 35% increase in Trojan attacks has been reported and attacks designed to encrypt data also increased by 24%.

[74] S. Ahmad. 2022. Cyber Security Threat and Pakistan's Preparedness: An Analysis of National Cyber Security Policy 2021. *Pakistan Journal of Humanities and Social Sciences Research. 5. pp. 25–40.*

[75] U. P. Khan, and M. W. Anwar. 2020. Cybersecurity in Pakistan: Regulations, Gaps and a Way Forward. *Cyberpolitik Journal. 5 (10). pp. 205–18.*

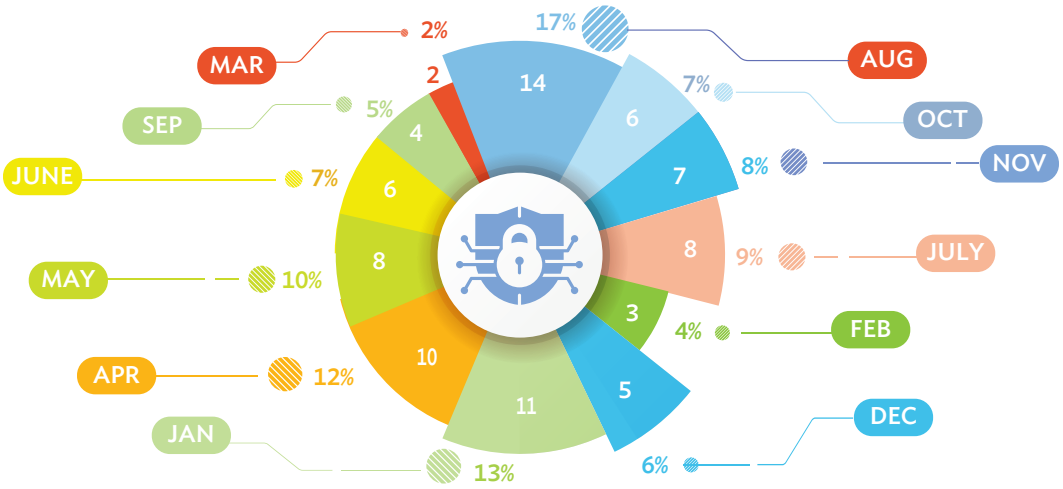
[76] J. Rizvi. 2024. Pakistan Sees 17pc Rise in Cyberattacks in 2023, but Still Low in Region: Kaspersky. *The News International. 19 February.* https://www.thenews.com.pk/print/1159347-pakistan-sees-17pc-rise-in-cyberattacks-in-2023-but-still-low-in-region-kaspersky.

Pakistan is rated 79th worldwide for cybersecurity capabilities. Pakistan's digital economy is experiencing rapid expansion, boasting over 100 million internet users and a burgeoning e-commerce sector. However, incidents of cyberthreats have also surged in recent years, with a staggering 300% increase in reported cyberattacks in 2020 alone. The challenges are multi-fold, and an escalation in incidents underscores the inadequacy of Pakistan's cybersecurity infrastructure.[77]

A whole-of-society cybersecurity and hygiene awareness-building campaign is needed. A significant hurdle is the widespread lack of awareness about cybersecurity within the government, as well as among the general population. Many internet users in Pakistan neglect basic cybersecurity practices, such as employing robust passwords or regularly updating their software.[78] The National Telecommunication and Information Technology Security Board issues advisory notes on various attempts of attacks but these communication methods need improvement for a targeted response.

A total of 89 advisories were issued in 2023, empowering the stakeholders with information about malware. Around 43 alerts were issued from July to December in 2022, and from January to June in 2023 as many as 46 advisories were reported. Figure 30 gives a glimpse of advisories issued by the National Telecommunication and Information Technology Security Board during 2022–2023. It would be interesting to compare Pakistan with other countries that have been struggling with cybersecurity. The quantum of incidents is higher in other countries, but the reason is that Pakistan does not include cyberthreats to general public in their advisories and only create alerts for public sector organizations.

Figure 30: Cybersecurity Advisories, 2022–2023



Source: Ministry of Information Technology and Telecommunication; Pakistan Telecommunication Authority.

[77] M.F. Khan, A. Raza, and N. Naseer. 2021. Cybersecurity and Challenges Faced by Pakistan. *Pakistan Journal of International Affairs.* 4(4). pp. 861–890.

[78] Ministry of Professional and Technical Training (MoFEPT). 2022. *Cybersecurity Awareness Report*. https://mofept.gov.pk/SiteImage/Misc/files/MoFEPT%20Cybersecurity%20Awareness%20Report%20V10.pdf (accessed 23 September 2024).

A targeted cybersecurity and cyber-hygiene awareness campaign needs to be rolled out on a systematic basis in order to ensure ongoing national cyber-resilience. PTA conducted some relevant training for government organizations in collaboration with international and national agencies recognizing the nature of cyberthreats. These trainings were delivered on encryption, network operations, and shadow server platforms (footnote 4). The target audience and selection process for identification of participants is an area that need more attention for future.[79]

3.6 Digital Diplomacy

Digital diplomacy is the use of technology to advance a country's foreign policy objectives, interests, and values on the global stage. Pakistan has embraced digital diplomacy as a key component of its diplomatic strategy, using various online tools and platforms to engage with global audiences, facilitate diplomatic interactions, promote its culture and economy, and participate in international cybersecurity discussions.

The Ministry of Foreign Affairs in Pakistan has set up a Strategic Communications Division, aimed at using technology to spread Pakistan's development story and foreign policy goals globally. The Pakistan Portal, launched in May 2023, illustrates these efforts, designed to display and convey the outcomes of Pakistan's public diplomacy activities.

Some Pakistan embassies have successfully used social media tools and platforms to connect with the diaspora abroad. The experiment has yielded positive results, and the community feels connected to the authorities through digital platforms. The Ministry of Foreign Affairs also uses social media accounts to announce its statements on key issues.

Pakistan embassies are, however, usually seen using digital platforms either to refute rumors or to state government positions. Online media should be utilized strategically to support and protect Pakistan's national interests and to promote international cooperation. For example, digital media can be effectively used to approach the Pakistani diaspora to send remittances or to amplify a strategy to influence other governments.[80]

Pakistan can work with key nongovernment actors abroad, including those in civil society, to tackle common problems and take advantage of technical support and new possibilities that arise from international and regional cooperation.

Digital diplomacy can be a powerful tool for attracting local and foreign direct investment into the digital sector in Pakistan. By showcasing the potential opportunities and the value proposition of Pakistan supported by a strong policy framework, the government can attract investors who are looking for new markets and value options.

[79] T. Rasool, N. F. Warraich, and A. Rorissa. 2018. A Study of the Information Quality of E-Government Websites in Pakistan. *ICEGOV 18: Proceedings of the 11th International Conference on Theory and Practice of Electronic Governance.* 696–698. https://doi.org/10.1145/3209415.3209478

[80] C. Bjola. 2024. Digital Diplomacy: From Tactics to Strategy. American Academy in Berlin. https://www.americanacademy.de/digital-diplomacy-tactics-strategy/ (accessed 5 March 2024).

The government can also use digital platforms to communicate with prospective investors, provide information and guidance, and facilitate business processes and transactions. One promising area for investment in the digital sector is green data centers, i.e., facilities that use renewable energy sources and efficient cooling systems to reduce the environmental impact of storing and processing large amounts of data. Pakistan can use digital diplomacy to capitalize on the current interest in green tech and attract investments from multilateral financiers and corporations.

Chapter 4
Digital Economy

Key Diagnostic Findings

- Only 17.7% of Pakistanis use digital payments. Pakistani banks and financial institutes have issued 59 million payment cards, covering 24% of the population (compared to 71% in India).
- Pakistan ranks 8th in the world on the adoption of cryptocurrency, which is used as a value-holding asset against devaluation of the currency, which has fallen by 165% during 2017–2024.
- Pakistan's e-commerce spend crossed $10 billion in 2023. This ranks among the lowest in the region, trailing Bangladesh ($16 billion). Low penetration of digital payments acceptance, cash-on-delivery practices, and low digital literacy are the major impediments to e-commerce.
- More than 130 cities and small towns in Pakistan are host to an aggregate of approximately 18,000 technology or digital businesses. This is indicative of the potential of tech businesses to be adopted by small towns, and its potential to change the fate of these towns by earning foreign exchange income.
- Technology companies represent only 3.3% of the total market capitalization of the Pakistan Stock Exchange (PSX). Given the foreign exchange earning capability and relatively high gross profits of the tech business, future tech initial public offerings have the potential to significantly increase the stock market multiples.
- Pakistan's corporate tax rate and payroll taxes are among the highest in the region and in comparable countries. This results in Pakistan collecting less in corporate income tax than nearly all its regional peers. The high tax rate discourages both scaling up of businesses and tax compliance.
- Pakistan's ICT and telecom sector has a trade surplus of more than 89%. This highlights the importance of customized approaches to taxation and regulatory policy for developing this sector and enhancing foreign exchange earnings through exports of ICT and IT-enabled services (ITeS).
- Pakistan's tech industry lacks the presence of multinational captive ICT companies due to unfavorable taxation and foreign exchange policies. Comparatively, India has 1,900+ or 46% of the global tally of Captive ICT offices, employing over 1.9 million staff.
- In 2023, Pakistan had produced more than 157,000 science, technology, engineering, and mathematics (STEM) graduates; out of those, only 43,000 were ICT graduates. However, only 12% of the 18–25 age group in Pakistan were enrolled in higher education, which was the lowest rate in the whole region. This impacts a country's capacity for developing high-skills industries.
- Pakistan's retail sector has only 125,593 point-of-sale systems deployed per latest data, which is the lowest in the region.
- Pakistan's small and medium-sized enterprises (SMEs) resist digitalization because of concerns about unpredictable changes of policies and taxes and regulatory actions.
- Only 4.3% of local banks' loans go to SMEs, and just 3.6% to the agriculture sector. These are the lowest rates in the region. Commercial banks prefer to lend up to 85% of their loan portfolio to the government, which gives them equal or higher returns, with much lower or virtually no risk of default, and often with sovereign guarantees. This makes lending to any other sector less attractive.
- Pakistan has the third-largest professional population in the global gig/freelancing work industry. While this supports digital employment across the country, the non-organized nature of this employment and the low value of the services provided significantly drags down

the average compensation value of services associated with Pakistani tech workers. This is currently at about $11,000 per worker per year on the Stack Overflow platform, which is the lowest among all the surveyed countries.

- Pakistan's startups received $366 million, the highest ever, in venture capital funds in 2021. This dropped to only 18% of that in later years because the US dollar became costly for venture capital activity as US Federal Reserve rates rose and investors shifted away from unstable and emerging markets, especially those with unclear policies, weak legal protection, and low dollar revenues and margins.
- The mobile gaming and apps development ecosystem in Pakistan is growing, with current revenue at about $500 million. The projected market value of the global mobile gaming and apps industry by 2027 is $799 billion, with a compound annual growth rate of 9.7%. In 2022, Pakistan-developed games downloads were growing three times faster than the rest of the world.
- Pakistan lacks the foundation of a long-term sustainable policy framework and an action plan, which is key to building a strong and functioning digital economy.

Key Recommendations

- Implement a uniform 5% GST rate for all digital transactions, with an input tax credit for 5 years, to encourage nationwide adoption of digital payments and e-commerce platforms, reducing cash-related inefficiencies and frictions, and documenting the economy.
- Cut corporate income tax rates and the cost of doing business for SMEs by 10% for the next 10 years, conditional on the businesses registering themselves and using digital platforms for their transactions.
- Simplify taxation and foreign exchange regimes for ICT export companies to attract more global captive offices to establish and expand their presence in Pakistan.
- Cap the payroll taxation for ICT-exporting companies' staff to 15% of their income and offer them tax credits for hiring local talent.
- Consider approving tax credits for women-led businesses that are engaged in digital trade or export of ICT or ITeS.
- Reimagine regulation of the digital economy; put in place a single window regulation for internet businesses that is flexible, responsive, and supportive.
- Establish a Data Exchange Layer and adopt the Pakistan Digital Stack to digitize governance, regulation, and the economy.
- Launch a tech initial public offering initiative to support more tech companies to get listed on the PSX and raise equity capital.
- Create a dedicated tech financing window at the State Bank of Pakistan (SBP) to provide low-interest loans and guarantees to tech companies and facilitate their access to banks and financial institutions.
- Mandate via the SBP that commercial banks allocate at least 15% of their loan portfolios to SMEs, with a minimum of 50% emphasis on digital and ICT businesses; reward and support banks that surpass this target and sanction those that fail to meet it.

- Provide tailored financing programs for women-led tech companies and women-led businesses that are engaged in digital trade or export of ICT or ITeS.
- Identify and prioritize high-impact economic sectors for digital transformation. Sectors such as agriculture, transport, logistics, and manufacturing, both large- and small-scale, and their value chains can enable innovations like precision agriculture and end-to-end market digitalization to raise productivity.
- Establish a network of ICT parks across the country, run by the private sector or in a PPP mode, to provide a conducive ecosystem for startups and tech companies. The ICT parks should offer co-working spaces, incubation and acceleration programs, mentorship and networking opportunities, access to funding and support services, and tax and regulatory incentives.
- Promote public–private collaboration to build skills for digital readiness. For example, PPP projects could deliver skills training at scale by using innovative online platforms that are accessible via smartphones and tablets.
- Design and implement tailored programs on digital literacy, digital marketing, e-commerce, use of digital tools and regulatory compliance that can help micro, small, and medium-sized enterprises (MSMEs) to grow and scale up.
- Introduce programs for young women and women-led businesses on digital entrepreneurship, business skills, mentorship, and networking opportunities.
- Implement modular digital education programs in schools for achieving early understanding and proficiency in basic digital skills and to prepare children for the digital economy; examples are basic coding and digital creativity skills classes.
- Run programs on digital citizenship through various communication channels to build public awareness on topics such e-commerce, online privacy, cybersecurity and online safety.
- Create a 2-year + 2-year stackable associate graduate degree in ICT skills to increase university enrollments, affordability, and female participation in the tech sector.
- Engage industry and government stakeholders to strategize, accelerate, and finance the development of special technology zones based on smart specializations and strong research, development and innovation (RDI). Implement tailored incentive structures to attract FDI by capitalizing on Pakistan's value proposition and favorable international rankings.[81]
- Create specialized commercial courts and dispute resolution tribunals to ensure that corporate disputes are settled expeditiously or within a reasonable period of 6 months.
- Announce a 20-year capital gains tax exemption for investments in tech startups. During this period, any income from venture capital funding and private investments by foreigners into startups should be exempt from capital gains tax for at least 7 years from the date of capital deployment.
- The SBP needs to create policies and ensure that banks finance ICT businesses. The Securities and Exchange Commission should work with the Pakistan Software Export Board (PSEB) and the Pakistan Software Houses Association (PSHA) to plan an annual road map for listing technology companies on the PSX. A target should be set for increasing technology companies' listings to 5% of all the companies listed on the PSX by 2027 and increase it to 12% by 2030.

[81] Pakistan is 47th out of 125 countries on the Venture Capital and Private Equity Country Attractiveness Index. For details see: https://blog.iese.edu/vcpeindex/.

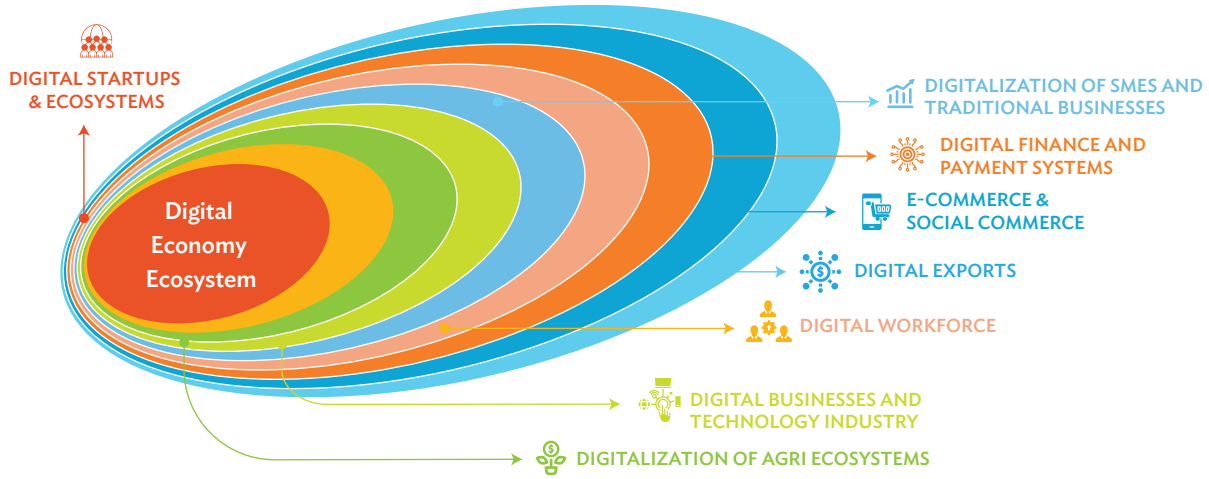
4.1 Overview

A substantial portion of economic activities unfold online, spanning transactions, interactions, financial dealings, communication, and governmental services. The digital economy propels the evolution of traditional industries, leveraging technologies for enhanced efficiency, cost, productivity, and business process optimization, broader market reach, and the introduction of innovative products and services, boosting firms' competitiveness in domestic and global markets.

The new technologies have fostered entirely new industries and business models, represented by digital banks, real-world assets virtualization, social commerce, online gaming, cloud computing services, and the app economy. The societal implications of the digital economy extend to areas such as employment, education, rural economic development, health and utilities, entertainment, market-responsive skills development, governance, and social interactions.

This section examines the current dynamics of the digital economy in Pakistan (Figure 31). It covers digital financial services and financial technology (fintech), e-commerce, digital businesses and industry, digitalization of SMEs and traditional companies, digitalization of agriculture, startups, and innovation, export of digital services, and the digital workforce. Principally, it explores how digital technologies are being leveraged for Pakistan's growth and competitiveness of its industries, businesses, and talent. Moreover, it explores opportunities offered by the digital economy for driving job creation, income generation, and social inclusion.

Figure 31: Digital Economy Ecosystem of Pakistan



SMEs = small and medium-sized enterprises.
Source: Asian Development Bank.

Pakistan's digital economy is undergoing a dynamic evolution, driven by a young population, increased internet penetration, as well as government and non-government initiatives. This evolution is particularly pronounced in e-commerce, FinTech, and ICT services. Over the last decade, there has been a noticeable shift in the ICT employment landscape, reflecting the underlying sociodemographic transition.

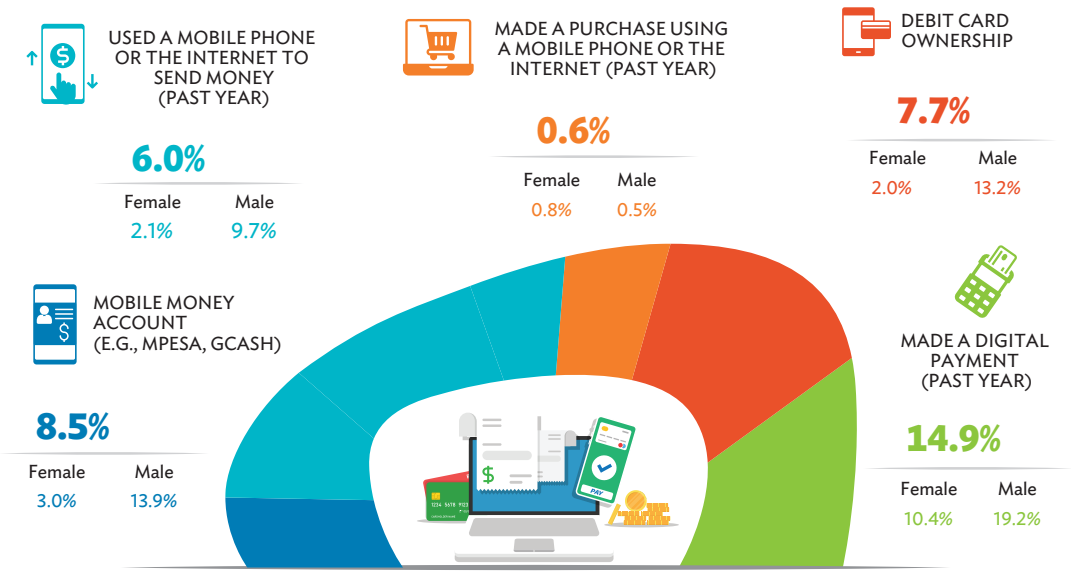
4.2 Digital Finance and Payment Systems

According to the UNDP, as of January 2024, 8.5% of the population held mobile money accounts, 14.9% conducted digital payment transactions, 0.6% conducted an online purchase, and 5.7% used internet services to pay a utility bill in the past year.

The State Bank of Pakistan's Payment Systems Review for the second quarter of FY2023–24 outlines Pakistan's digital payment ecosystem (Figure 32) as follows:

- Real-time Gross Settlement System called the Pakistan Real-time Interbank Settlement Mechanism is operated by the SBP.
- Raast, also operated by the SBP, is the country's instant payment system which provides a free-of-cost funds transfer facility to the customers.
- Banks and microfinance banks provide banking services to customers.
- Electronic money institutions (EMIs) issue e-money and provide customers with e-wallets and payment cards for digital transactions.

Figure 32: Pakistan's Digital Finance Ecosystem



Source: Datareportal.com.

- E-commerce gateways provided by banks and payment system operators and service providers (PSOs/PSPs) to e-merchants for facilitating online purchases.
- PSOs/PSPs provide services such as check clearing, interbank ATM switching, bill payments, fund transfer mechanisms, and payment gateway services.

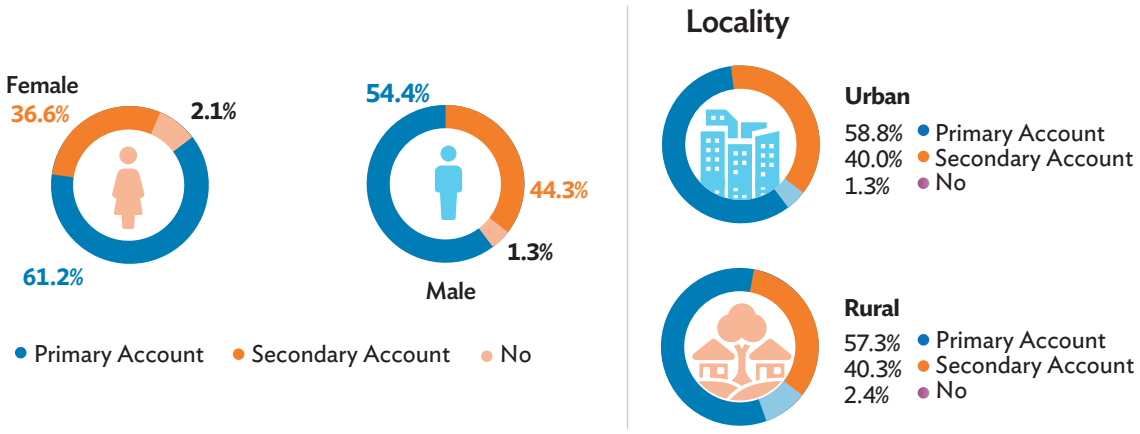
This interconnected payments infrastructure comprises 33 banks, 12 microfinance banks, 5 EMIs, and 5 PSOs/PSPs, providing a wide range of payments and other digital financial services to users across the country. In addition to this, 16 banks/microfinance banks offer branchless banking services, thereby extending banking services beyond traditional branches, through an extensive network of branchless banking agents and mobile apps.[82]

Digital Banking and Finance

According to the SBP Payment Systems Review (footnote 84), financial inclusion through digital means has grown between 2023 and 2024. Comparing, for example, the second quarter of FY2023 to the same quarter in FY2024, a significant increase was observed in the adoption of mobile and internet banking. The number of Internet banking users grew by 7%, while mobile banking users grew by around 9% over the same period.

At the same time, however, a significant gender divide is also evident across the salient indicators (Figure 33), suggesting that women still use digital or mobile payments and online banking suboptimally (Figure 34).

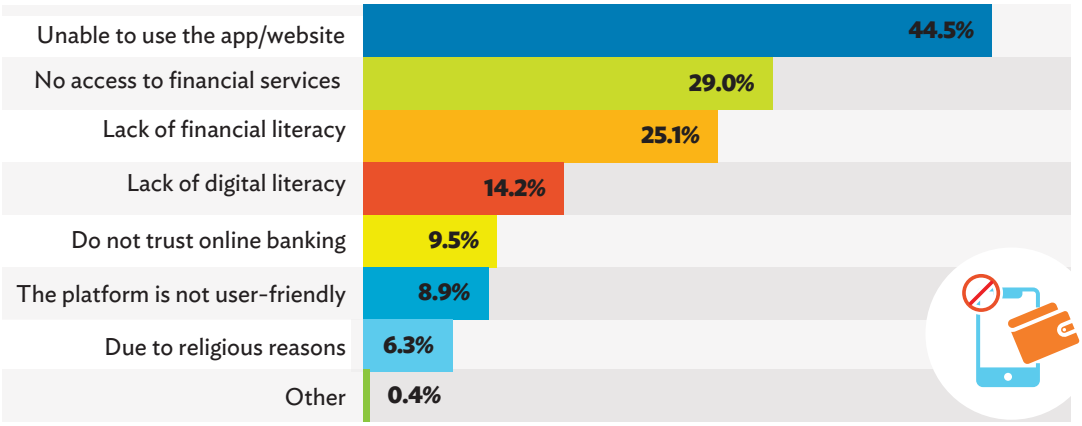
Figure 33: Use of Mobile Wallets by Gender and Locality



Source: Adapted from UNDP. 2024. *Doing Digital for Development*.

[82] State Bank of Pakistan. 2024. Payment Systems Review for the 2nd Quarter of Fiscal Year 2023-24. https://www.sbp.org.pk/psd/pdf/PS-Review-Q2FY24.pdf (accessed 22 August 2024). 25 https://datareportal.com/reports/digital-2024-pakistan?rq=Digital%202024%3A%20Pakistan

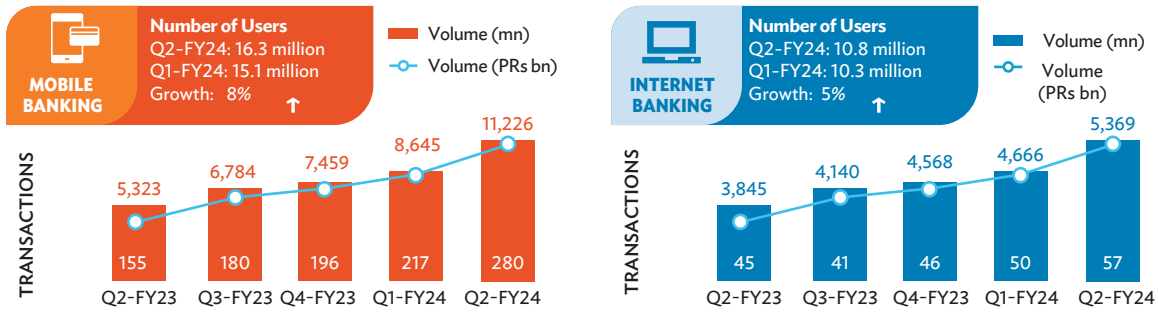
Figure 34: Reasons for Not Using Mobile Wallets



Source: Adapted from UNDP. 2024. *Doing Digital for Development.*

Figure 35 gives us a window on the healthy growth in value and volume of mobile banking and internet banking transactions, between second quarter (Q2) FY23 and Q2 FY24. The mobile banking transactions' *value* more than doubled, while the *volume* grew by about 81%. Similarly for internet banking transactions, the *value* grew by about 40%, while the *volume* grew by about 27% during the same period.

Figure 35: Mobile and Internet Banking Value and Volume

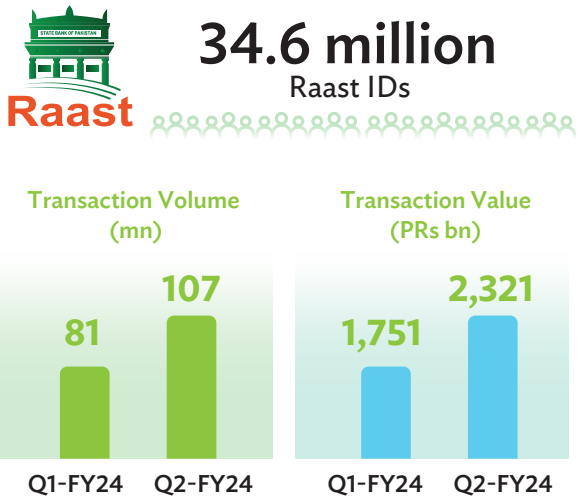


FY = fiscal year.
Source: State Bank of Pakistan.

The central bank is now implementing three new modules of Raast, which include bulk payments, person-to-person payments, and person-to-merchant payments, along with the issuance of licenses. Additionally, the process of issuing licenses for digital banks is also underway, marking a significant step toward enhancing the country's digital financial infrastructure.

Analyzing Figure 36 allows us to draw the average value of a Raast transaction. Looking at the quarterly numbers, during Q1 FY24, the average value for each Raast transaction was approximately PRs21,617, which increased to PRs21,691 by the end of Q2 FY24, a marginal increase of 0.34% between the two quarters.

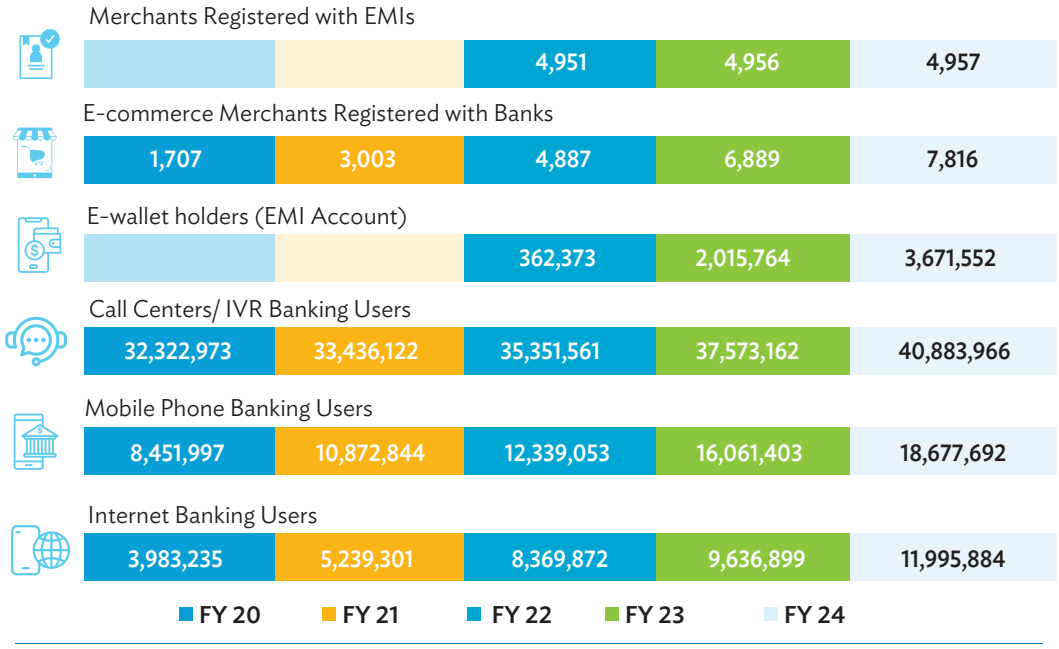
Figure 36: Raast IDs Created



Source: State Bank of Pakistan.

Meanwhile, the growth in usage of call centers and interactive voice response banking has been relatively modest at 6.65% (Figure 37). A surge was noted in the number of e-wallet holders, particularly those with accounts at EMIs, which soared by 984% from 148,086 to 1,605,865. The e-commerce sector mirrored this trend, with a 48% increase in the number of merchants registered with banks. Additionally, there was a significant 811% growth in the number of merchants registered with EMIs (increasing from 4,943 to 45,014), underscoring a substantial shift toward electronic money institutions in the retail and commercial sectors.

Figure 37: Growth in Digital Financial Inclusion Tools, 2022–2023



Payment Systems Infrastructure and Users (2024)

RTOBs	ATMs	POS	Debit cards	Credit cards	No. of branchless banking agents	No. of branchless banking accounts
18,320	18,957	125,593	48,327	2,047	662,084	117,295

EMI = electronic money institution, FY = fiscal year, IVR = interactive voice response, POS = point of sale, RTOB = real-time online banking.

Source: State Bank of Pakistan.

The per-transaction cost charged by NADRA to banks, which is notably higher compared to regional counterparts, is a hurdle for expanding digital finance. NADRA charges a fee of PRs10 for SMS-based CNIC verification. The corresponding per transaction cost for India was quoted to be ₹0.5 (or equivalent to PRs1.68).[83]

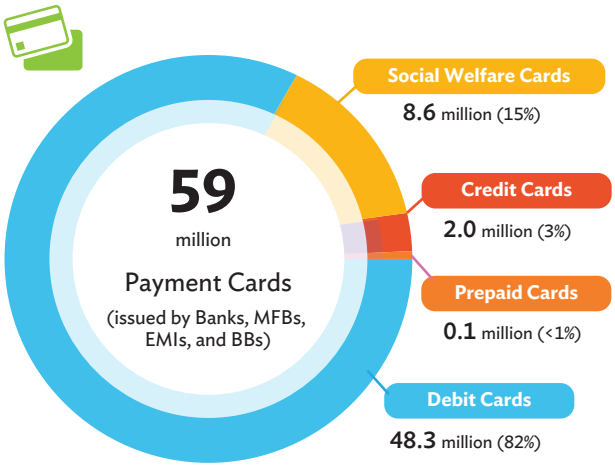
Several development finance institutions are lagging in digital banking. To facilitate such institutions in expanding their digital offerings, the Securities and Exchange Commission of Pakistan (SECP) has already issued regulatory sandbox guidelines in 2019.[84]

[83] Based on findings of the authors/team.

[84] Securities and Exchange Commission of Pakistan. 2019. *Regulatory Sandbox Guidelines, 2019.* https://www.secp.gov.pk/document/secp-regulatory-sandbox-guidelines-2019/?wpdmdl=37476 (accessed 23 August 2024).

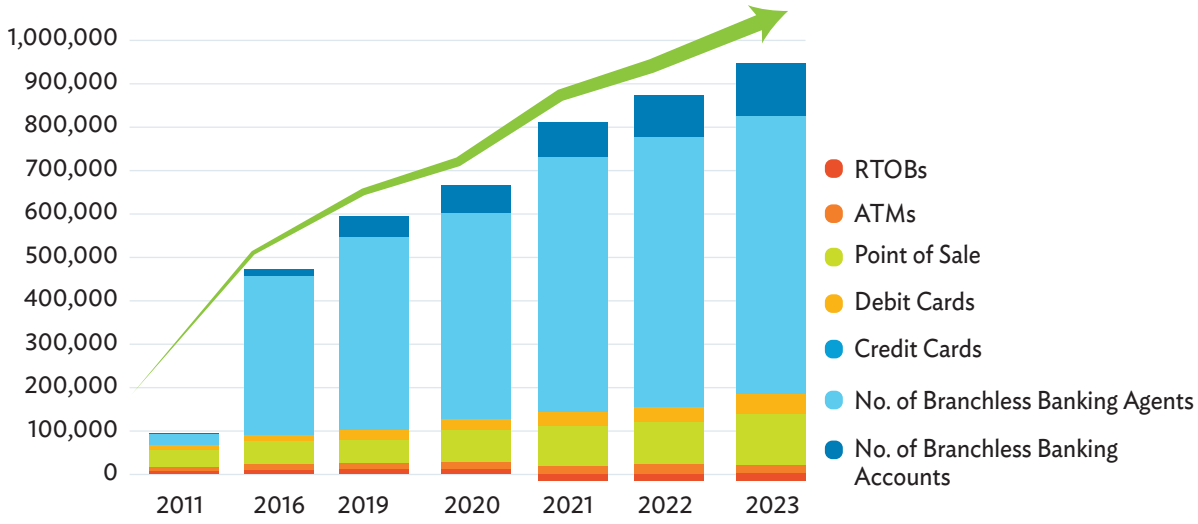
The significant expansion of branchless banking has played a crucial role in promoting financial inclusion and the accessibility of financial services (Figure 38). The trend in digital finance services (Figure 39) shows growth in real-time online branches, number of ATMs, number of POS machines, number of issued payment cards (debit and credit cards), number of branchless banking agents, and number of branchless banking accounts.

Figure 38: Payment Cards Issued in Pakistan



EMI = electronic money institution, MFB = microfinance bank.
Source: State Bank of Pakistan.

Figure 39: Trend in Digital Financial Services in Pakistan



RTOB = real-time online banking.
Source: State Bank of Pakistan.

Digital Payment Services—Regulatory Frameworks

Since 2020, various regulatory and infrastructural frameworks have been introduced, encompassing digital banking regulations, digital customer on-boarding processes, mobile application security protocols, QR code standardization, and others. The SBP has substantially reinforced its supervisory framework for digital financial services, with specific attention to cybersecurity, financial stability, and consumer protection.

Furthermore, the SBP and other stakeholders have implemented action plans to enhance the anti-money laundering and counterterrorism financing regime in line with Financial Action Task Force recommendations to strengthen the integrity of the financial sector.

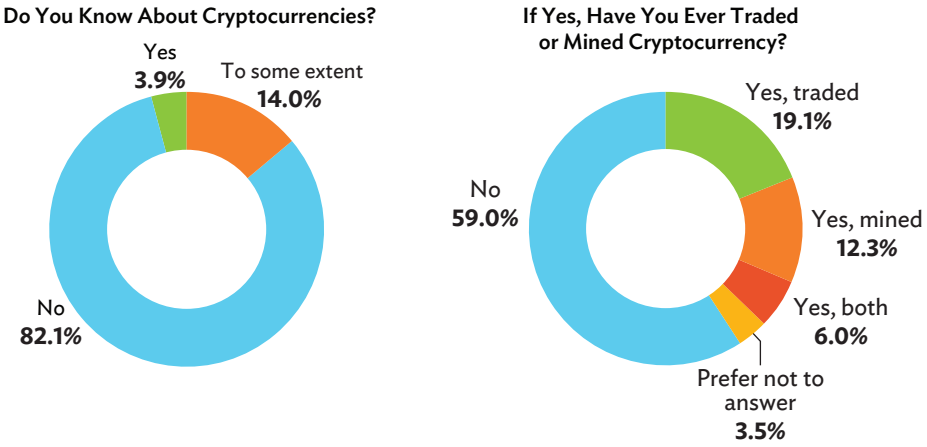
However, despite the introduction of several modern financial products, the advanced stages of digital financial service development and their full potential remain untapped as consumers continue to rely heavily on cash and traditional financial instruments on account of cybersecurity concerns, among other aspects.

It is noteworthy that rapid digital adoption and focus on alternative payment methods in the fntech sector is attracting global and local investments.

State of Digital Currencies and Digital Assets

It is estimated that Pakistani citizens own approximately $20–$25 billion worth of digital currencies. Chainalysis, a global cryptocurrency tracking company, ranks Pakistan at 8th in global adoption of cryptocurrencies. As per the same document, Pakistan's adoption is fueled by its inflation and rapidly devaluing currency.[85] Pakistan's standing can be understood by comparing it with its peers and regional countries.

Figure 40: Cryptocurrency in Pakistan



Note: National Human Development Report 2023/2024 survey responses.
Source: Adapted from UNDP. 2024. *Doing Digital for Development*. p.98.

[85] Chainalysis. 2023. The 2023 Geography of Cryptocurrency Report. October. https://www.chainalysis.com/wp-content/uploads/2024/06/the-2023-geography-of-cryptocurrency-report-release.pdf.

Concerned by the sizable volume of these transactions, which can significantly impact the outflow of foreign exchange from the country, Pakistan imposed a complete ban on cryptocurrencies ownership, trade, and any transactions in April 2023.[86]

In a positive development, the SBP announced in July 2023 that it is in a consultative process to launch Pakistan's Central Bank Digital Currency by 2025. It is not yet clear if this currency launch will be available for retail transactions in the first phase or will be limited to interbank and treasury transactions.[87]

4.2.4 Digital Finance Enablers

A campaign reducing GST rates on payments made through any digital medium can be a key enabler for the adoption of digital payment systems. The Punjab Provincial Tax Authority has adopted a 5% sales tax on payments made through credit and debit cards to food merchants since FY2020–21.[88]

The Federal Board of Revenue has adopted this mechanism for the finance bill 2023–24 and reduced the GST rate to 5% for payments made to restaurants through credit or debit cards; however, the 5% tax is without input adjustment (merchants are otherwise allowed to deduct their input costs from the tax withheld when they file their tax returns) for the restaurant/café owners.[89] This generates friction from business owners, as it reduces their willingness to adopt a pass-through tax against which they cannot make input adjustment claims.

Expanding this approach, with allowances for input adjustments, to all sectors of the economy will yield significant results. It will increase tax collection in absolute terms and will also help in automatically mapping retail and consumer payments across the country; this can also support in reducing the size of the undocumented economy.

4.3 Digital Commerce

The digital commerce market covers all consumer transactions made via the internet that are directly related to online shopping for products and services, including both e-commerce and social commerce. It enables businesses and consumers to conduct transactions remotely, with a variety of payment options and delivery methods available.

86 A. Singh. 2023. Pakistan Announces Fresh Ban on Crypto, but Adoption as a Hedge Remains Popular. *CoinDesk. 18 May.* https://www.coindesk.com/policy/2023/05/18/pakistan-announces-fresh-ban-on-crypto-but-adoption-as-a-hedge-remains-popular/

87 Y. Khatri. 2019. Pakistan Central Bank Eyes Digital Currency Launch by 2025. *CoinDesk. 2 April.* https://www.coindesk.com/markets/2019/04/02/pakistan-central-bank-eyes-digital-currency-launch-by-2025/

88 S. Omer. 2020. PRA Cracks down on Restaurants Violating Tax Laws. *Profit by Pakistan Today. 4 September.* https://profit.pakistantoday.com.pk/2020/09/04/pra-cracks-down-on-restaurants-violating-tax-laws/

89 S. Sarfraz. 2023. Restaurants/Eateries: Credit/Debit Card Payments Allowed at Reduced 5pc ST. Brecorder. 10 July. https://www.brecorder.com/news/40251795.

State of E-commerce

E-commerce generated $10.42 billion in revenues in 2023, contributing to 3.0% of the country's GDP.[90]

The E-commerce Policy Framework 2019[91] aims to address several challenges. These include limited consumer trust (only 18% of Pakistanis engage in online purchases), logistical challenges characterized by high logistics costs (18% of goods value), and an uncertain payment infrastructure prone to misuse.[92]

A range of e-commerce platforms are operational catering to various needs and preferences of online consumers as depicted in Figure 41.[93]

Figure 41: Top E-Commerce Platforms in Pakistan

Daraz	The largest and most prominent platform, offering a diverse range of products across various categories
HomeShopping	Known for an extensive product catalog and competitive pricing
Laam	Offers a variety of beauty and fashion segrment products targeting the top-tier clientele
Priceoye	Mainly serves electronic goods segment with a focus on price concious clientele
Telemart	Specializes in electronics and mobile devices, and also provide buy now pay later services for procurement of smartphones
iShopping.pk	Focuses on electronics, appliances, and fashion products
Sastaticket.pk	Provides online travel and ticket booking services for price concious clientele
Bagallery	Offers a wide range of beauty and fashion products for top-tier clientele.

Sources: State Bank of Pakistan, Karandaaz, and author's own research.

[90] A. O'Neill. 2024. Gross Domestic Product (GDP) in Pakistan 2023. 4 July. https://www.statista.com/statistics/383739/gross-domestic-product-gdp-in-pakistan/ (accessed 16 September 2024).

[91] Ministry of Commerce & Textile (Commerce Division). 2019. E-Commerce Policy Framework of Pakistan. September. https://www.commerce.gov.pk/wp-content/uploads/2019/10/e-Commerce-Policy-Framework-of-Pakistan.pdf.

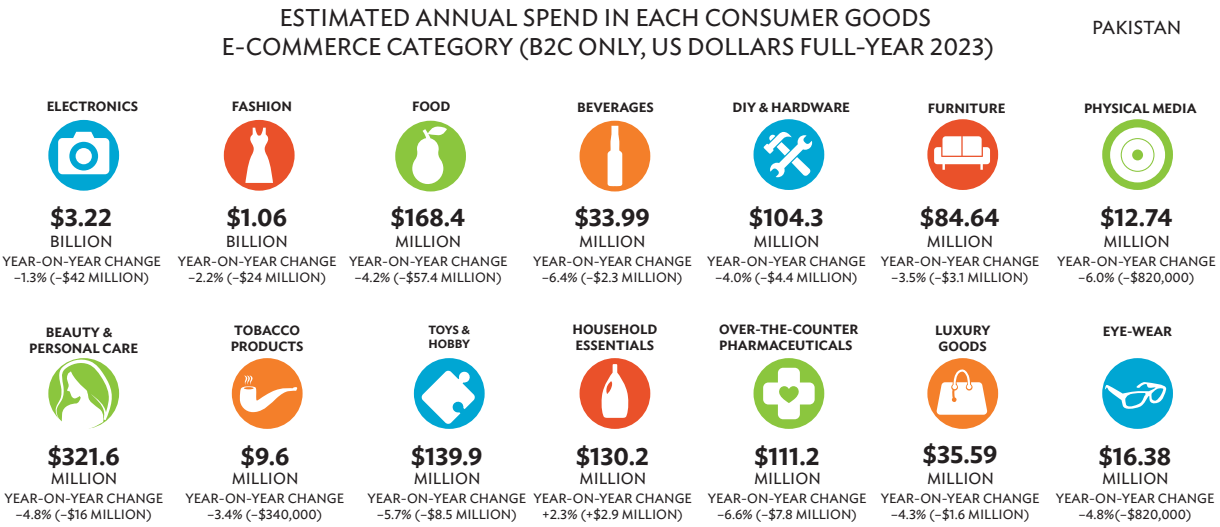
[92] S. Kazmi. 2023. Strong-growing Pakistan's E-commerce sector. *Pakistan & Gulf Economists. 13 March.* https://www.pakistangulfeconomist.com/2023/03/13/strong-growing-pakistans-e-commerce-sector/ *(accessed 2 February 2024).*

[93] Informantal. 2023. Top 10 E-Commerce Platforms in Pakistan. 4 June. https://informantal.com/top-10-e-commerce-platforms-in-pakistan/; Avada. 2023.10 Best Ecommerce Websites in Pakistan for Improving Conversion Rates Avada Commerce. https://avada.io/articles/ecommerce-websites-in-pakistan/

E-Commerce Stores and Transactions

Pakistan's e-commerce market has shown growth in recent years, stimulated by increased internet and smartphone usage (Figure 42). The pandemic accelerated this trend as people turned to online shopping to minimize physical contact.[94]

Figure 42: E-Commerce Spending on Consumer Goods



Notes: Figures represent estimates of full-year revenues for 2023 in US dollars, and comparisons with the previous calendar year. The "Physical Media" category does not include downloads or streaming . Comparability: Significant best revision and major category definition changes. Figures are not comparable with previous reports.

Source: Statista E-Commerce Market (see statista.com).

The data show that e-commerce businesses that have bank accounts have grown to 7,310 in the third quarter of 2023, from 496 in 2017. During 2023, people spent the most on electronics and fashion products; other popular categories included food, beauty and personal care products, toys, household items, and non-prescription medicines.

In terms of services bought through e-commerce mediums, online travel, and tourism saw the most spending on services during 2023 with $4.38 billion. Spending on flights led this segment, with hotels, packaged holidays, and vacation rentals featuring among other strong categories (Figure 43).

[94] S. Kemp. 2024. Digital 2024: Pakistan. DataReportal—Global Digital Insights. February 23. https://datareportal.com/reports/digital-2024-pakistan (accessed 4 March 2024).

Figure 43: E-Commerce Spending on Travel and Tourism Services

Notes: Figures represent estimates of full-year revenues for 2023 in US dollars, and comparisons with the previous calendar year. Comparability: Significant best revision and major category definition changes. Figures are not comparable with previous reports.
Source: Statista e-commerce market (see statista.com).

Other digital commerce services include online ride-hailing services, which netted $201 million during 2023; digital health treatments were valued at $181 million; digital fitness and well-being generated $137 million, while digital media spend (subscriptions to online video services, online gaming, e-books, and online music) was valued at $590 million during the same year.

Table 9 compares Pakistan's e-commerce to its neighbors and regional peers.

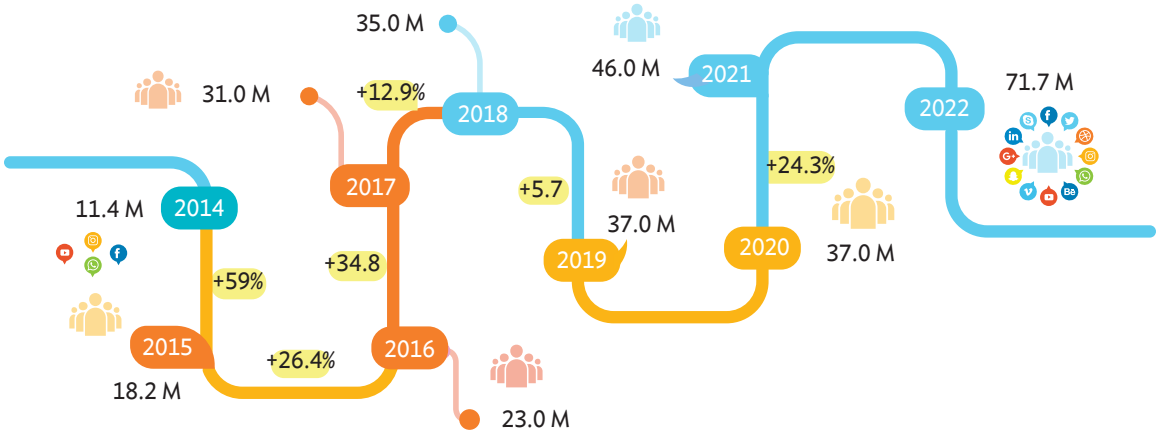
Table 9: Comparative Regional E-Commerce Spend of Pakistan

Country	E-Commerce Goods	E-Commerce Services	E-Commerce Subscriptions (media)	E-Commerce Total
	($ billion)	($ billion)	($ billion)	($ billion)
India	88.00	23.20	3.93	115.13
Thailand	19.26	3.40	1.88	24.54
Philippines	17.92	3.83	1.90	23.65
Bangladesh	12.81	3.12	0.72	16.66
Pakistan	5.45	4.38	0.59	10.42

Source: State Bank of Pakistan.

Parallel to this, social commerce is also expanding rapidly, with sales through social media platforms anticipated to be around $1.3 billion in 2023. Social media usage statistics for 2022 show 71.70 million active users (30.1% of the total population), engaged on various platforms. However, it is important to note that these are not unique users. Among these, Facebook had 37.30 million users, Instagram had 12.95 million users, TikTok reached 16.51 million users, and Snapchat had 25.70 million users. LinkedIn and X (formerly Twitter) are used by 9.30 million and 4.65 million users, respectively (Figure 44).

Figure 44: Timeline of Social Media User Growth in Pakistan



Sources: PTA, Datareportal, UNDP.

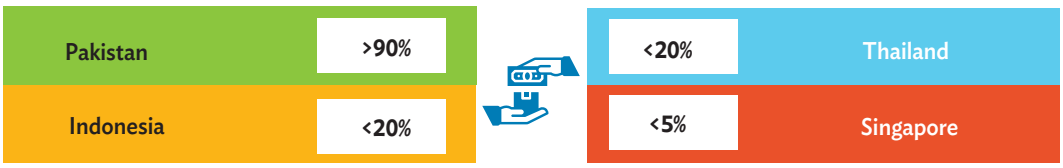
Cash on Delivery

Cash on delivery (COD) has held back the potential of digital commerce in Pakistan. COD transactions are often held with the transaction agents for weeks, which causes the merchants to fund a negative cash flow. The direct cost of a COD transaction also becomes a critical element.

A recent PricewaterhouseCoopers (PwC) report[95] identified Pakistani consumers using COD for more than 90% of e-commerce transactions to purchase goods, the highest percentage among their regional counterparts (Figure 45).

[95] PwC Pakistan. 2023. *Banking Publication 2023: Navigating the Future of Opportunities and Challenges.* https://www.pwc.com.pk/en/Banking_Publication/2023/Navigating_the_Future_of_Opportunities_and_Challenges_V1.pdf (accessed 23 August 2024).

Figure 45: Pakistan's Overreliance on Cash on Delivery



Source: State Bank of Pakistan.

Because of COD, customers' tendency to return a shipment without payment increases. SBP's launch of Raast version 2.0, which includes person-to-merchant operation through any bank app, has, therefore, great potential to reduce COD. Merchants also like to reduce adverse customer ratings and ensure consistency of products and services to win customers' trust in digital commerce purchases. A long-overdue establishment of a local escrow service—where a legally bound third party holds money or assets such as securities or real estate until a given contract or agreement is fulfilled—can reduce the lack of trust between the merchants and the buyers.

On the part of the government, a lower tax bracket on payments through digital mediums will help increase digital commerce transactions. A further incentive can be given to new merchants by introducing a first 36 months reduced income tax on revenue earned through digital commerce. This will increase the merchants' and product on-boarding. Meanwhile, it will bring small merchants to the documented economy and thus create a long-term net positive impact.

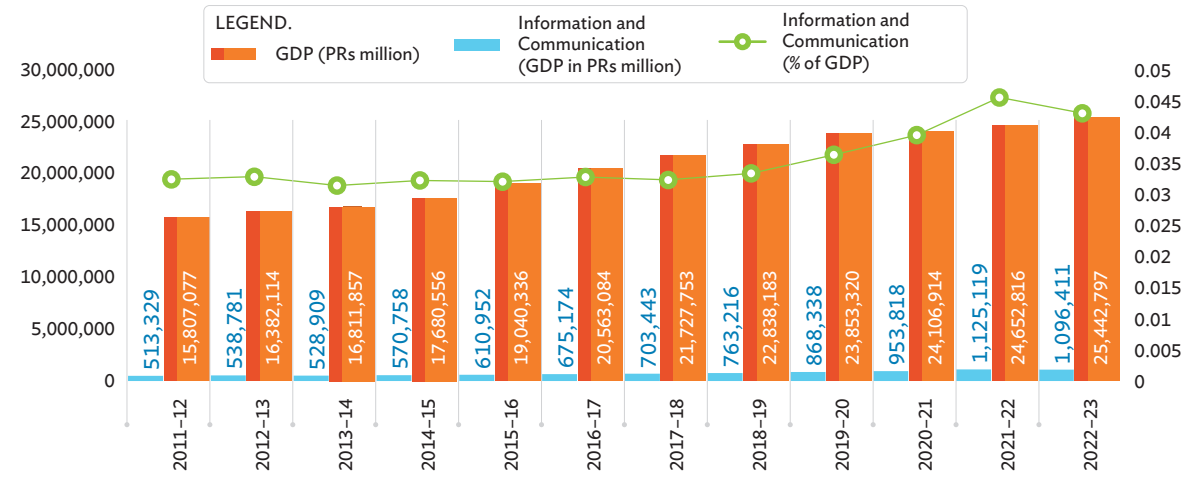
4.4 Digital Businesses and Technology Industry

The ICT sector has experienced significant growth in its share of the national GDP, with increases in FY2020 (14%) and FY2022 (18%). However, a decline of 2.55% was observed during FY2023 owing to temporary restrictions imposed by the SBP on foreign currency outflows.

In terms of the ICT sector's contribution to the total GDP, there has been a consistent upward trend over the years, with a peak seen in FY2022, accounting for 4.56% of the GDP (Figure 46).[96]

[96] State Bank of Pakistan. 2023. Gross Domestic Product of Pakistan (at Constant Basic Prices of 2015-16). https://www.sbp.org.pk/ecodata/GDP_table.pdf (accessed 16 September 2024).

Figure 46: Digital Trade in Pakistan



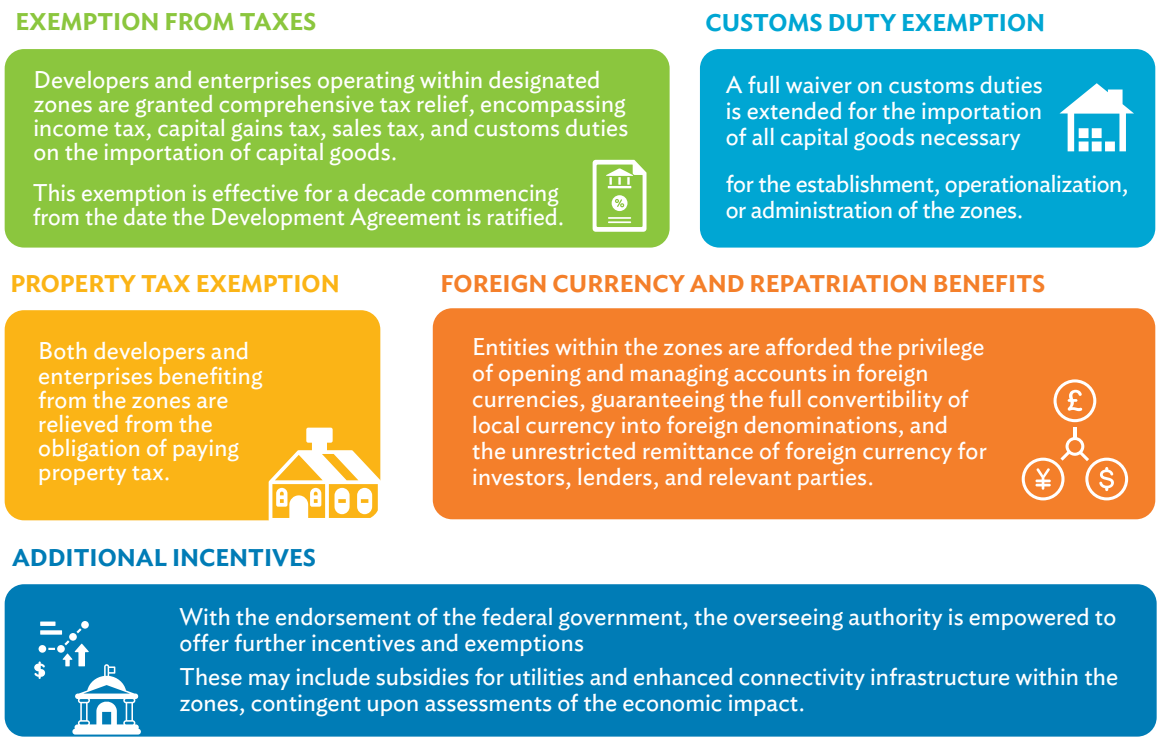
GDP = gross domestic product.
Source: State Bank of Pakistan.

Pakistan has allowed the following incentives for FDI in the digital sector:

- Sales tax exemption on export of ITeS in Islamabad Capital Territory.
- Tax Credit Regime and Specific Provision for Startups.
- One percent withholding income tax on the proceeds of exports in case a tax credit is not available for entities not registered with the PSEB, whereas a 0.25% withholding income tax on the proceeds of exports is applicable for PSEB-registered entities.
- Up to 100% foreign ownership of ICT & ITeS companies.
- Provision of ICT-enabled office space in software technology parks.
- Up to 100% repatriation of profits for foreign ICT & ITeS investors.
- Fifty percent of export earnings can be retained in foreign currency for making payments abroad.
- Low sales tax rate on ICT-based services in Punjab and Balochistan. No sales tax on the export of services by call centers in Sindh. Reduced rate of sales tax on ICT-based services in Khyber Pakhtunkhwa Province.

In addition to the above, the Special Technologies Zones Authority has also offered incentives through its act (Figure 47).

Figure 47: Incentives Offered Under the Special Technologies Zones Authority Act, 2021



Source: Special Technology Zones Authority Act, 2021. https://stza.gov.pk/storage/2022/01/STZA-Act-2021.pdf.

Number of Digital Businesses vs. Others in National Companies Registrar

The SECP reports a total of 209,400 registered companies across the country.[97] A previous data exchange with SECP for September 2023 stats reported that 20,775 companies were registered as ICT companies.[98] This makes the share of registered ICT companies approximately 10% of total registered companies.

Number of Digital Businesses in Primary vs. Secondary Cities

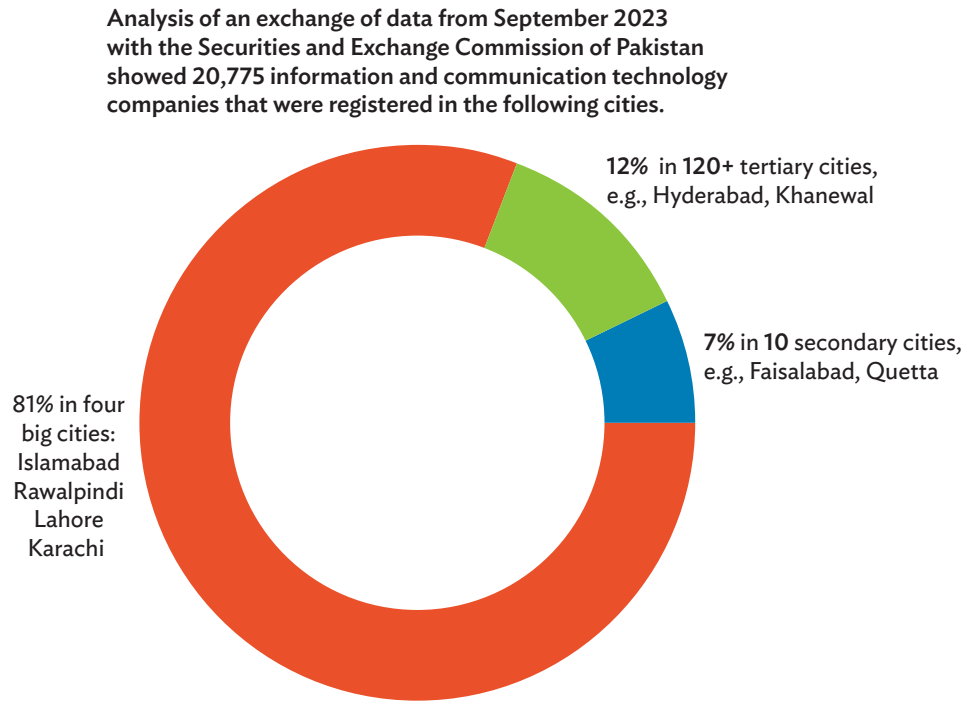
According to SECP data, four big cities, i.e., Lahore, Islamabad, Karachi, and Rawalpindi, had 81% of the 20,775 technology companies registered in 2023 (Figure 48). The rest were split between 10 secondary cities like Faisalabad, Multan, Peshawar, Gujranwala, Bahawalpur, Sialkot, Quetta, Sargodha, and Gujrat with 7%, and 120+ tertiary status cities with 12%, including Sahiwal, Abbottabad, Hyderabad, Jhelum, Swat, Okara, Khanewal, Attock, Wah Cantt, Mardan, and Chakwal.[99]

[97] Associated Press of Pakistan. 2024. SECP Registered 2,095 Companies in December 2023. 18 January. https://www.app.com.pk/business/secp-registered-2095-companies-in-december-2023/

[98] This is based on findings of the authors/team.

[99] This is based on findings of the authors/team.

Figure 48: City-Wise Registrations of Information and Communication Technology Companies in Pakistan



IT = information technology, SECP = Securities and Exchange Commission of Pakistan.
Source: Pakistan Software Export Board.

Analysis of an exchange of data from September 2023 with the Securities and Exchange Commission of Pakistan showed 20,775 information and communication technology companies that were registered in the following cities.

ICT is expanding across Pakistan, showing that firms can build a tech-savvy workforce and an alternate economy for these small towns that is less affected by local economic shocks and more connected to the global market. These high-paying white-collar jobs in small towns can create a new culture of wealth creation and attract more youth to develop skills that are in global demand. It can also boost the secondary economy for these small towns of new retail businesses, service sector companies like banks, courier companies, and hospitality and entertainment businesses like cinemas, clubs, cafes, and restaurants.

To create such economic conditions in small tertiary towns, or boost them in urban areas, all that is needed is digital infrastructure and enabling government policies.

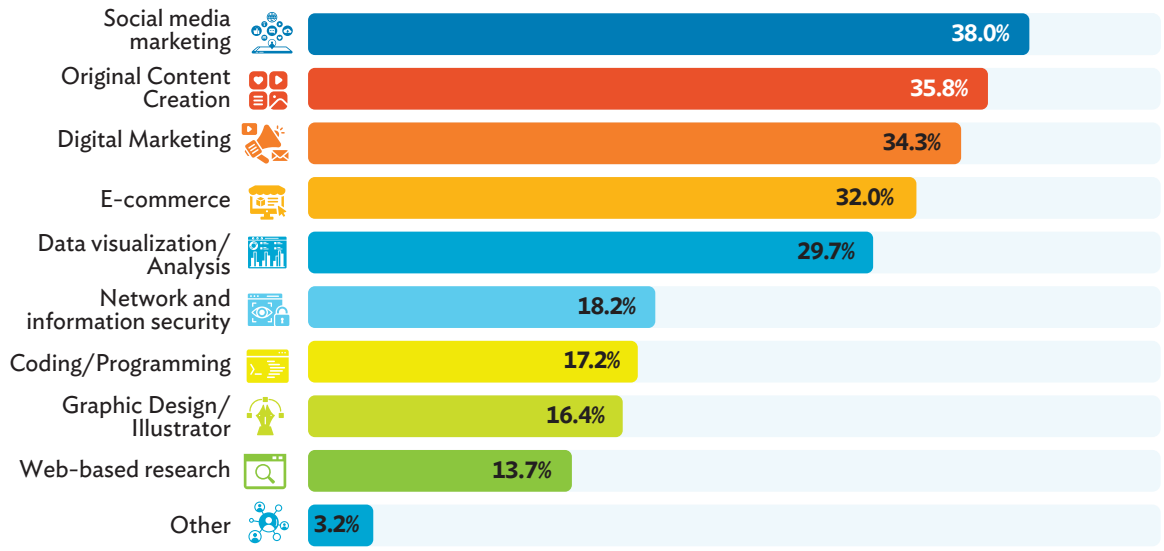
Market Capitalization of Digital Businesses in Stock Exchange

An analysis of PSX data reveals a total of 524 listed companies with a total market capitalization of PRs9.06 trillion.[100] Of the total number of companies, 16, or 3%, are listed as software, technology, or telecom companies, with a market capitalization of PRs304 billion, which is approximately 3.3% of the total market capitalization of the PSX.[101]

High Corporate Taxes and Cost of Doing Business

Pakistan has adopted a much higher corporate income tax rate compared to nearly all its regional competitors (Table 10). Ideally, in order to attract global businesses and encourage local corporatization, Pakistan could have positioned itself somewhere in the middle (Figures 49 and 50).

Figure 49: Digital Skills Required to Excel at Workplace

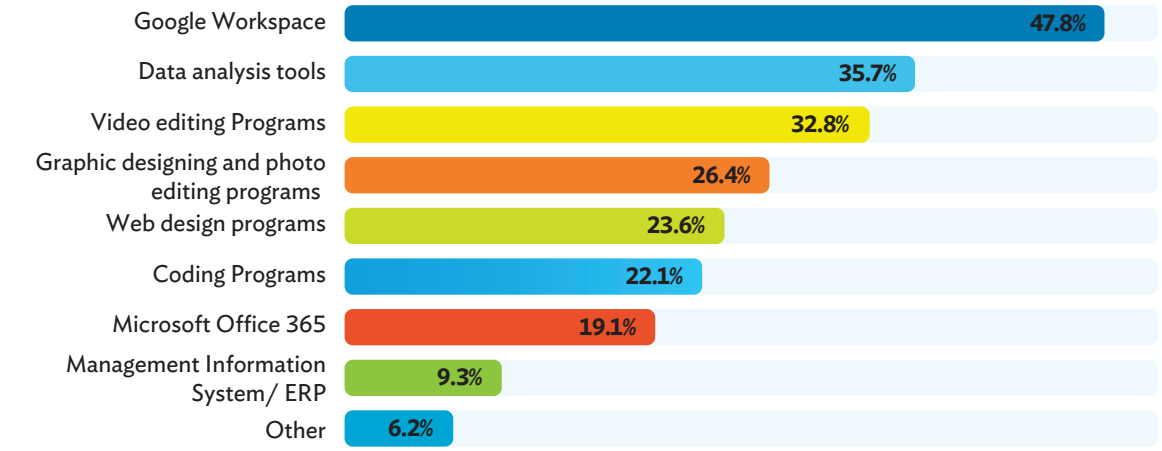


Source: Adapted from UNDP. 2024. *Doing Digital for Development.*

[100] Pakistan Stock Exchange (PSX). 5 Years Progress Report. https://dps.psx.com.pk/progress-report (accessed 23 August 2024).

[101] Simply Wall St. 2021. Pakistani (KSE) Market Analysis & Valuation - Updated Today. 30 August. https://simplywall.st/markets/pk (accessed 23 August 2024).

Figure 50: Digital Skills Desired by Employers



ERP = enterprise resource planning.
Source: Adapted from UNDP. 2024. *Doing Digital for Development.*

Table 10: Comparison of Corporate Income Tax Rates with Regional Peers

Country	Corporate Income Tax Rate	Tax Collected (FY 2022-23) approx.	Number of Companies (approx.)	Average Corporate Tax per Company (approx.)	Tax Collecting Agency
		In USD equivalent	Billion	In USD equivalent	
Pakistan	29% (for non-banking companies)	$10.4	1,400,000	$34,500	Federal Board of Revenue (FBR)
India	22% (for domestic companies)	$121.8	100,000	$87,000	Central Board of Direct Taxes (CBDT)
Bangladesh	30% (for non-listed companies)	$4.4	250,000	$44,000	National Board of Revenue (NBR)
Sri Lanka	24%	$3.4	3,500,000	$13,600	Inland Revenue Department (IRD)
People's Republic of China	25%	$345	1,000,000	$98,600	State Taxation Administration (STA)
Iran	25%	$35	100,000	$35,000	Iranian National Tax Administration (INTA)
Saudi Arabia	20%	$40	50,000	$400,000	Zakat, Tax and Customs Authority (ZATCA)
UAE	9%	$5.5	100,000	$109,000	Federal Tax Auhority (FTA)
Philippines	25% (for large corporations)	$17	500,000	$170,000	Bureau of Internal Revenue (BIR)
Thailand	20%	$33	100,000	$66,000	Revenue Department (RD)
Malaysia	24%	$19	300,000	$190,000	Inland Revenue Board of Malaysia (IRBM/LHDN)

FY = fiscal year, UAE = United Arab Emirates, USD = United States dollars.
Note: This is based on the findings of the authors/team.
Source: State Bank of Pakistan.

Pakistan is among the countries with the highest corporate tax rates. The high corporate tax rate not only works against attracting global businesses to Pakistan, in turn stifling FDI, but also results in lower aggregate collection of corporate income tax.[102]

Beyond high corporate tax rates, Pakistani businesses are exposed to several other additional taxes, levies, duties, and regulatory payments, which make it further challenging for them to have enough free cash flows to reinvest into businesses (Figure 51). There is also a significant compliance burden, lack of digitalization, and less-than-effective interoperability between federal and provincial revenue collection agencies.[103]

Figure 51: Cost of Doing Business for Local Technology Businesses in Pakistan

Cost of Doing Business: Domestic Services

	IT & ITeS	BPOs	Freelancers	Startups
Withholding Tax	3%	3%	3%	100% tax credit
Income Tax on Electricity	12%	12%	7.5%	12%
Income Tax on phone and Internet	15%	15%	15%	15%
Tax on Imports	5.5%	5.5%	-	-
Annual Income Tax	29%	29%	-	-
Super Tax	1%	1%	-	-
Sales Tax Electricity (FBR)	17%	17%	-	17%
Sales Tax (phone & internet)	19.5%	19.5%		19.5%
Sales Tax Electricity (PRA)	3%	3%	-	3%
Sales Tax on Services	5%	5%	-	5%
Outward Remittances	3%	8%	-	3%

BPO = business process outsourcing, FBR = Federal Board of Revenue, IT = information technology, ITeS = IT-enabled service, PRA = procurement regulatory authority.

Source: Zainab and Kashoon. 2022.

Digital Business Enablers

Digital technology businesses are often competing against global organizations; therefore, it is of utmost importance to have optimal operational capabilities with minimum regulations impeding their performance.

[102] This is based on findings of the authors/team.

[103] H. Zainab and L. Kashoon. 2022. Tax Analysis - Mapping Cost of Doing Business for ICT & ITeS in Pakistan. Islamabad, Pakistan. Pakistan Software Houses Association for ICT & ITES. https://www.pasha.org.pk/wp-content/uploads/Tax-Analysis-Report_Mapping-Cost-of-doing-Business-for-ICT-and-ITeS-industry-in-Pakistan-2022.pdf.

Pakistan's regulatory regime, most of the time unwittingly, operates with an industrial-era mindset, which is not ideal for knowledge economy businesses. Pakistan has too many horizontal regulators that operate across multiple industrial sectors without expertise in any of these various industries. It is critical for Pakistan to significantly reduce these horizontal regulators and adopt the concept of vertical regulators, which are built for a certain industry. These vertical regulators must be given specific KPIs for the development of that particular industry without interference from other regulators, and they are bound to produce these results and fulfil performance parameters every year.

In addition, the country's financial and banking industry is not yet attuned to dealing with knowledge economy companies. Raising equity or debt capital is particularly challenging for digital businesses, as banks and financiers are often unable to assess them. A potential route for these companies is to raise capital from the stock market; however, the representation of technology companies in the PSX is very minimal and unsatisfactory, and so is their contribution to the national GDP (well below their Indian counterparts). Policies and incentives that support financing opportunities and PSX listing can be helpful in improving the situation.

4.5 Digital Workforce

Pakistan produced 157,102 STEM graduates in 2022–23.[104] Industry engagement and various studies have noted that less than 10% of these graduates are fully prepared for the contemporary tech world challenges.[105]

This includes the understanding of emerging technological skills and knowledge, adaptability and continuous learning, problem-solving and critical thinking, demonstrating practice of soft skills, understanding of a global perspective, ethical and social responsibility, and understanding the business and market trends.

Because of the above factors, it takes considerable time for a fresh graduate to acquire the requisite skills to contribute effectively to the industry. HEC's Technology Development Fund, as well as successful partnerships among universities and industry players, could play a catalytic role. Such cooperative arrangements should ensure that the digital skills imparted are not only pertinent to industry requirements but also directly applicable in real-world scenarios.

Digital Is Part of the Organized Sector

PwC drafted a report for the Pakistan Software Export to assess Pakistan's organized ICT sector comprising 316,000 ICT workers staffed at 11,858 tech companies across the country as of 2021.[106] These workers are employed in multiple export-oriented service industries, such as call centers, software design and consultancy, hardware services, telecommunication services, and software development services. The report estimates the entire output of Pakistan's ICT industry at $3.9 billion

[104] R. Haq. 2023. Over a Million Pakistani University Students Enrolled in STEM Fields. Pakistan Link - Community (blog). https://pakistanlink.org/Community/2023/Feb23/17/11.HTM (accessed 26 August 2024).

[105] U. Hanif. 2023. Only 10% ICT Graduates Employable: SBP. *The Express Tribune. 20 May.* https://tribune.com.pk/story/2417643/only-10-it-graduates-employable-sbp.

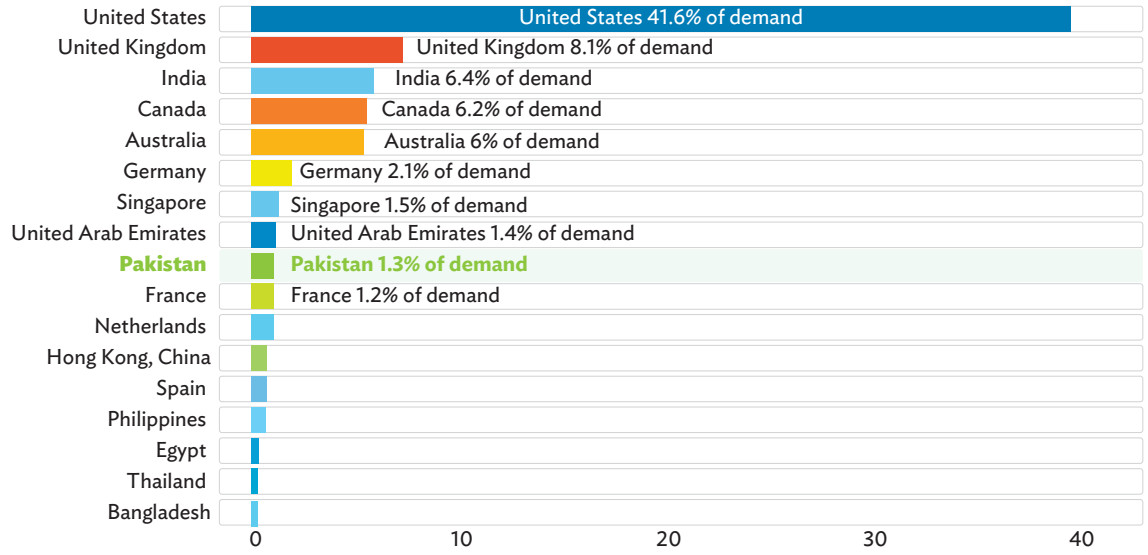
[106] PwC. 2023. *Unlocking Pakistan's IT Potential—A Roadmap for IT/ITeS Export Growth. Tech Destination.* https://app.techdestination.com/public/assets/assets/pdf/Marketing%20Collateral.pdf?v=2.1.50.

including export and locally generated revenues. It is important to note that the export revenue is taken as the reported export remittances received in the country through invoices declared to the SBP. This $3.9 billion is equivalent to around 1.0% of the country's annual GDP for FY2024 (estimated at around $374.9),[107] much lower than India's ICT sector contribution of 7.5% of its GDP in FY2023.[108]

International Services Freelancers

A PSEB research report puts the number of active freelancers in Pakistan at approximately 1 million (footnote 112). The Online Labor Index (OLI) 2020 measures the supply and demand of online freelance labor across countries and occupations by tracking the number of projects and tasks posted on the five major English-language online labor platforms in real time, representing at least 70% of the market by traffic. In addition, the OLI tracks six non-English language platforms; three in Spanish and three in Russian.[109] For 2024, the OLI 2020 ranks Pakistan's online labor utilization is at 1.3% of global aggregate demand, just below that of Singapore and United Arab Emirates (Figure 52).

Figure 52: Online Labor Utilization as Percentage of Global Aggregate Demand



Source: State Bank of Pakistan.

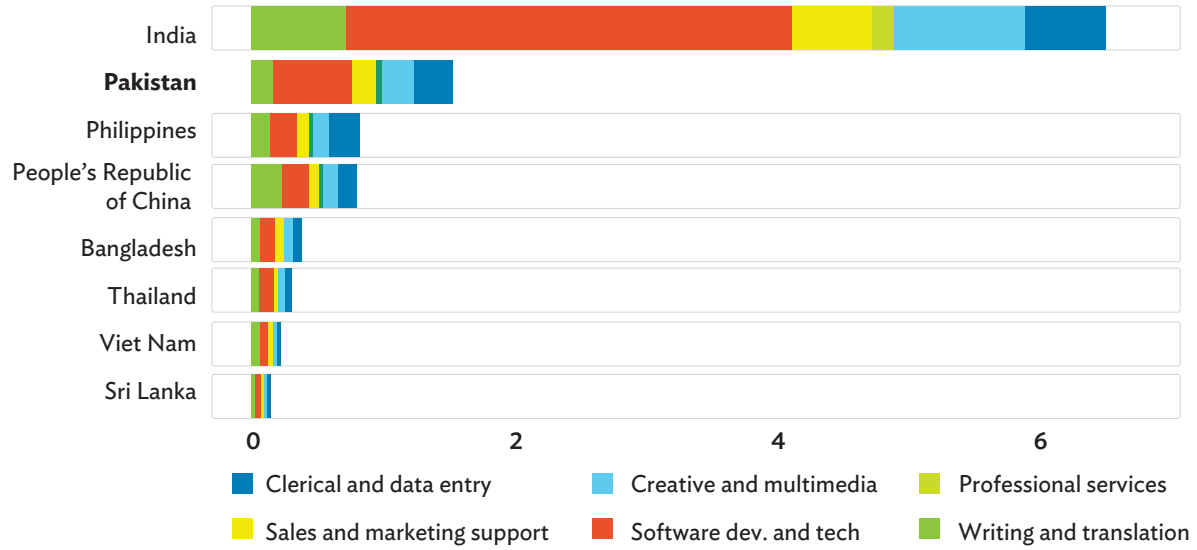
[107] ADO Economic Database (in-house economic database maintained by the Economic Unit at the ADB Pakistan Resident Mission, Islamabad).

[108] India Brand Equity Foundation (IBEF). 2024. IT&BPM Industry in India. https://www.ibef.org/industry/information-technology-india#:~:text=Introduction (accessed 26 August 2024).

[109] F. Stephany, O. Kässi, U. Rani, and V. Lehdonvirta. 2021. Online Labour Index 2020: New Ways to Measure the World's Remote Freelancing Market. Big Data & Society. http://onlinelabourobservatory.org/oli-demand/

Comparing Pakistan with its regional peers on an occupational categories scale results in Pakistan scoring well below India. However, Pakistan ranks above all other regional countries across almost all of the respective categories (Figure 53).

Figure 53: Online Labor Utilization by Occupational Categories



Source: The Online Labor Index 2020.

The OLI ranks Pakistan as having the third-largest professional population in the global crowd-work gig industry after India and Bangladesh, respectively.[110] Platforms such as Upwork, Fiverr, and Freelancer connecting workers with tasks have facilitated this industry's growth, representing a shift toward more flexible, decentralized work structures in the digital age. This achievement is partly attributable to government-led initiatives such as DigiSkills.pk aimed at boosting digital freelancing skills, contributing to the emergence of a substantial freelancer workforce.[111]

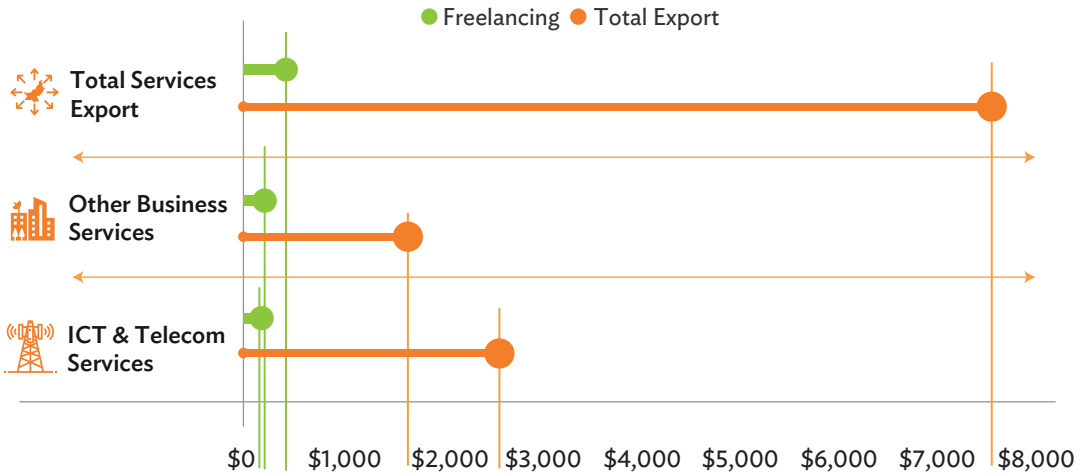
Freelancer income has become an important contributor toward national services export receipts. During FY2022–23, ICT freelancers' export proceeds comprised $215 million (or approximately 8.2%) of the cumulative ICT and telecom export remittances of $2.60 billion, while non-ICT freelancers' export remittances totaled $149 million out of $1.63 billion. This implies that the total freelancing export proceeds constituted approximately 4.8% of Pakistan's total services sector export remittances, which were $7.59 billion in FY2022–23 (Figure 54).[112]

[110] S. Omair. 2022. Pakistan's Digital World-of-Work. *The Nation. 26 October.* https://www.nation.com.pk/26-Oct-2022/pakistan-s-digital-world-of-work.

[111] DigiSkills Training Program | Free Online Training in Pakistan. https://digiskills.pk/ (accessed 28 January 2024).

[112] State Bank of Pakistan (SBP). 2024. Exports and Imports of Goods & Services (as per BPM6). August. https://www.sbp.org.pk/ecodata/ExportsImports-Goods.xls (accessed 16 September 2024) (along with additional findings of the authors/team).

Figure 54: Share of Freelancing in Respective Services Exports of Pakistan



ICT = information and communication technology.
Source: Digiskills.pk.

The "National Freelancing Facilitation Policy 2023 (Consultation Draft)" envisages a set target of $5 billion in ICT and ICTeS export remittances within the next 3 years, i.e., 2026.[113]

An Active Platform Economy

According to a 2022 report by Fairwork, the global proportion of platform workers lies within 1.5% to 3% in countries having particularly active platform economies. The same report estimates Pakistan's platform workers at around 1.5 million, comprising nearly 2% of its labor force engaged in the platform economy through online and location-based services. It therefore ranks as a particularly active platform economy.[114]

High Taxes on Employed Workforce and Top Talent

As mentioned, Pakistan imposes high payroll taxes on its corporate workers. This makes top-talent workers want to leave their Pakistan-based employers and move to a country with lower taxes. This also makes professionals choose to work remotely for companies or do freelance work that is taxed at 1% of their remittance income received through formal banking channels.[115] High taxes and corresponding compliance burden thus hinder the growth and development of corporate salaried individuals as well as small businesses and disincentivize corporatization (Figure 55).

[113] Ministry of ICT and Telecommunications, Government of Pakistan. National Freelancing Facilitation Policy 2023 (Consultation Draft). https://moitt.gov.pk/SiteImage/Misc/files/National%20Freelancing%20Facilitation%20Policy%20Updated%20July%202023%20UPLOAD%20VERSION.pdf (accessed 27 August 2024).

[114] Fairwork. 2022. *Fairwork Pakistan Ratings 2022: Labour Standards in the Platform Economy. Islamabad, Pakistan; Oxford, United Kingdom; Berlin, Germany:* https://fair.work/wp-content/uploads/sites/17/2022/08/Fairwork-Pakistan-Ratings-2022-EN.pdf.

[115] For freelancers registered with the PSEB, the corresponding tax rate is currently 0.25%, while non-registered freelancers are taxed at the standard rate of 1%, applicable as of 27 August 2024.

Figure 55: Employee Payroll Taxes in Pakistan

Employee Payroll Tax

According to section 149, part 1 1st Schedule, the payroll tax is a fixed tax levied on the employees of the company. The taxes are imposed against the income slab of the employees. The payroll tax is deducted from employee's salary and paid through the company to federal revenue authority. While payroll tax is not considered as cost for the company in the books, it is considered an indirect cost.

Slab		Tax Rate		
Up to 600,000		0%		
600,001	1,200,000	2.5% of the amount above 600,000		
1,200,001	2,400,000	15,000	Plus	12.5% of the amount > 1.2 M
2,400,001	3,600,000	165,000		20% of the amount > 2.4M
3,600,001	6,000,000	405,000		25% of the amount > 3.6M
6,000,001	12,000,000	1,005,000		32.5% of the amount > 6.6 M
Above 12,000,000		2,955,000		35 % of the amount > 12 M

Source: Pakistan Software Export Board.

Freelancing, while perceivably an unintended consequence of low corporatization and higher corporate taxes, nevertheless benefits freelancers and their respective communities. The government needs to balance its taxation policy with appropriate incentives for freelancers to scale up and create enterprises without navigating cumbersome financial and regulatory barriers. Pakistan also needs to equip its freelancers with adaptive skills to counteract the potential value loss from AI tools on low-intensity tech-based work.

Pakistan-based technology companies face the potential challenge of losing skilled talent to offshore peers owing to better remuneration packages. There is a need to address this issue strategically and balance the taxation policy with the growth of this vital sector. Some companies report that more than 30% of ICT/data professionals with 2–3 years of experience leave, causing a steady loss of trained people.[116]

Universities and Training Ecosystem

The HEC's HEIS Statistics[117] for 2021–22 reveal that Pakistan has 262 distinct university campuses accredited by the HEC. The data indicates 209,811 registered students pursuing the disciplines of software engineering, computer science, information technology, and related fields in these universities at the bachelor's, master's, and doctorate levels.

The gender breakdown for these ICT and telecommunication courses reveals 151,775 male students and 58,037 female students, with a gender-wise ratio of 72.33% male and 27.66% female students. While this gender gap is concerning in the ICT and telecommunication discipline, the overall gender divide across all disciplines comprises 54.3% male students and 45.7% female students for a total of 1.94 million enrolled students across all disciplines and across all higher education institutions in the country (footnote 122).

[116] Based on findings of the authors/team.
[117] Higher Education Commission. https://www.hec.gov.pk/english/universities/hes/Pages/HEDR-Statistics.aspx (accessed 27 August 2024).

The country produced 471,306 university graduates in 2020–21. Of these, 157,102 were in STEM fields, including 43,000 graduates in ICT (footnote 110).

Assessing the stats for tertiary school enrollment (higher education institutions providing bachelor's degrees) for eligible 18- to 25-year-olds, Pakistan demonstrates a 13% enrollment, which is almost half of South Asia's average of 25%, while languishing at the bottom of the list (Table 11).[118]

Table 11: Regional Comparison: Tertiary Enrollment Rates (Ages 18–25)

Country	18- to 25-year-old population enrolled in tertiary education (%)
Iran	57
Thailand	49
Viet Nam	42
India	32
Sri Lanka	27
South Asia average	25
Bangladesh	23
Pakistan	13

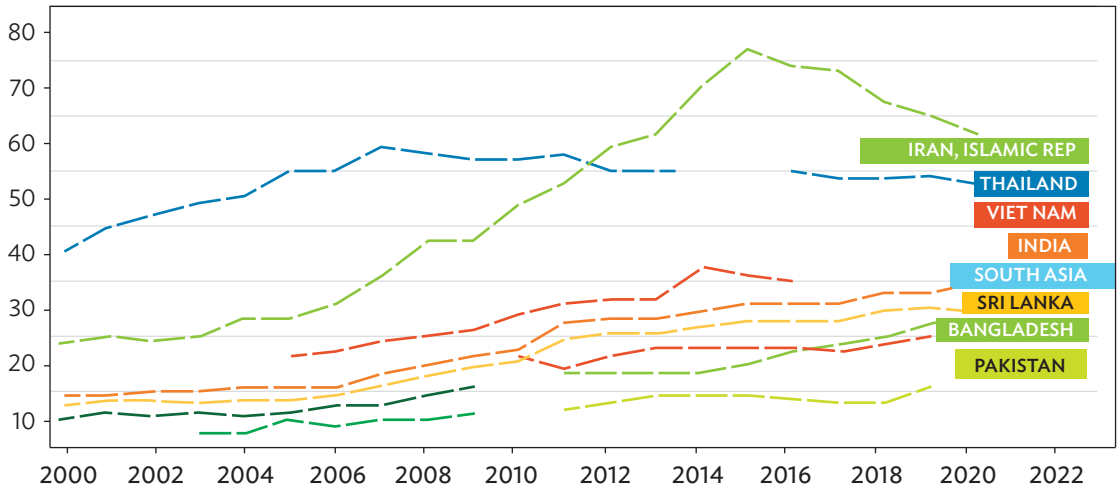
Source: Higher Education Commission.

Figure 56 depicts a year-on-year progress on tertiary school enrollment in the respective countries from 2000 till 2022.

Figure 56: Comparison of School Enrollments in Comparable Countries

School enrollment, tertiary (% gross) - Pakistan, South Asia, India, Sri Lanka, Bangladesh, Viet Nam, Thailand, Islamic Republic of Iran

UNESCO Institute for Statistics (US). UIS.Stat Bulk Data Download Service. Accessed 19 September 2023. apiportal.uis.unesco.org/bdds.



Source: World Bank.

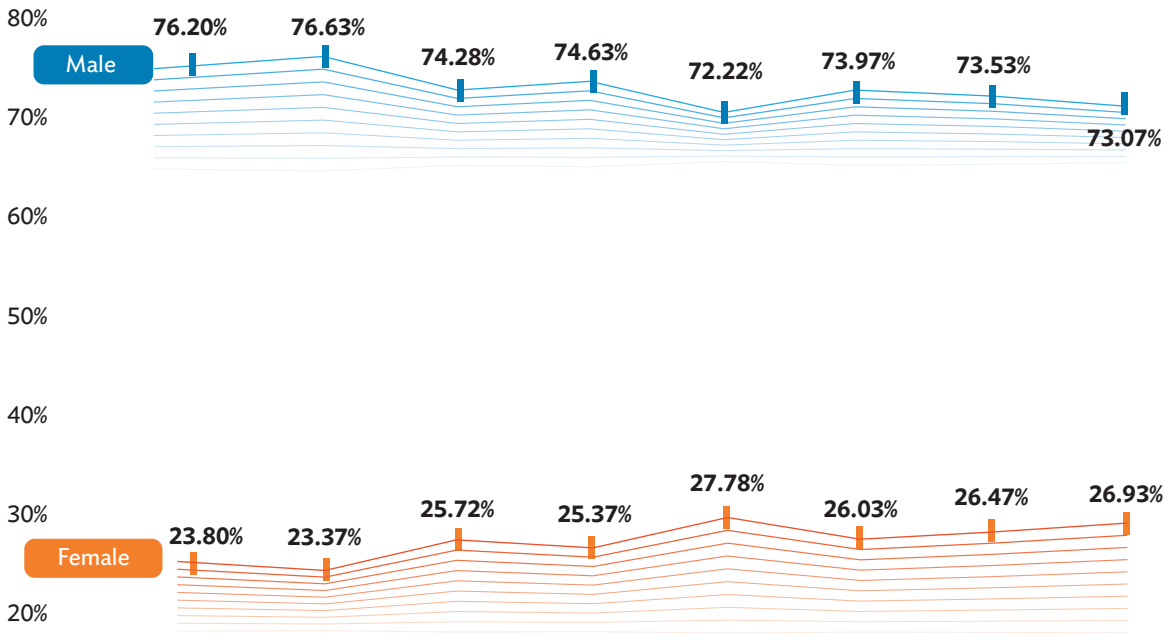
[118] World Bank Open Data. 2024. https://data.worldbank.org/indicator/SE.TER.ENRR?locations=PK-8S-IN-LK-BD-VN-TH-IR (accessed 27 August 2024).

The local ICT industry has indicated that these students' lack of industry preparedness and considers only 10% of these graduates to be industry-ready upon induction into job roles (footnote 111).

Digital Workforce Enablers

Pakistan needs to prepare new graduates to achieve approximately 200,000 new inductees in the industry each year for it to become a serious contender for a global technology enabler.[119] A key factor is the low female participation in the workforce, especially in the tech industry, as depicted in Figure 57. This is despite the fact that the ICT industry presents a comparatively conducive working environment for females.

Figure 57: Gender-Wise Enrollment of Students



Source: Pakistan Software Export Board.

Cost pressures often prevent students from modest backgrounds, especially women, from completing 4-year degrees. Women are also more likely to quit early when they get married. A possible solution could be to offer "2 years + 2 years" stackable degree programs that address these challenges. These degrees could cover most technology topics in the first 2 years, enabling a student to earn an associate degree and enter the industry, with the choice that he/she can return for another 2 years of education at his/her own pace, or through online learning methods to finish the full degrees.

[119] Author's recommendation based on findings.

The PSEB launched a major initiative in 2022 to conduct training through industry professionals. An industry consortium of 19 companies executed a pilot program named "TechLift," for which the curriculum was drawn by the industry and the trainers were industry employees.[120] This pilot program trained 4,000 qualified students from a pool of 24,483 interested candidates, with 300 hours of boot-camp-style coaching. More than 75% of students were able to achieve passing marks, and 79% of the graduated students were able to attain employment within a year of completion of the program.[121]

PSEB conducted a pilot program to train final-year university students in the 6th, 7th, and 8th semesters. The program also included training to around 100 faculty members in advanced software development, code quality assurance, and cloud technologies skill sets.[122]

To provide the country with the necessary technology resources, short courses on technology skills and emerging technology concepts can be delivered through bootcamps and online/in-person hybrid courses. The National Vocational and Technical Training Commission and its provincial counterparts are working actively to meet this requirement. The commission has trained 379,350 students in technology skills, such as cybersecurity, AI, and robotics, by October 2022. It also runs the Prime Minister's Youth Skills Development Program, which has a budget of PRs10 billion, and has given training to 161,000 students in this program, of which 96,000 students are trained in technology skills.[123]-

Moreover, Ignite National R&D Fund launched "DigiSkills," a training initiative for freelancers. DigiSkills has imparted more than 3,000,000 trainings since 2018, out of which more than 800,000 trainings have been provided to women.[124]

4.6 Digital Exports

Recent Pakistani ICT and telecom, and other business services export remittances are approximately 60.7% of all the services export remittances of the country and nearly 13.5% of all the export remittances (Figure 58).[125]

[120] Associated Press of Pakistan. 2023. Techlift Boot Camp Launched to Train IT Graduates: IT Minister. 20 March. https://www.app.com.pk/national/techlift-boot-camp-launched-to-train-it-graduates-it-minister/ (accessed 28 August 2024).

[121] P@SHA Learning & Development Wing. 2024. TechLift Impact Assessment Report—Amended Version with Employment Update. Pakistan Software Houses Association. Islamabad. https://www.pasha.org.pk/wp-content/uploads/TechLift-Impact-Report-Public-1.pdf.

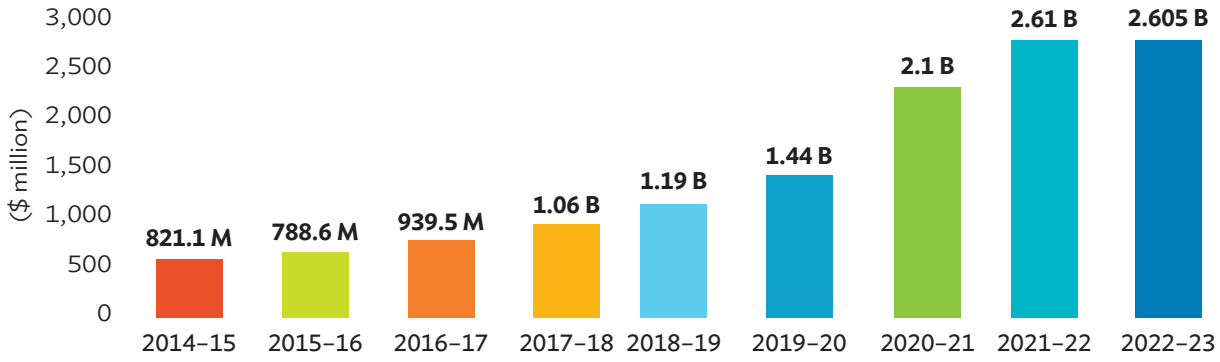
[122] MOITT. 2024. Federal Minister for ICT Syed Amin Ul Haque directs expediting process of giving cash rewards to ICT industry. https://moitt.gov.pk/NewsDetail/MDQzYjMwNWQtNDRhZi00NTBlLWJkMjMtZDcyOWMzMjRhZjYy. (accessed 16 September 2024); S. Kaleem. 2023. ICT-Industry Academic Bridge Program Certificate Distribution Ceremony. DHA Suffa University. 19 October 2023. https://www.dsu.edu.pk/it-industry-academic-bridge-program-certificate-distribution-ceremony/ (accessed 16 September 2024).

[123] Government of Pakistan, Ministry of Federal Education and Professional Training. 2023. Madad Ali Sindhi Increases the Quota for Women from 33% to 40% and Orders Full Accommodation of Differently Abled Students under the Prime Minister's Youth Skills Development Programme (PMYSDP). December.https://mofept.gov.pk/NewsDetail/YWYzMTExNDEtMGJiZC00OTJiLTk1MDYtNmNlMTViOWFjYzdm (accessed 28 March 2024).

[124] Digiskills.pk. 2018. What Is DigiSkills.pk. https://www.digiskills.pk/WhatsDigiSkills.aspx (accessed 28 August 2024).

[125] State Bank of Pakistan (SBP). 2024. Exports and Imports of Goods & Services (as per BPM6). August. https://www.sbp.org.pk/ecodata/ExportsImports-Goods-Arch.xls (accessed 16 September 2024).

Figure 58: Pakistan's Information and Communication Technology and IT-Enabled Services Export Remittances Between FY2014–15 and FY2022–23



FY = fiscal year.
Source: State Bank of Pakistan.

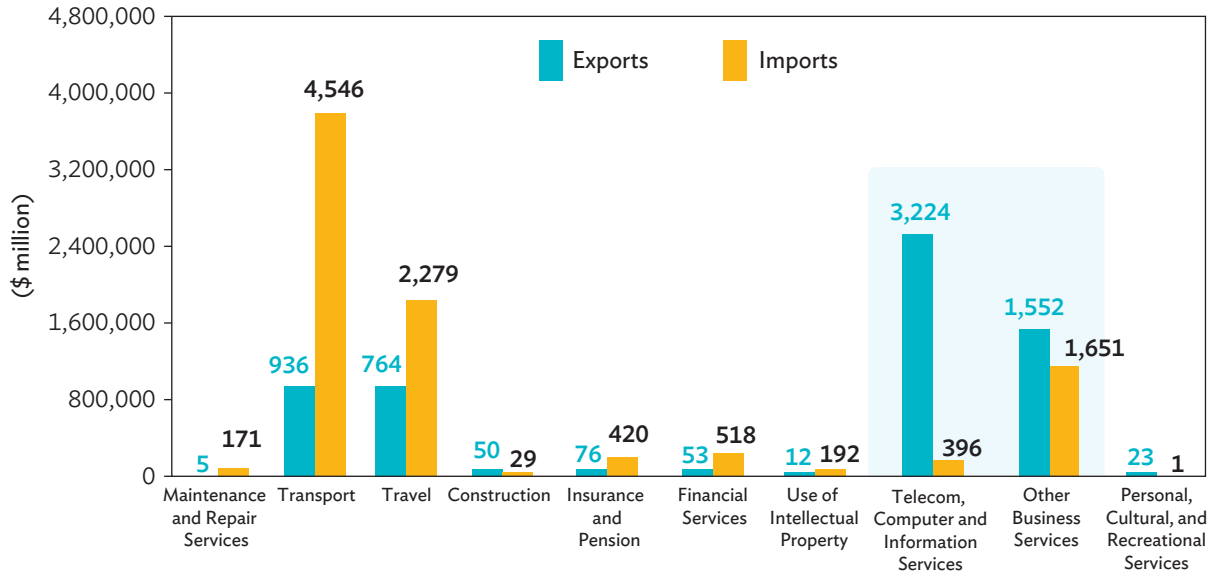
SBP data indicate that, in FY2020–21, there were 5,613 companies and individuals involved in the export of ICT and ITeS, which are remitting export proceeds through official banking channels. Nine of these exporters have remitted export proceeds of more than $10 million, with the highest among them having remitted $42 million. There are 169 firms that have remitted export proceeds valued between $1 million and $10 million, while 196 firms have remitted between $500,000 and $1 million.[126]

Both ICT export remittances and Other Business Services export remittances are the two fastest-growing service-sector export segments in the country over the past 4 years, valued at $3.22 billion and $1.55 billion for FY2023–24, respectively. The software development services sector earns 46.5% of the total ICT export revenue of the country.[127]

Pakistan can generate more value in foreign exchange by the export of these services compared to expensing the foreign exchange by the import for these services. ICT & Telecom accounts for approximately 89.1% of the trade surplus, while Other Business Services accounts for approximately 48.5% of the trade surplus. The contributions from both these segments have helped limit Pakistan's services sector trade deficit to $2.821 billion for FY2023–24 (Figure 59).

[126] Based on findings of the authors/team.
[127] State Bank of Pakistan (SBP). 2024. Trade in Services (Quarterly Archive) - From FY23 to Date - Extended Balance of Payments Services Classification (EBOPS 2010). August. https://www.sbp.org.pk/ecodata/ExportsImports-Goods-Arch.xlsEconomic%20Data (accessed 16 September 2024).

Figure 59: Pakistan's Services Trade Balance, FY2023–24



Source: State Bank of Pakistan.

As Pakistan grapples with the balance of payments as its core economic problem, these two services segments present a positive picture for future foreign exchange growth perspectives.

Achieving the $20 billion export target in the ICT and telecom sector with an 85% trade surplus can theoretically address Pakistan's overall trade deficit in services and goods. It is, however, important to note that while the "export value" of these services is the value that the individuals and companies actually invoice to their overseas clients, the "export remittances" are the funds that actually get repatriated to Pakistan, with any residual amounts considered as earnings retained by exporters at the respective source destinations. From this perspective, the actual ICT and Other Business Services export revenue is estimated to be much higher (as much as 2–2.5 times) compared to the actual export remittances.[128]

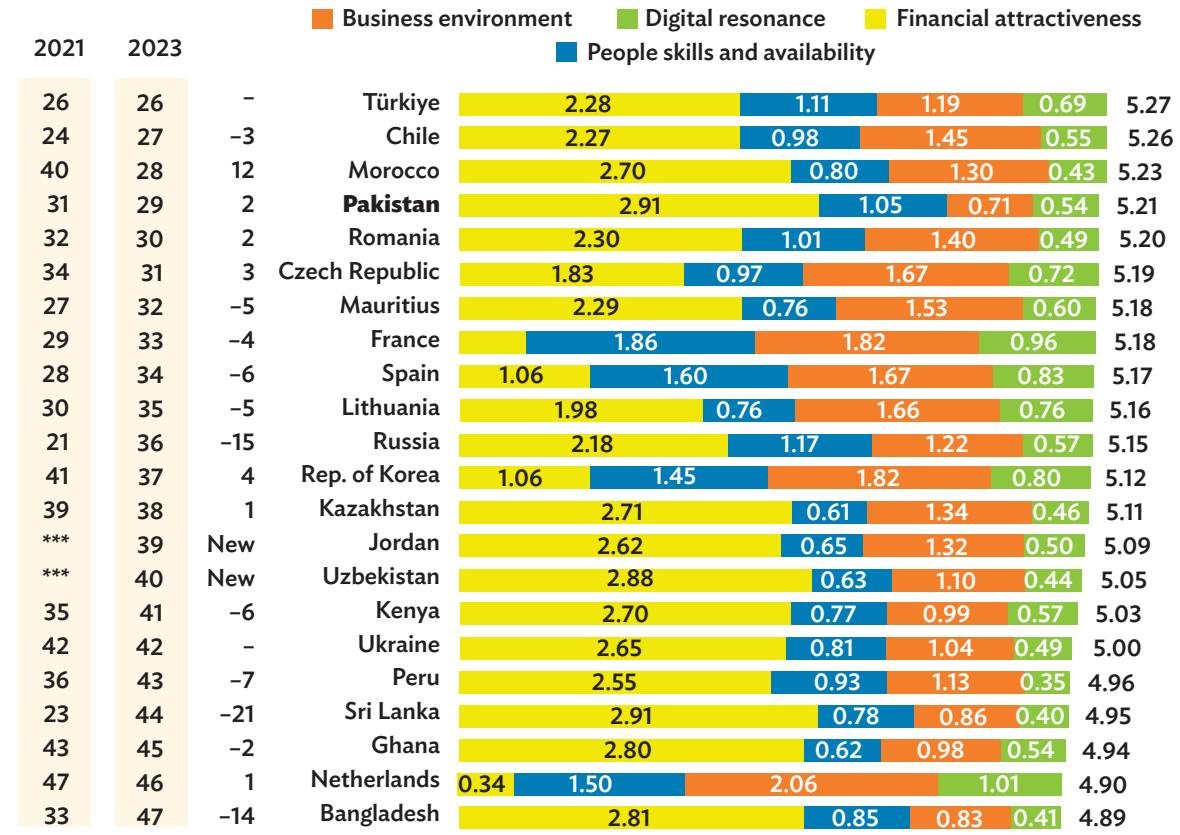
Recently, the government has allowed up to 50% of remittances to be retained in the Exporters' Specialised Foreign Currency Accounts, thereby removing restrictions on foreign exchange outflows for conducting necessary business-related transactions; consequently, translating into higher remittances.[129] AT Kearny's Global Services Location Index for 2023 ranks Pakistan among the top two countries for being the most financially attractive location for the services sector. However, Pakistan's relatively lower ranking on business environment, digital resonance, and availability of skilled resources drags down its overall rank to 29th in the Index's 2023 report (Figure 60).[130]

[128] Based on findings of the authors/team.

[129] G. A. Khan. 2024. ICT Exports Break Records. *The Express Tribune. 18 May.* https://tribune.com.pk/story/2467114/it-exports-break-records (accessed 28 August 2024).

[130] Kearney. 2024. Regenerative Talent Pools: The 2023 Kearney Global Services Location Index. https://www.kearney.com/service/digital-analytics/digital/gsli/2023-full-report.

Figure 60: AT Kearney Global Services Location Index 2023 (Appended Table Ranking 26–47)



2021	2023			Business environment	People skills and availability	Digital resonance	Financial attractiveness	
26	26	–	Türkiye	1.19	1.11	0.69	2.28	5.27
24	27	–3	Chile	1.45	0.98	0.55	2.27	5.26
40	28	12	Morocco	1.30	0.80	0.43	2.70	5.23
31	29	2	**Pakistan**	0.71	1.05	0.54	2.91	5.21
32	30	2	Romania	1.40	1.01	0.49	2.30	5.20
34	31	3	Czech Republic	1.67	0.97	0.72	1.83	5.19
27	32	–5	Mauritius	1.53	0.76	0.60	2.29	5.18
29	33	–4	France	1.82	1.86	0.96		5.18
28	34	–6	Spain	1.67	1.60	0.83	1.06	5.17
30	35	–5	Lithuania	1.66	0.76	0.76	1.98	5.16
21	36	–15	Russia	1.22	1.17	0.57	2.18	5.15
41	37	4	Rep. of Korea	1.82	1.45	0.80	1.06	5.12
39	38	1	Kazakhstan	1.34	0.61	0.46	2.71	5.11
***	39	New	Jordan	1.32	0.65	0.50	2.62	5.09
***	40	New	Uzbekistan	1.10	0.63	0.44	2.88	5.05
35	41	–6	Kenya	0.99	0.77	0.57	2.70	5.03
42	42	–	Ukraine	1.04	0.81	0.49	2.65	5.00
36	43	–7	Peru	1.13	0.93	0.35	2.55	4.96
23	44	–21	Sri Lanka	0.86	0.78	0.40	2.91	4.95
43	45	–2	Ghana	0.98	0.62	0.54	2.80	4.94
47	46	1	Netherlands	2.06	1.50	1.01	0.34	4.90
33	47	–14	Bangladesh	0.83	0.85	0.41	2.81	4.89

Source: AT Kearney. 2024.

The above argument, however, has a counterargument that needs to be acknowledged and tackled: Pakistan's high ranking as one of the most financially attractive locations for the services sector is in spite of its knowledge workers receiving the lowest wages in the global market. This is mainly due to a misplaced perception with respect to Pakistan as an investment destination, and its lack of recognition for having a competitive pool of technical resources. Moreover, it represents a failure to market or brand the country internationally to maximize its value propositions.

Pakistan is facing a serious challenge with this issue. Pakistan's indigenous skilled resources are also in high demand in other countries, where they can earn approximately four to eight times more by moving to work in their respective tech sectors.[131] Some of these countries have better quality of life, social security, and a much higher value for the respective income tax contributions. According to media reports, out of the citizens moving abroad in 2023 for better opportunities, about 45% were educated and skilled professionals,[132] while the exact proportion of ICT professionals could not be established.

[131] Based on findings of the authors.

[132] Stack Overflow. 2023. Stack Overflow Developer Survey 2023. https://survey.stackoverflow.co/2023/ (accessed 20 September 2024).

Boosting Digital Exports

Supply Side

To boost Pakistan's ICT exports, both the supply and the demand sides of the equation need to be addressed. The supply-side efforts should focus on developing skilled human resources and enhancing the skills of the existing ones. This requires specialized degree programs that can accelerate the industry transition, such as "2 years + 2 years" stackable degrees, as proposed above, to increase the participation of female students and students who cannot afford to finance a 4-year degree program. Additional measures can include industry readiness /on-the-job placements for final year university students, post-tertiary specialized boot camps, conversion of semi-skilled resources into market-ready, technically adept resources, as well as upskilling of university faculty.

The ICT & ITeS industry needs to create agile, adaptive workplaces that are technology-ready on a priority basis. With an annual influx of 100,000 new workers in the industry, this would require around 4.9 million square feet (f^2) of additional office space every year, based on the assumption that only 70% of staff works from offices.[133] This would pose a major financing challenge. One possible solution could be to invest in technology infrastructure development in second-tier cities offering (potentially) comparatively lower land costs to include these in the knowledge ecosystem and diversify the talent pool across the country.

PSEB has taken up several projects in this regard, the latest being the addition of 25 software technology parks bringing the tally to 40, mainly in the secondary and tertiary cities, ranging from 10,000 f2 to 50,000 ft2 of office space for each such facility. Preference is being given to locations close to an ICT university, as well as cities having more than 20 ICT companies registered with the SECP.[134] As per current anecdotal knowledge, 32 software technology parks have already been built and are functional with more than 350 companies having more than 8,000 professionals operating from the respective locations.

PSEB is also developing two major ICT parks in Islamabad and Karachi, with over 45,000 square meters (m^2) and 106,449 m^2 of office space, respectively.[135] These ICT parks will look to host medium- and large-scale local and international ICT businesses. Special Technologies Zones Authority and National Aerospace Science and Technology Parks are also adding technology-enabled workspace facilities across the country.[136] The Capital Development Authority has recently floated a tender to lease out a grey structure for establishing an ICT park in Islamabad.[137]

---

133 Based on findings of the authors/team.

134 Software Technology Parks. Tech Destination. 2021. https://stagingapp.techdestination.com/public/assets/assets/pdf/stp.pdf?v=2.1.49 (accessed 28 August 2024).

135 MoITT. 2022. https://moitt.gov.pk/NewsDetail/NzIyMWZmMDQtMDUwZS00N2ZkLThlZDAtZGU5MDM4YTkzZDFi (accessed 4 September 2024); *The Nation*. 2022. MOITT Launches Pakistan's Largest IT Park in Karachi. 8 November. https://www.nation.com.pk/08-Nov-2022/moitt-launches-pakistan-s-largest-it-park-in-karachi.

136 Engineering Post. 2023. Software Technology Parks in the Public and Private Building Being Established to Facilitate ICT Industry. 1 September. https://enggpost.com/software-technology-parks-in-the-public-and-private-building-being-established-to-facilitate-it-industry/.

137 Capital Development Authority Islamabad. 2024. Expression of Interest (EOI). 30 April https://admin.cda.gov.pk/attachment/file/YTJoYUR4MkhTbkdVUVhZYXN3UmZCUE5xOXRjclRzeGdqYW1sMFM5amF5TmM3Sk9GbkRyN0FNZnM2NFlWb3pVRVV3d2k1Y0h4ajhjeXllVWZEQ1FTUksyQSt0cEJ2ZHF2T0p2Q2xVM2MrN2I4bXluWk9RT2VjTEhpREZTNmpNKzM=/view.

However, a key aspect of Pakistan's technology industry is the lack of captive ICT companies. Pakistan has fewer than 10 captive ICT companies.[138] By comparison, India had over 1,400 captive centers in 2022, employing more than 1.3 million and generating over $33 billion in annual revenues.[139] By 2025, the National Association of Software and Service Companies expects an additional 500 captive units to be established in India.[140]

Pakistan needs a strategic shift in its taxation and foreign exchange policy regimes to attract captive offices. Pakistan's corporate tax rate, as well as its payroll tax rates, are among the highest in the neighboring regions. Both are direct costs to businesses. Since Pakistan's digital exports enjoy a trade surplus of $252 million (or approximately 88% of total ICT export remittances),[141] Pakistan needs to create a specialized corporate tax rate for ICT businesses at 15% to satisfy the Organisation for Economic Co-operation and Development global technology tax treaty requirements, [142] and a specialized payroll tax (at ideally below 15% for a slightly longer period) for the ICT sector employees.

In addition, Pakistan needs to open its foreign exchange regime to accommodate for 100% liberal foreign exchange policy tailored for the ICT/digital sector, which would seem fair and workable due to the sector's trade surplus.

Demand Side

On the demand side, Pakistan needs to expand the "Tech Destination" brand program, work on reshaping its global image as a country that is business-friendly and technology-adaptive, enhance its global presence in publications and events, ensure media coverage to emphasize this national strategic shift, and ensure the marketing campaigns are supported by the practical implementation of policies. All of this will directly help the country's capabilities to be re-assessed upward, support the enhancing of compensation for its "in demand" technology resources, and directly increase the clients' interest to consider Pakistan on their global technology resourcing list.

Under the umbrella of the same program, Pakistan should look to create a strong business development strategy and global partnerships involving its international diaspora to act as business development agents for the country's tech industry. The newly established EXIM Bank of Pakistan and the PSEB should look to take their partnership forward to assist in the funding of international projects of Pakistan-originated tech companies and build a referral sale network of Pakistani expatriates.[143]

---

138 Based on findings of the authors/team.

139 ANSR. 2022. Captive Centers in India: Maximize Business Efficiency with Offshore Captive Center Solutions. (blog). 11 October 2022. https://ansr.com/blog/captive-centers-in-india/ (accessed 16 September 2024).

140 National Association of Software and Service Companies, a not-for-profit industry association, is the apex body for the $245 billion technology industry in India. https://nasscom.in/; S. Mandal. 2021. Global Captive Centers in India: Can Add Value If Set up Differently Fox Mandal. 19 October. https://www.foxmandal.in/global-captive-centers-in-india/ (accessed 28 August 2024).

141 Government of Pakistan. 2024. IT Exports Remittances Surges to US$286 million in July. 19 August. PR No.177. Press Information Department, Ministry of Information and Broadcasting, https://pid.gov.pk/site/press_detail/26181 (accessed 28 August 2024).

142 Organisation for Economic Co-operation and Development. 2024. 138 Countries and Jurisdictions Agree Historic Milestone to Implement Global Tax Deal. https://www.oecd.org/newsroom/138-countries-and-jurisdictions-agree-historic-milestone-to-implement-global-tax-deal.htm (accessed 28 August 2024).

143 EXIM Bank of Pakistan. 2022. https://eximbank.gov.pk/exim-bank-bop-and-pseb-join-hands-for-software-export-expansion-program-sweep-a-catalyst-for-growth-in-software-exports/ (accessed 22 March 2024).

4.7 Digitalization of Small and Medium-Sized Enterprises and Traditional Businesses

Adoption of Information and Communication Technology by Small and Medium-Sized Enterprises and Traditional Businesses

A 2022 report by the Overseas Investors Chamber of Commerce estimated that Pakistan could add $60 billion to its GDP by digitalizing its economy over the next 7–8 years, which would offer innovative job prospects to 23% of its population.[144]

According to estimates by the Small & Medium Enterprise Development Authority, there are more than 5 million SMEs in Pakistan. SMEs contribute 40% to Pakistan's GDP and 25% to its exports. After agriculture, the SME sector employs the highest percentage of the working population in the country and contributes to 78% of non-agricultural sector employment.[145]

SMEs are utilizing e-commerce platforms to expand their customer base beyond geographical borders. Platforms such as Facebook, Instagram, and X (formerly Twitter) are used for branding and customer engagement. The adoption of digital payment solutions such as mobile wallets and online gateways has enhanced the transaction experience for SMEs. *HBL Konnect, EasyPaisa, JazzCash, UBL Omni, SadaPay,* and *NayaPay* are among the notable digital payment solutions that are operational in Pakistan.

SMEs in Pakistan are reluctant to digitalize their operations because of concerns around possible adverse changes in policies or tax rates. Moreover, Pakistan's SME and agriculture sectors lack sufficient capital, even though these two sectors combined make up almost 63% of the country's GDP.[146] Only 4.3% and 3.6% of local banks' loans go to SMEs and agriculture, respectively, which are the lowest proportions in the region (footnote 99). Therefore, generally, the status of SMEs' digital readiness is poor, necessitating requisite attention.

Digitalization of Supply Chain

Integration of the Pakistan Single Window with the General Administration of Customs of the People's Republic of China marks a significant achievement in Pakistan's drive to digitize cross-border trade between the two countries.[147] This integration envisages to improve data exchange protocols and to promote more efficient verification checks between the two trading partners.

---

144 *Business Recorder*. 2023. Digitisation Can Add $60bn to Economy in 7-8 Years: OICCI. 17 February. https://www.brecorder.com/news/40226770#:~:text=The%20Overseas%20Investors%20Chamber%20of (accessed 21 March 2024).

145 State Bank of Pakistan. 2022. Challenge Fund for SMEs: Expression of Interest Document. https://www.sbp.org.pk/smefd/circulars/2022/C4-Annex-A.pdf (accessed 21 March 2024).

146 Finance Division, Government of Pakistan. n.d. Chapter 02: Agriculture. In Pakistan Economic Survey 2023-24. https://finance.gov.pk/survey/chapter_24/2_agriculture.pdf (accessed 21 March 2024); Competition Commission of Pakistan. 2023. Enhancing the Economic Efficiency of Small and Medium Enterprises in Pakistan. https://cc.gov.pk/assets/images/Downloads/assessment_studies/enhancing_the_economic_efficiencyof_smes_in_pakistan.pdf (accessed 21 March 2024).

147 Pakistan Single Window. https://www.psw.gov.pk/initiatives/123 (accessed 24 December 2023).

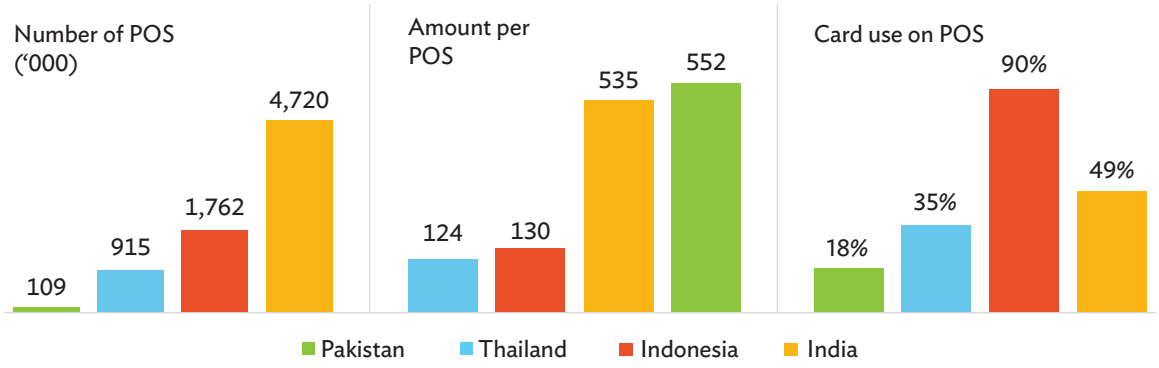
The distribution freight industry has witnessed many digitalization attempts in the past 5 years as well. Major players in this domain are Truck It In, Trukkr, BridgeLinx, Truckistan, LoadOye, and TruckSher. Most of these players provide a platform to multiple small fleet operators and distributors to organize a well-structured, digitally managed operation to interface the demand for trucking with its corresponding supply. Few of these players also provide invoice factor financing services and are vertically integrated with banks and financial institutions.

Mapping Retail and Wholesale Transactions

POS devices are the core requirement for enabling digital transactions, especially for retail and wholesale segments.

A recent PwC study reveals that 109,000 POS have been implemented across Pakistan with card usage on the same at a mere 18%. The table from the same document in Figure 61 showcases these statistics as among the lowest in the peer and regional countries' group.

Figure 61: Pakistan Point-of-Sale Implementation Comparison with Regional Peers



POS = point of sale.
Source: State Bank of Pakistan.

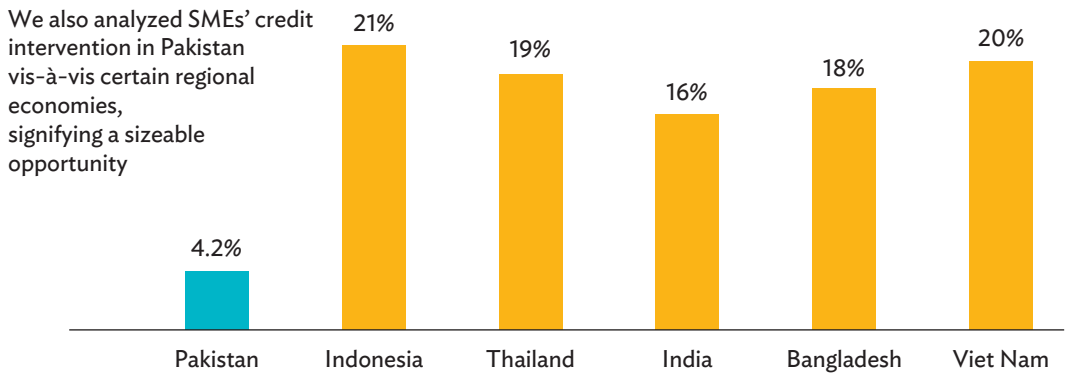
During the last 4 years, Pakistan saw a renewed attempt to aggressively push toward digitalizing the MSME and SME retail and wholesale sectors (Figure 62). A new ecosystem sprang up, including tech startups, local and global venture capital, banks, financial institutions, and mobile payment services providers. Some of these applications are profiled as follows:[148]

- *Markaz* allows wholesalers to list their product catalogs and associated items. This has resulted in a catalog of more than 100,000 items on the Markaz application, which the retailers can procure.
- *Bazaar* is a business-to-business marketplace for small enterprises (*Kiryana* outlets) to buy and sell products and receive wholesale discounts on their purchases.

[148] Profile information for each application is sourced from their respective corporate websites.

- *Tajir* enables purchasing managers, factory owners, distributors, etc., to collaborate with registered members to stay updated on new product launches and/or exclusive offers. In addition, customers can track their orders using Tajir's end-to-end logistics system.
- *Salesflo* allows retailers to place orders, connecting them with manufacturers, wholesalers, and authorized distributors. It provides these businesses with multiple functions, such as real-time stock availability updates, specifically tailored catalogs for individual outlets, personalized dashboards for each store or brand, and integrated payment capabilities.
- *Finja* provides small businesses with easy access to funds and other financial instruments such as mobile payments or collections and reduces fraud risks.
- *Dastgyr* provides real-time access to inventories, prices, and delivery modes. Dastgyr also provides financing to retailers for procurement. Dastgyr is backed by Veon, the parent organization of Jazz.[149]

Figure 62: Exposure Toward Small and Medium-Sized Enterprises of Pakistani Banks' Loans Portfolios



SMEs = small and medium-sized enterprises.
Source: State Bank of Pakistan.

CreditBook, Digikhata, and Udhar all look to digitalize the accounting functions of small retailers and allow retailers to extend credit to their retail customers.

Digitalization of SMEs provides banks and financial institutions with a more structured view of their historical data, which will facilitate easier decision-making when extending credit to these businesses.

The Pakistani banks have their current aggregate portfolio comprised of just 4.2% lending to the SME sector. A comparison across multiple peer and neighboring countries finds Pakistan at the bottom by a significant margin, with Indian banks at 16%, and Indonesian banks leading with 21% of their loan portfolio extended to the SME sector (Figure 62).

[149] M. Khan. 2022. Fintech Dastgyr Raises $37m in Series a Round for Biggest Investment yet at This Stage in Pakistan. *x*. 14 June. https://www.dawn.com/news/1694793 (accessed 29 August 2024).

4.7.3 Digitalization of Small and Medium-Sized Enterprise Enablers

The need to organize siloed models and create an interlinked digitalization framework is critical for Pakistan to enable its business operations, supply-demand forecasting, financing requirements, production analysis, raw material availability, seasonal cycles, warehousing requirements, and price management for necessary items. All of that and more will need to be interconnected and available for analysis on a national scale.

The Digital Economy Enhancement Project, funded by the World Bank, could be an enabler. It has recently been approved by the Executive Committee of the National Economic Council.[150] It proposes the development of a National Data Exchange Layer, connecting all major government regulators and entities on a data-sharing platform, to which businesses can integrate their digital platforms to share data and transactions and help with integrating various regulatory, licensing, reporting, and business services processes.

As indicated above, Pakistan's SME sector suffers from a systemic expulsion from financial inclusivity. Banks and other financial services providers are content with making risk-free margins from simply lending to the government by buying Treasury bills and other government papers. A policy shift is necessary to increase lending to the SME sector. This can provide the country with immense dividends via discovering and adopting innovative economic models, products, and services, enhancing supply chain efficiency and productivity as well as facilitating commodity exports.

It is also important for the local private sector software developers to work with the public sector and provide basic software solutions for digitalizing small businesses (such as a basic version of an enterprise resource planning software), and/or customized accounting platforms, digital marketing solution sets, e-commerce automation modules, customer management interfaces, logistics management, and inventory control systems. Ideally, these systems should potentially facilitate seamless integration with common APIs.

One way for the government to make progress could be to fix a target for digitalizing a certain percentage of SMEs each year and reduce the cost of purchasing and adopting these systems by partially subsidizing the respective software and deployment costs.

Singapore has created two exemplary projects: *Enterprise Singapore*, to provide a Productivity Solutions Grant of up to S$30,000 to eligible SMEs, and *SMEs Go Digital*, to provide up to 70% subsidies for SMEs to implement digital platforms and software for digitalizing business operations.[151] Pakistan can look to adopt similar programs under the Small and Medium Enterprises Development Agency, with the EXIM Bank of Pakistan to potentially play a catalytic role for export-oriented enterprises.

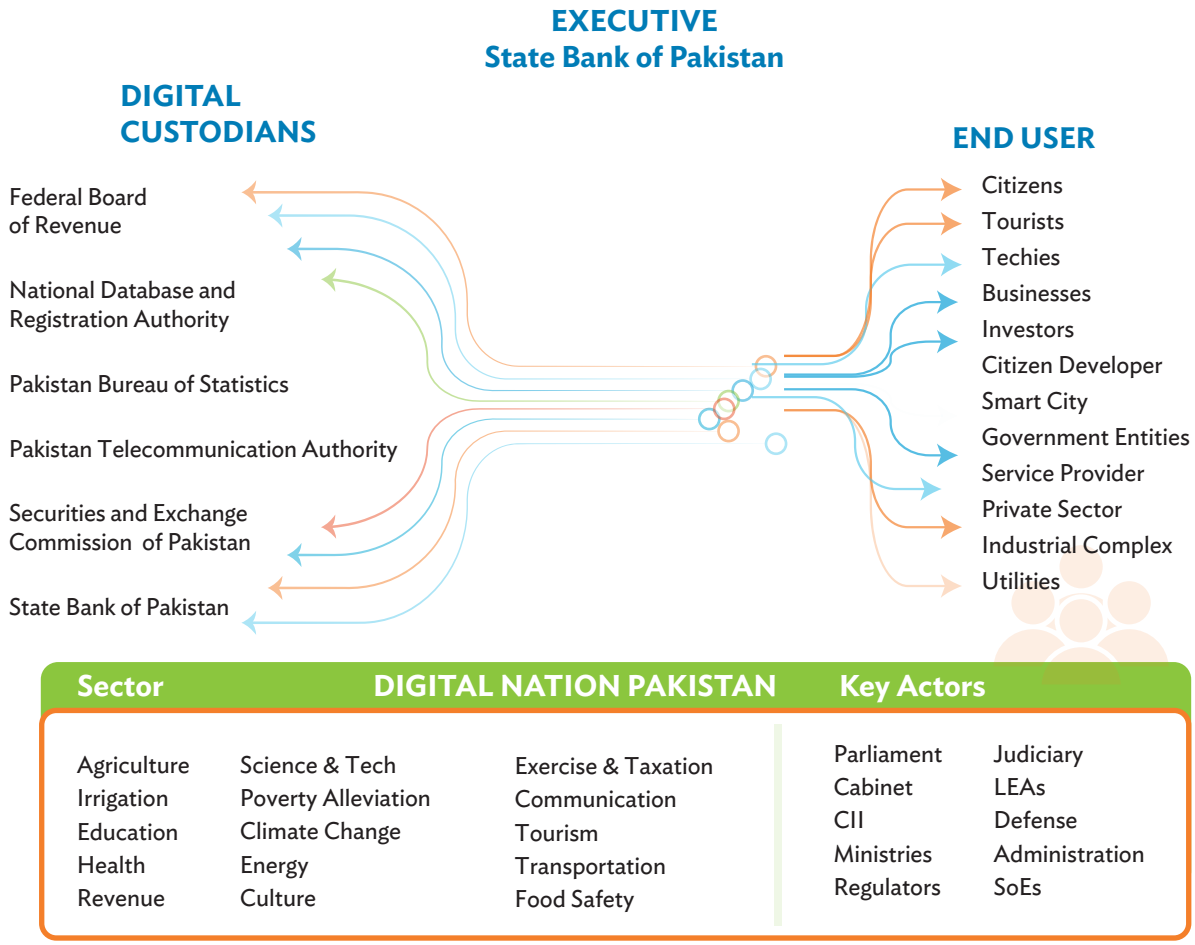
[150] *Pakistan Today*. 2023. ECNEC Approves Digital Economy Enhancement Project at Rs 17.4b Cost. 6 April. https://www.pakistantoday.com.pk/2023/04/06/ecnec-approves-digital-economy-enhancement-project-at-rs-17-4b-cost/ (accessed 22 March 2024).

[151] Grow Digital. 2023. Infocomm Media Development Authority (IMDA) Singapore. 3 August. https://www.imda.gov.sg/How-We-Can-Help/smes-go-digital/Grow-Digital (accessed 7 April 2024).

Pakistan Digital Stack is a significant step in this direction. This initiative, spearheaded by Karandaaz, shows potential impact on six aspects i) smart, efficient, and transparent government; ii) improved quality of life; iii) innovative resource management for a sustainable environment; iv) creative and competitive economy; v) smooth and effective transport infrastructure; and vi) an inclusive and flourishing society.[152]

Figure 63 depicts the composition of the proposed Pakistan Digital Stack, which involves national data custodians such as NADRA, FBR, State Bank of Pakistan, SECP, among others. On the executive side, it includes the federal and provincial governments as well as the judiciary. Finally, it integrates end users (citizens, businesses, government enterprises, banks, industries, services companies, utilities, smart cities, etc.) within the overall architectural framework.

Figure 63: Proposed Architecture of Pakistan Digital Stack



CII = Council of Islamic Ideology , LEA = local education agency , SoE = state-owned enterprise.
Sources: Ministry of Information Technology and Telecommunication and Karandaaz.

[152] Karandaaz. 2024. Envisioning the Pakistan Digital Stack - Workshop Presentations. January. https://karandaazmain.wpenginepowered.com/wp-content/uploads/2024/03/PDS-Complete-Presentations.pdf (accessed 7 April 2024).

It is envisaged that once these proposed digitized SMEs start connecting to the National Data Exchange Layer utilizing the digital stack's potential and developing customized technology capabilities, the country will make significant progress toward automation and optimizing business operations across the board.

4.8 Digitalization of Agriculture Value Chains

The agriculture sector occupies the most land in most countries, employs a significant percentage of labor, and contributes a significant percentage of the GDP. Therefore, the digitalization of agriculture and the corresponding ecosystem requires a separate mention.

As per the Pakistan Economic Survey 2023–24, the agriculture sector amounts to 22.5 million hectares of cultivated land, employs 37.4% of the employed population, and contributes a 24% share in the national GDP.[153]

Four major active platforms—GrowTech Services, Farmdar, Bakhabar Kissan, and Ricult—operate in the agritech domain.[154]

GrowTech Services is a farm and farmer support platform that provides farm, soil, plant health assessment, and yield analysis. It also provides a loan portal for farmers, agriculture product-selling stores, and e-health services for farmers and their families. GrowTech has 15,629 farmers and 3,384 farms on-boarded, spanning 60,456 acres of farmland.[155] The Outcomes Assessment Report 2023 for the Accelerating Access to Finance and Increasing the Income of Small Farmers project—launched by the Pakistan Microfinance Investment Company and implemented by GrowTech Services—compares project and non-project wheat farmers for 2022–23 (Figure 64). It reveals that while total input expenditure remained consistent for both groups, project farmers achieved a substantial 45% increase in both yield and revenue in comparison to the control group. Moreover, the net revenue of project farmers exceeded that of non-project farmers by 57%—directly aligned with the increase in yield/acre.[156]

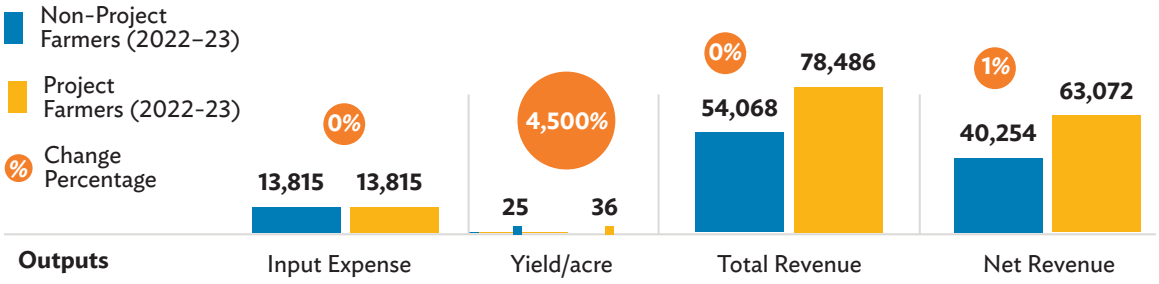
[153] Government of Pakistan, Finance Division. 2024. Chapter 02: Agriculture. In *Pakistan Economic Survey 2023–24.* https://www.finance.gov.pk/survey/chapter_24/2_agriculture.pdf.

[154] Profile information for each application is sourced from the respective corporate websites.

[155] GrowTech Services. https://www.growtechsol.com/ (accessed 29 August 2024).

[156] Pakistan Microfinance Investment Company (PMIC). 2023. Outcomes Assessment Report 2023: Accelerating Access to Finance and Increasing the Income of Small Farmers. https://pmic.pk/wp-content/uploads/2023/10/final-outcome-ar.pdf (accessed 29 August 2024).

Figure 64: Comparative Analysis of Project and Non-Project Wheat Crop Farmers



Source: Growtech. 2023.

Farmdar is a precision farming solutions platform that uses satellite remote sensing and satellite imagery with computer vision to carry out an AI-based analysis of the farm's health. It provides harvest monitoring, yield analysis, and water usage reports to increase water usage efficiency by up to 30%, input efficiency by 20%, waste reduction by 25%, and yields by up to 25%.[157]

Bakhabar Kissan is a farmer advisory platform that provides farm advisory, livestock advisory, weather updates, crop life-cycle advisory, agriculture shop, and drone services. It claims to have profiled more than 500,000 farmers.[158]

Ricult provides farm monitoring and crop scans through satellite remote sensing and imagery analysis. Its mobile app provides farmer advisory services and an agri-finance solution. It also links farmers with transportation providers, mills, banks, and finance providers.[159]

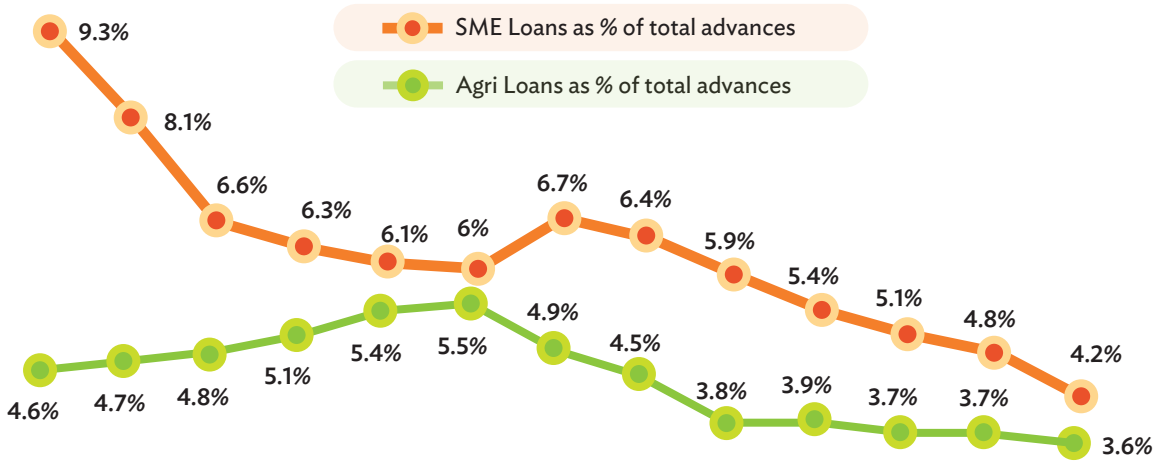
Two major programs in this domain include the concluded $8.2 million USAID-funded Pakistan Agriculture Technology Transfer Activity implemented by the Cultivating New Frontiers in Agriculture that provided access to finance and tools (drip irrigation and hydroponics, tractors, and other necessary Agri products) to approximately 148,000 farmers, as well as the ongoing National Rural Support Program, a not-for-profit organization of the Government of Pakistan.

Financial Inclusion of the Agriculture Sector

Banks in Pakistan have traditionally shied away from expanding their loan portfolio to agriculture, with just 3.6% of commercial banks' total loan portfolio extended to the sector (Figure 65).

[157] Farmdar. https://www.farmdar.ai/ (accessed 29 August 2024).
[158] Bakhabar Kissan (Bkk). https://bkk.ag/ (accessed 29 August 2024).
[159] Ricult. https://www.web.ricult.com/ (accessed 29 August 2024).

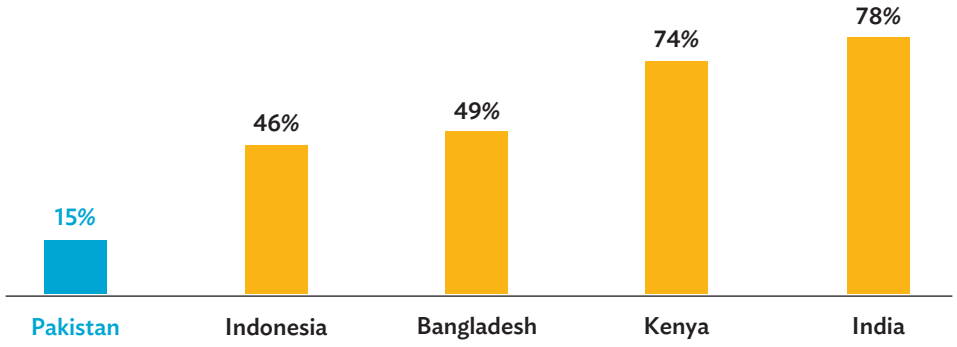
Figure 65: Banks' Loan Advances to Agriculture and Small and Medium-Sized Enterprise Sectors



SME = small and medium-sized enterprise.
Source: State Bank of Pakistan.

The same can also be seen through the lens of the percentage of bank accounts in the rural segment, which is also at a dismal state of just 15% of the eligible population, of age 15 or more having a bank account. This is the lowest when compared with Pakistan's peer countries (Figure 66).

Figure 66: Pakistan Rural Population Financial Inclusion Regional Comparison



Source: State Bank of Pakistan.

Digitalization in Agriculture Is in Its Early Stages

While the digitalization of this sector has started, the data, or lack thereof, show that the salient initiatives are at a nascent stage.

Lack of smartphone usage is one of the key challenges in digitalizing this sector among the rural population, particularly the farmers. Smartphones are the key enablers for any digitalization efforts; without these, the whole value chain will remain broken. Startups such as Kistpay (a"buy now, pay later"platform for financing smartphones in partnership with the UNDP, GSMA, and Google) are attempting to plug this gap effectively, while others such as Digital Dera (a social startup which creates physical knowledge-sharing hubs in the villages) can be promoted to help the farmers learn these digital tools.[160]

Another potentially useful initiative is the government-funded pilot project Agriverse, Pakistan's National Precision Agriculture Cloud with three distinct components, i.e., Data Lake, GIS application, and AI/machine learning framework. The Data Lake is central to the data demand generation for agri-remote sensing through drones via a service model referred to as "Drones-as-a-Service". The GIS application aims to provide a visual tool for navigation of all spatiotemporal data for analysis by experts; and finally, the AI/machine learning framework supports this analytical effort through an array of industry-proven libraries and high-performance computing infrastructure. The prescription maps are stipulated to be standardized for automated utilization through smart implements (drone sprayers, variable rate systems, laser levelers, etc.). This project is being implemented by a consortium of National Aero Space Science and Technology Park, Arid Agriculture University, and PCSIR.[161] It is estimated that an investment of $200 million can expand the scope of this project to 400 smart farms and an area of 20,000 acres.[162]

A few efforts were made in the past to create an online marketplace for the trade of farm produce directly between the farmers and the wholesale buyers, excluding the middle agents from the process and ensuring more profits for the farmers. Tazah Technologies had limited success in developing the online marketplace for the trade of farm products. However, this segment is still primarily unattended.

4.9 Digital Startups and Ecosystems

Startup Segments

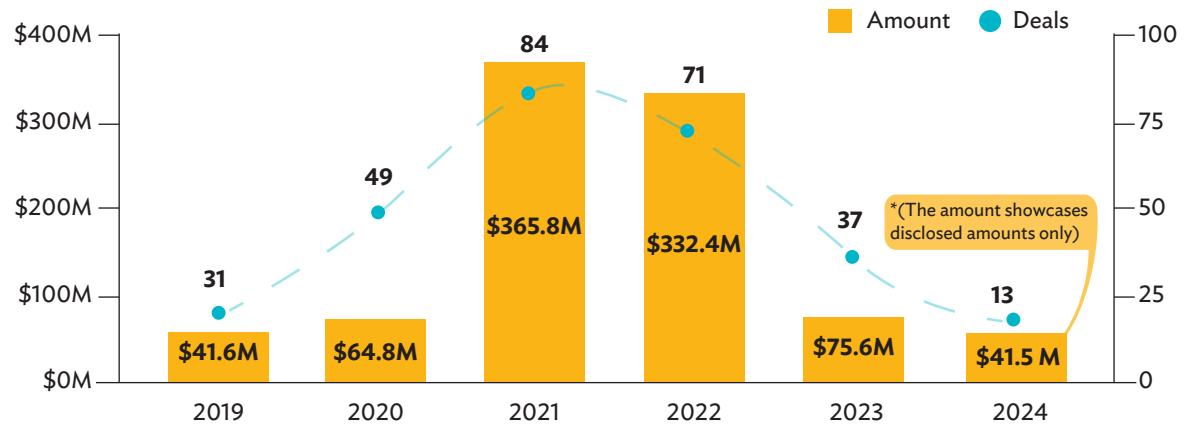
In FY2022, local start ups made 58 deals worth $355 million. Subsequently, there was a decline by 79% in FY2023 when local start ups secured only $74 million in disclosed funding, followed by a further decline of 44% in FY2024 (Figure 67).

[160] Kistpay. https://kistpay.pk/ (accessed 29 August 2024); Digital Dera. https://www.agriculturerepublic.com/digital-dera/ (accessed 29 August 2024).

[161] Corrigendum-I, Request for Proposal, NASTP-GREENAI-AGRIVERSE HARDWARE/RFP01/2024.Public Procurement Regulatory Authority (PPRA). https://www.ppra.org.pk/doc/29-3/nastp293-174.pdf (accessed 29 August 2024).

[162] Based on author's conversations with the project team.

Figure 67: Pakistan Startup Funding Value and Volume



Source: Techshaw. 2023.

There were only five transactions in the fintech sector and three in e-commerce. Prominent startups such as Abhi (wage access and payroll), PostEx (logistics), and Neem (financial) were among the recipients.

Typically, normal businesses in Pakistan transitioning from their initial seed stage to a more established status have a success rate of approximately 5%–7%. However, tech startups in the country have outperformed this average, with success rates exceeding 10%.[163] This indicates a thriving environment for technology-based enterprises, surpassing the general business landscape.

Investments by Venture Capital

Venture capital funding of Pakistan's start-up ecosystem paints varying pictures separated by the year 2022. Pakistan has been a star performer in its region during FY2021–22 and FY2022–23. However, ever since the gradual US Federal Reserve interest rate hikes commenced in March 2022, Pakistan has suffered a significant downturn in line with other emerging market countries.[164]

Other than the phenomenon of rising interest rates resulting in a start-up funding crunch globally, Pakistan's political uncertainty during FY2022–23 also complicated its economic situation and exacerbated the downturn. Despite this, the start up ecosystem in Pakistan demonstrated resilience in 2023.[165]

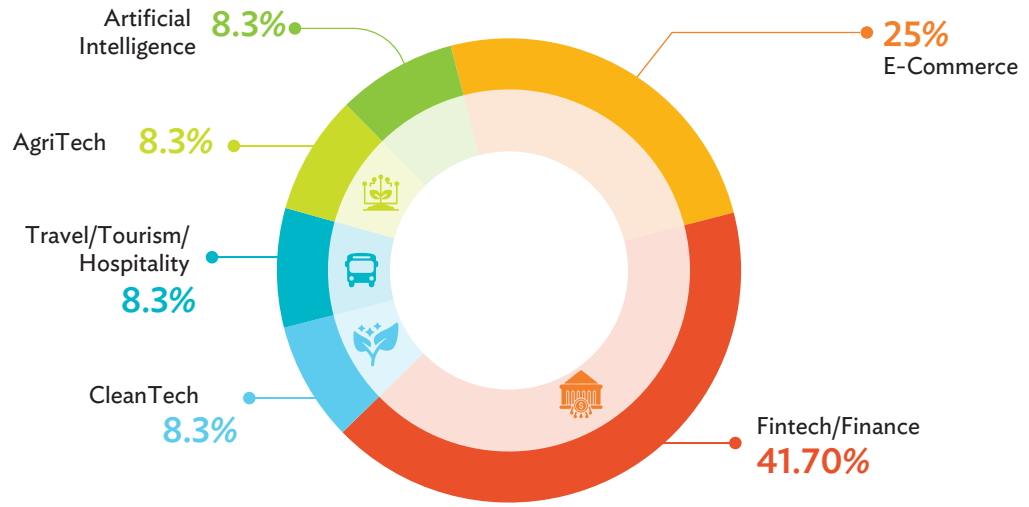
[163] A. Wahid. 2023. Tech-Startups from Seed to Sky. *Internews Pakistan. 25 July.* https://internews.pk/eng/2023/07/25/tech-startups-from-seed-to-sky/ *(accessed 2 February 2024).*

[164] N. Uderani. 2024. Pakistan Startup Funding Review | A Teaser. Insights by Data Darbar. https://insights.datadarbar.io/pakistan-startup-funding-review-a-teaser/ (accessed 29 August 2024).

[165] M. Khan. 2023. For Pakistan, B2B Startups Are the Future. Insights by Data Darbar. 21 February. https://insights.datadarbar.io/for-pakistan-b2b-startups-are-the-future/ (accessed 29 August 2024).

Analyzing the funding for different startup categories (Figure 68), we see that e-commerce and fintech took the major share, followed by singular deals belonging to sectors such as agritech, AI, and cleantech.

Figure 68: Pakistani Startup Category-Wise Funding



Source: Invest2Innovate.

It is interesting to note how the nature of the startups has changed over the years (Table 12 and Figure 69). In the early stages, the focus of Pakistani founders was on solving the end-user problems through the business-to-consumer model; following 2019, the founders discovered the untapped potential of the underserved SME sector in Pakistan. Since then, the focus has shifted to business-to-business startups. Not only have business-to-business startups obtained more funding—in gross and relative terms—but have also attracted some notable global investors, including Tiger Global, Kleiner Perkins, and Chimera Capital.[166]

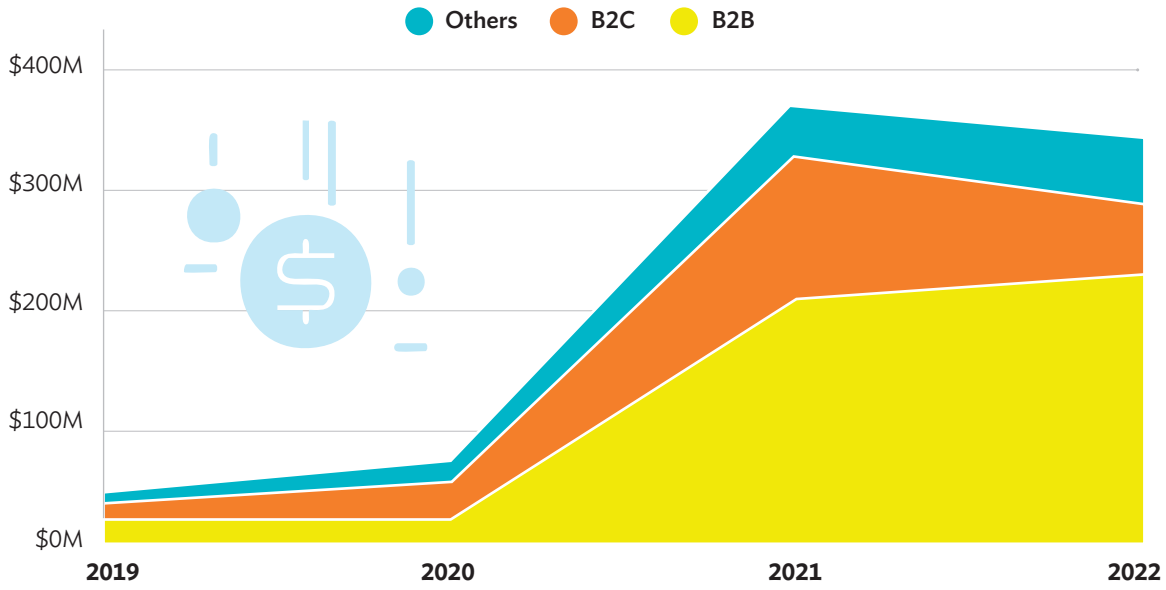
[166] Data Darbar. 2024. Tech & VC Landscape Pakistan 2023 | Report Insights by Data Darbar. 21 March. https://insights.datadarbar.io/tech-vc-landscape-pakistan-2023-report/ (accessed 22 March 2024).

Table 12: Pakistan Struggled to Attract Venture Capital Funding in 2023 Compared to Regional Peers

Economy	Capital Funding ($)
Indonesia	1.75 billion
Egypt	680 million
Nigeria	616 million
Philippines	190 million
Pakistan	76 million
Bangladesh	72 million

Source: Invest2Innovate.

Figure 69: Startup Funding Amounts by Segment



B2B = business-to-business, B2C = business-to-customer.
Source: Invest2Innovate.

Social Entrepreneurship

Social entrepreneurs in Pakistan have been encouraged by government-sponsored initiatives such as the Prime Minister's Innovation Award, which incentivizes innovation through tax benefits and financial support for research and development (Table 13).[167]

[167] National Innovation Award, Prime Minister's Youth Programme. https://www.pmyp.gov.pk/pmyphome/PMIL (accessed 11 February 2024).

Table 13: Select Social Enterprises in Pakistan

Category	Social Enterprise	Initiative
Building Women's Capacity	Circle Women Women's Digital League SEWEGAP Women's Hub	Leadership development for women entrepreneurs Capacity building in the electronic and online sectors Networking and support platform for professional women
Improving Women's Living Conditions	Ghonsla SRE Solutions	Insulation to reduce wood consumption and improve living conditions Affordable, high-quality solar products as an alternative to wood and kerosene
Providing Education, Counselling, and Support	Alvi Corporation Youth Engagement Services (YES) Network Pakistan MeraMaan	Funding Fatima Girls School for girls from poor backgrounds Training and engagement programs for youth, with a focus on social entrepreneurship Income generation through capacity-building workshops, providing free training in less-developed areas
Health and Health Care	DoctHERs Pharmagen Water	Affordable health care for marginalized women, employing female doctors Promoting preventive health care through clean and purified drinking water
Creating Jobs and Livelihood Development	WECREATE Alvi Corporation	Entrepreneurial community center supporting women-owned businesses Providing technical expertise for women's success in business
Giving Women a Voice in their Communities	Women Through Films	Making documentaries to empower women and conducting training sessions

Sources: Author's own research; UNESCAP. 2017. Activist to Entrepreneur: The Role of Social Enterprise in Supporting Women Empowerment in Pakistan. https://hdl.handle.net/20.500.12870/727.

Incubators and Accelerators

The venture capital landscape remains relatively underdeveloped. There is a pressing need to reinforce the fund of funds proposals previously suggested by Ignite. Additionally, the establishment of thematic incubation centers, such as a health-tech incubator at Aga Khan University, is imperative for targeted growth in specific sectors. This approach will not only streamline the incubation process but also ensure the development of specialized skills and solutions pertinent to critical areas like health care technology.

Youth entrepreneurship is also supported by a variety of organizations that cater to different stages of business development. Pakistan hosts a healthy number of approximately 98 entrepreneurship support organizations.[168]

The entrepreneurship support organization segment comprises 22 incubators, 13 accelerators, 18 co-working spaces, 24 university-based business incubation centers, as well as others including foundations and business associations. Some notable incubators include the National Incubation Centers in different cities, Plan9, Founders Institute, Accelerate Prosperity and Jump Start Pakistan. Some notable investors include +92 Ventures, Bunyad Seed, Fatima Gobi Ventures, i2i Ventures, Ignite National Technology Fund, Indus Valley Capital, Karandaaz Pakistan, Lakson Investments,

[168] Ignite National Technology Fund. 2023. Study for Assessment of Pakistan's Startup Ecosystem. 9 August. https://ignite.org.pk/wp-content/uploads/2018/06/Ignite-Startup-Report.pdf (accessed 30 August 2024).

Sarmayacar and Zayn Venture Capital. Notable accelerators active in Pakistan include Invest2Innovate, Innoventures Global, Jazzxlr8, Katalyst Labs, PlanX, Endeavour Pakistan, Seed Ventures, and Telenor Velocity.

Ignite National Technology Fund and the HEC also play a pivotal role by endorsing ICT ventures and advocating curricular reforms to promote social entrepreneurship. Examples of social enterprises (Table 12) are operating across the country to contribute toward the achievement of the respective United Nations Sustainable Development Goals. An in-depth assessment is still required on the future sustainability of these efforts as most were initiated through donor funding.

Enabling Digital Startups

Pakistan's start-up ecosystem is still nascent; for the market to grow, the international funds need to set up their offices in Pakistan, while local investors also need to collaborate with them in addition to creating their own funds. Pakistan's complex taxation system is a major barrier toward venture capital investment due, in part, to a potential 29% capital gains tax on firms' long-term and high-risk investments once their current exemption ends in 2025. Venture capital investments are generally long term and high risk, and investing in Pakistan is perceived as riskier than in other countries.

It is recommended that Pakistan offers a capital gains tax exemption facility to venture capital funds and private investments by foreigners into startups that commit to a minimum 20-year investment horizon. During this proposed period, any income generated from such investments should be exempt from capital gains tax for at least 7 years from the date of capital deployment, applicable to all registered startup investments anywhere in Pakistan.

A major reason for organizations to incorporate their respective holding companies outside of Pakistan is to reduce the impact of taxation at the time of directors' disposal of shares or exiting the shareholding completely. Taxation is currently imposed on such activity in Pakistan at a rate of 15% to 25%, which discourages companies from investing in the country (footnote 24). Although the establishment of the STZA would address some of these issues in theory, actual implementation remains much to be desired.

The current burden on Pakistan's salaried class, which is expected to pay income tax at more than 30% effective rates while their earnings, savings, and assets have depreciated by nearly 80% in US dollar terms since 2021, is resulting in a noticeable exodus of highly educated, skilled technical professionals from the country, thereby exacerbating the already dismal issues in hiring the right talent.[169] The ICT sector must look to renegotiate its payroll tax brackets with the government as it brings in the cheapest foreign exchange to the country while delivering a significant trade surplus and increases the long-term potential to enhance the country's global competitiveness in the ICT sector.

[169] Z. Nazir. 2023. Pakistan's Brain Drain Crisis Escalates as Thousands Leave. 25 May. DW https://www.dw.com/en/pakistans-brain-drain-crisis-escalates-as-thousands-leave/a-65733569 (accessed 30 August 2024).

4.10 Frontier Technologies

The United Nations Conference on Trade and Development has created a frontier technology readiness index that tracks how countries score in their capacity to use, adopt and adapt frontier technologies across five domains: ICT Deployment, Skills, R&D Activity, Industry Activity, and Access to Finance (Table 14).[170]

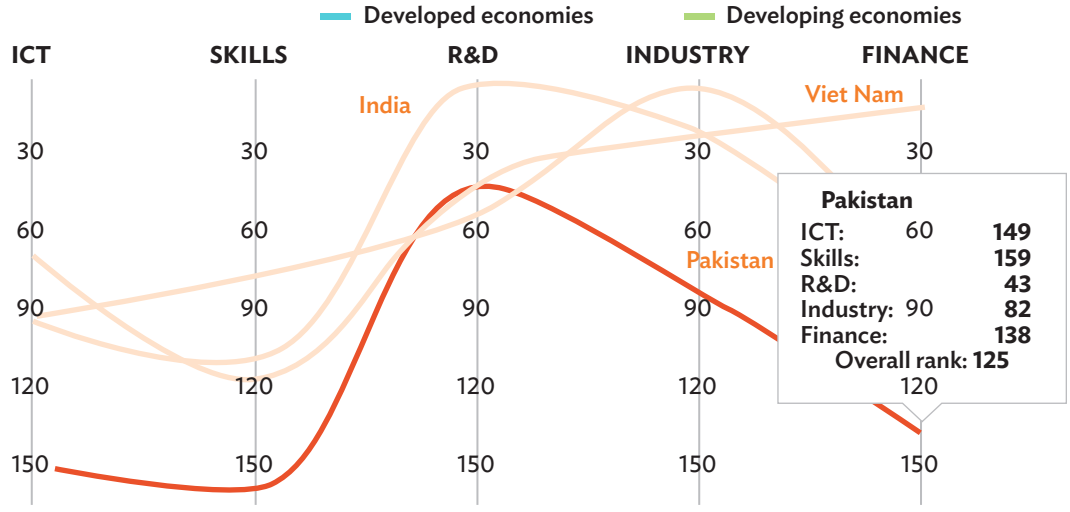
Table 14: Frontier Technologies

Internet of Things	Concentrated Solar Power	Blockchain	Nanotechnology
Big data	5G	Biofuels	Electric vehicles
Gene editing	Robotics	Drone technology	3D printing
Wind energy	Biogas and biomass	Green hydrogen	Solar PV
Artificial intelligence			

PV = photovoltaics
Source: World Bank.

Pakistan's cumulative rank is at 125th out of 166 countries on the 2023 Frontier Technology Readiness Index. Pakistan's rank deteriorated by two positions since 2021. In comparison to Pakistan, some of its regional peers have done better, while the others have performed similarly (Figures 70 and 71). India ranked at 46th on the index, Sri Lanka at 89th, while Bangladesh ranked at 126th.[171]

Figure 70: Pakistan's Rank on United Nations Conference on Trade and Development Frontier Technology Readiness Index 2023



ICT = information and communication technology, R&D = research and development.
Source: UNCTAD. 2023.

[170] UNCTADstat Data Centre. 2024. https://unctadstat.unctad.org/datacentre/reportInfo/US.FTRI (accessed 30 August 2024).
[171] United Nations Conference on Trade and Development (UNCTAD). 2023. Technology and Innovation Report 2023. 16 March. https://unctad.org/system/files/official-document/tir2023_en.pdf (accessed 20 September 2024).

Figure 71: Frontier Technologies for the Economy

How important are frontier technologies for the economy?

Frontier technologies already represent a $350 billion market, and one that by 2025 could grow to over $3.2 trillion.

Artificial Intelligence (AI)	Internet of Things (IoT)	Big Data	Blockchain
The AI market is expected to grow from $16 billion in 2017 to $191 billion in 2024.	The IoT market is expected to grow from $130 billion in 2018 to $1.5 trillion in 2025.	The big data market is expected to grow from $32 billion in 2017 to $157 billion in 2026.	The blockchain market is expected to grow from $708 million in 2017 to $61 billion in 2024.
403,596 publications between 1996 and 2018.	66,467 publications between 1996 and 2018.	73,957 publications between 1996 and 2018.	4,821 publications between 1996 and 2018.

What are the main types of frontier technologies?

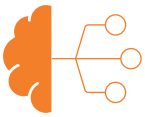
Digital technologies
The Metaverse, Internet of Things (IoT), blockchain, artificial intelligence (AI), big data, and quantum computing

Physical technologies
Autonomous driving, 3D printing and hardware innovations

Biological technologies
Bioprinting, organoids, genetic engineering, human augmentation and the brain-computer-interface

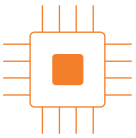
How fast are frontier technologies growing?

Growth of technologies as percent of total patents average growth, 2016-2020



Artificial intelligence
+718%

Big data
+699 %



Digital technologies
+172%

Cloud computing
+122%

Autonomous systems
+109%

Internet of Things (IoT)
–81%

Source: World Bank.

Chapter 5
Digital Society

Key Diagnostic Findings

- Pakistan's citizens face unequal access to technology, broadband, and digital skills due to geographical, financial, social, knowledge, and language constraints. Technology-driven programs require improved targeting and scale for transformative outcomes.
- Digital gender divides are caused by complex, compounded sociocultural, utility, and socioeconomic factors that need to be addressed through well-targeted future programming. Women in Pakistan are less likely to own a phone owing to these barriers. They also face systemic constraints because of cultural and social norms and limited mobility when they need access to government services. However, once online, women use digital resources actively, for social media, information and education, or communication with friends and family.
- Pakistan's education system at various levels does not adequately prepare students for evolving market dynamics and technological innovations. This results in a skills gap that lowers workforce quality and the country's competitiveness.
- Public awareness about digital threats, data protection, digital rights and responsibilities is low; this is because of limited literacy (including digital literacy), digital divides and low media coverage of issues around data privacy and security.
- Government-induced internet shutdowns in Pakistan are the highest in the region and have a significantly adverse financial impact (at approximately PRs1.3 billion per day as per a Pakistan Institute of Development Economics study).[172] In addition to businesses and the economy, internet freedom and foreign investment are also negatively impacted.
- Basic civic technology and participatory instruments, such as online redress mechanisms and citizen engagement smartphone apps are increasingly being used. However, more diverse and impactful uses of civic technology, such as online policy consultations, open data, participatory budgeting, petitioning, crowdfunding, online campaigns, etc., are not optimally explored in the civic space.
- Social innovation funds are growing and making positive contributions toward solving diverse social needs, but they are still few. Currently, crowdsourcing of funds is not allowed under SBP and SECP regulations, to prevent online fraud. In the future, blockchain, AI, and machine learning along with enhanced security technology tools are likely to enhance digital social innovation and enable national-level scale-up.
- Academia and civil society organizations working on diverse digital topics are growing but tend to be excluded from, or only symbolically involved in, digital policymaking processes.

[172] Pakistan Institute of Development Economics (PIDE). 2023. The Economic Cost of Internet Closure. https://file.pide.org.pk/pdfpideresearch/ig-02-the-economic-cost-of-internet-closure.pdf (accessed 1 July 2024).

Key Recommendations

The government needs to adopt a National Digital Inclusion Strategy with action plans, KPIs, and adequate resources to scale up inclusive technology adoption, access to services, and labor competitiveness among all segments of Pakistan's society by:

- improving data collection and analytics for better targeting of digital inclusion government programs and PPPs, in partnership with academia and civil society;
- advancing basic digital and financial literacy to boost inclusive connectivity, affordability via PPPs, local content and digital and financial literacy programs for vulnerable groups;
- promoting digital competency (local content creation, problem-solving, data protection, cyber resiliency) and market-responsive digital skills at all levels of Pakistan's education system;
- establishing provincial PPP-driven social innovation funds to incentivize solutions to local needs, e.g., local content development for different segments of society such as marginalized, rural dwellers, women, older people, people with disabilities, etc.;
- setting up a program for the upskilling/reskilling and empowerment of digital multipliers: teachers, civil society organizations (CSOs), local media, etc.;
- providing financing schemes for enhancing CSOs' and academia's role in analytics, policymaking, public education and practice of digital rights, ethics and responsibilities in Pakistan on diverse social topics, e.g., data protection, mis/disinformation, cyber-hygiene, child protection, etc.;
- leveraging partnerships with private sector, academia, civil society, and international partners;
- ensuring that the Digital Gender Inclusion Strategy 2024 elaborated by PTA and UNESCO is met with concrete gender-responsive budgeting and digital government, social and private sector programs (including access to affordable mobile devices), women-friendly digital/mobile local content development related to safe mobility, entrepreneurship, digital finance, e-commerce, employment, and maternal health, etc.;
- mainstreaming curricula on digital innovation and smart, market-responsive digital specialization programs in technical and vocational education and training and higher education for: STEM data science, AI, applied deep tech, digital entrepreneurship, legal and ethics issues (data protection, AI, etc.), cybersecurity, biotech, bio-med, green tech, space tech, etc. ; and
- publishing transparent criteria for internet shutdowns, to minimize their adverse impact on the overall economy as well as internet freedom, in general.

5.1 Overview

Digital Technology is Shaping our Lives

With notable speed, digital technology is not only influencing our governments and economic systems, but also permeating and, to a significant extent, shaping our lifestyles and social spaces. For example, viral use of social media platforms affects how people communicate, shop, and consume news. Misinformation, disinformation, and hate speech are new online social and political phenomena. Digital technology has infringed on electoral processes and has challenged our concepts of objectivity and truth, while children's exposure to online violence, such as cyberbullying, targeted exploitation, or extremism, is prompting new policies and parental coping mechanisms.

Therefore, in addition to the digital infrastructure, digital government, and the digital economy, the digital society is also being examined here to comprehensively diagnose the digital ecosystem in Pakistan. The chapter assesses how digital technologies are being perceived, adopted, and used by *ordinary people*. It also looks at enabling conditions, opportunities, benefits and risks brought upon by digital technologies in the social domain. This includes examining the extent to which digital rights and freedoms are being protected and practiced, the role of civil society, academia, and digital activism.

Digital society in Pakistan is characterized by inclusion, public trust, and civic engagement, driven by comprehensive national and provincial policies to improve connectivity, literacy, and equal access to resources. However, challenges, including the digital divide, particularly among marginalized groups, highlight the pressing need for targeted interventions. It requires stakeholders to continue collaborating and innovating to ensure that all segments of society benefit from the digital revolution, advancing Pakistan toward a more equitable and prosperous future.

Digital Society: International Comparisons

Pakistan's advancement in digital society indicators shows mixed results in global rankings such as the UN E-Participation Index (EPI) or in the annual Freedom on the Net survey conducted by Freedom House. For example, in the UN's 2024 EPI, which assesses how countries leverage online tools to facilitate interactions between the government and its people, Pakistan ranked 88th out of 193 countries, comparatively lower than regional peers such as Bangladesh (70th), India (61st), and Viet Nam (72nd).[173] In the 2023 Freedom on the Net survey, on a scale of 0 (least free) to 100 (most free), Pakistan scored 27 in the category "not free."[174]

The Inclusive Internet Index 2022 ranks Pakistan 79th out of 100 countries.[175] Despite scoring well on the "affordability" sub-indicator (relative to its own other indicators), Pakistan's ranking is lower than that of other Asian countries (Table 15).

Table 15: Comparison of Select Regional Countries—Inclusive Internet Index 2024

	Pakistan	India	Bangladesh	Viet Nam
Inclusive Internet Index	Rank out of 100 countries			
Availability	84	63	69	43
Affordability	63	13	64	61
Relevance	80	29	61	14
Readiness	80	35	63	51
Overall	79	50	64	46

Source: UN.

[173] United Nations. 2022. EGOVKB | United Nations > Data > Country Information. https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/128-Pakistan (accessed 2 September 2024).

[174] Freedom House. 2023. Pakistan: Freedom on the Net 2023 Country Report. https://freedomhouse.org/country/pakistan/freedom-net/2023 (accessed 2 September 2024).

[175] Economist Impact. 2022. *The Inclusive Internet Index 2022*. https://impact.economist.com/projects/inclusive-internet-index/2022/country/Pakistan (accessed 2 September 2024).

Public trust, attitudes, and technology usage influence the public's perceptions and beliefs about technology and, ultimately, their technology adoption behaviors. Digital tools and platforms also impact civic participation, transparency, accountability, and public engagement in governance and decision-making.

5.2 Digital Inclusion

> "An ideal digital society is one in which all residents have equal rights and access to information and relevant authorities to solve their daily problems and pursue well-being. It needs to be an inclusive space of mutual trust, rights, and responsibilities."[176]

This section examines the salient components that constitute the backbone of digital inclusion, covering mobile and internet connectivity as well as related initiatives to enhance digital skills and literacy. These components and instruments include mobile phone connections, availability of internet connections, and speed, although discussion on these issues have been dealt with in more detail in the chapter on Digital Infrastructure.

Tech and Youth in Pakistan

Pakistan's youth are more digitally connected than ever. According to the 2023 Census, 66.5% of Pakistan's population is under 30 years old, but 77 % of smartphone users are just 21 to 30 years old. Most of those who live in urban centers have access to smartphones and use social media. Gender differences also exist in the purpose and usage of mobile phones in Pakistan.[177] Male students make 5 to 10 calls per day, with female mobile users generally making fewer calls than males.[178]

Pakistan is a conservative society, and the survey findings indicate that one of the major purposes of using a mobile phone in Pakistan is socializing, which is otherwise not very encouraged socially. Interaction through anonymous accounts is, therefore, prevalent.

Another study conducted in 2018, focusing on students in Islamabad and Rawalpindi, contended that approximately 60% of the students in Pakistan are addicted to smartphone usage. This ratio is much higher than in other developed and developing countries worldwide (Figure 72).[179]

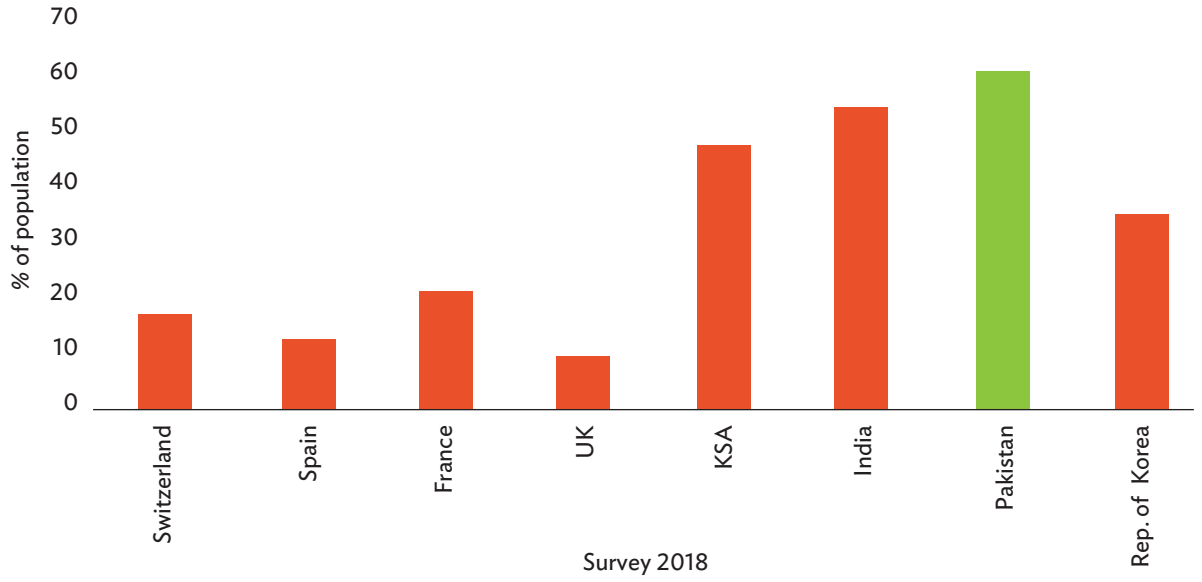
[176] K. Kusnadi, A. Purvantiningsih, and Y. Sudarso. 2023. Digital Society Based on Public Civility: An Alternative to Strengthen National Character. *Journal of Education Humaniora and Social Sciences. 6(1). pp. 328–42.*

[177] Z. Ali. 2013. Mobile Phone and Pakistani Youth: A Gender Perspective. *Journal of Telematics and Informatics. 1(2). pp. 59–68.*

[178] A. Ali and M. Ahmad. 2013. Geospatial Data Sharing in Pakistan; Possibilities and Options. Global Geospatial Conference. 2013 UNECA Conference Center at Addis Ababa, Ethiopia. doi: 10.13140/2.1.4291.9363

[179] M. T. Khalily et al. 2020. Smartphone Addiction and Its Associated Factors among Students in Twin Cities of Pakistan. *Journal of the Pakistan Medical Association. 70(8). pp. 1357–1362.*

Figure 72: Pakistan's Mobile Addiction Rate Surpasses Advanced Nations



KSA = Kingdom of Saudi Arabia, UK = United Kingdom.
Source: Journal of Pakistan Medical Association.

According to the PTA's Annual Report 2023–24, the number of mobile cellular subscribers reached 196 million, while broadband internet subscribers reached 143 million, including 139 million mobile broadband subscribers of which only 30 million (25%) are females. The use of mobile data in Pakistan grew from 2,493 petabytes in 2018 to 13,021 petabytes in 2024.

Use of Social Media

In line with those in other middle-income countries, Pakistan's popular social media platforms include WhatsApp, Facebook, Instagram, and TikTok. Popular internet discussions revolve around religion, politics, entertainment, socializing, academics, as well as professional.

In 2023, approximately 72 million social media users were registered in Pakistan. This accounts for 30% of the population. However, the data show significant gender disparity in social media usage across platforms with the exception of Instagram, suggesting greater comfort with and preference for the platform among female users (Table 16).

Table 16: Comparative Share of Social Media Users in Pakistan

Social Media	Total (million)	Male	Female	Gender Gap
Facebook	43.8	77%	23%	68.7
YouTube	71.7	72%	28%	59.2%
TikTok	16.51	83%	17%	78.5%
Instagram	12.95	66%	34%	45.9%

Source: Pakistan Telecommunication Authority.

A comparison with middle-income countries depicts similar trends as those manifested in Pakistan (Figure 73).[180]

Figure 73: Social Media Usage in Middle-Income Countries

WhatsApp and Facebook are the most-used media sites in middle-income countries

% of adults who say they ever use ...

Most common Least common

	WhatsApp	Facebook	TikTok	Instagram	Twitter (X)	Telegram
Brazil	90	73%	51%	63%	22%	28%
Mexico	83	75	41	42	30	27
Argentina	88	75	31	54	20	13
Kenya	64	62	37	24	21	17
South Africa	71	61	37	23	20	9
Indonesia	75	53	35	31	8	14
Nigeria	54	56	25	23	14	13
India	50	39	13	26	8	16
8-COUNTRY MEDIAN	**73**	**62**	**36**	**29**	**20**	**15**
US	**29**	**68**	**33**	**47**	**22**	**N/A**

Source: Pew Research. 2023.

[180] R. Wike et al. 2023. Attitudes on an Interconnected World: Exploring Views about International Engagement, Travel and Closeness to Others around the Globe. Pew Research Center. 6 December. https://www.pewresearch.org/global/wp-content/uploads/sites/2/2023/12/gap_2023.12.06_global-citizenship_report.pdf.

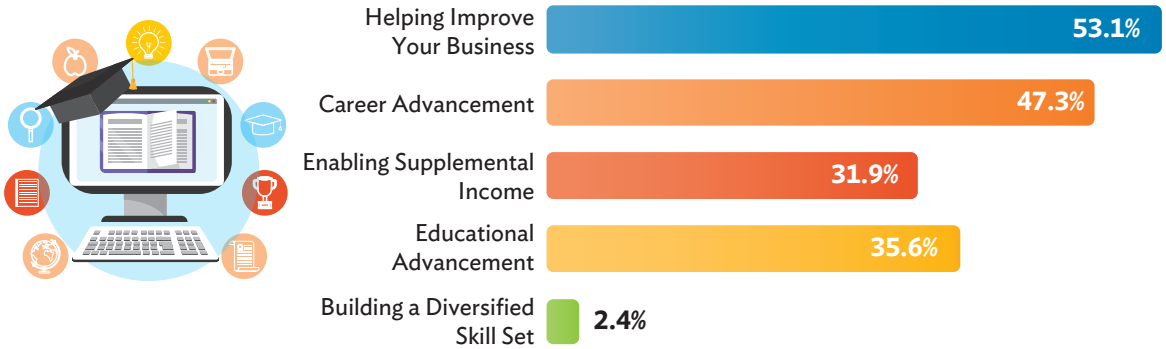
Updated granular data on digital gender dimensions, however, are not readily available. Most reports on women's attitudes and usage refer to the nationally representative Pakistan Social and Living Standards Measurement Survey (2019–2020) or sporadic qualitative studies. Given the dynamic pace of the sector, systematic collection and analysis of data on gender dimensions in the digital sector is important for continuous understanding and better targeting of related interventions.

Digital Skills and Digital Literacy

The Organisation for Economic Co-operation and Development defines digital literacy as the ability to access, understand, communicate, and create information through digital devices and technologies. Illiteracy is cited as the primary barrier in accessing digital platforms by only 22% of mobile phone users, while 16% identified a lack of digital skills as their main obstacle.[181]

Individuals proficient in digital skills earn higher incomes than those who are not (Figure 74). In Pakistan, the most significant disparity in earnings is seen among highly skilled individuals, particularly in the upper quantile (90th percentile). These wage differentials are evident across various factors such as education level, occupation, geographic location, age, and disability status of individuals.[182]

Figure 74: Digital Skills Required at Workplace



Source: Adapted from UNDP. 2024. *Doing Digital for Development*.

The paradigm shift toward digital literacy and its application in real-life situations is still missing in Pakistan. Amid a severe economic crisis characterized by skyrocketing inflation, increasing unemployment, and overwhelming debt, Pakistan urgently needs innovative approaches to develop and involve its predominantly youthful labor force effectively.[183] Community-based organizations,

[181] S. Ali. 2021. Digital Literacy in Pakistan: Where Do We Stand? 3 November. YourCommonwealth.org. https://yourcommonwealth.org/technology-innovation/digital-literacy-in-pakistan-where-do-we-stand/ (accessed 11 September 2024).

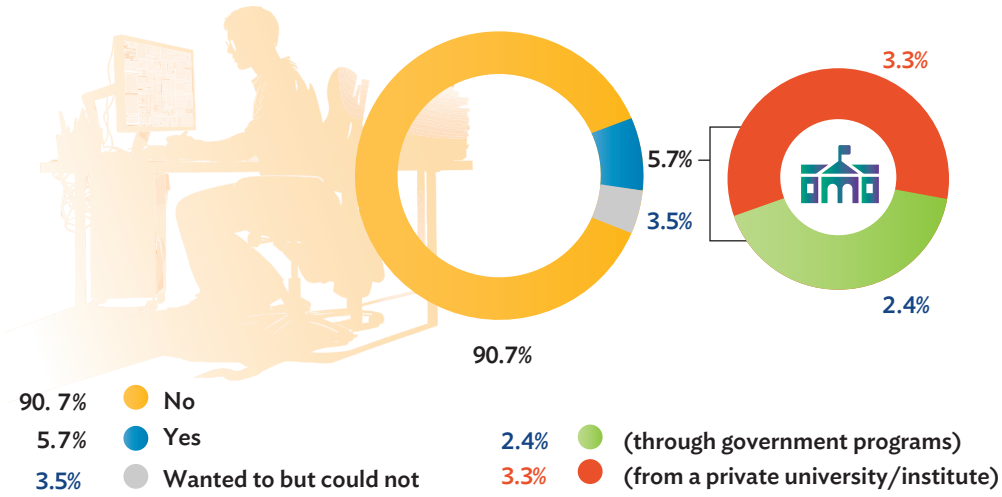
[182] W. Shair et al. 2022. The Impact of the Digital Divide on Wage Gaps among Individuals in Pakistan. *Journal of Policy Research. 8(4). pp. 97–107.*

[183] A. Khan, N. Rashid, and H. Fatima. 2023. The World Is Digital. When Will Pakistan Catch Up? DAWN. 5 June. https://www.dawn.com/news/1758070 (accessed 11 September 2024).

such as Code for Pakistan and TechJuice, organize workshops, seminars, and events to promote digital literacy and awareness at the grassroots level.

Partnerships with technology companies and NGOs can assist in developing user-friendly digital platforms. Schools and universities can also be integrated into digital literacy initiatives. Conducting workshops and training sessions for youth on using digital platforms for engagement will ignite outcomes (Figure 75). Engagement with youth-led organizations and community leaders is necessary to ensure inclusivity in digital initiatives. Public representatives must create a demand for implementing and evaluating digital engagement efforts for society.[184]

Figure 75: E-Learning Programs



Source: Adapted from UNDP. 2024. *Doing Digital for Development*.

UNICEF's Learning Passport program, in collaboration with Microsoft, designs digital education via providing high-quality, flexible learning aligned with local curricula catering to marginalized children, especially girls. Since its inception in September 2022, the pilot program has engaged over 4,000 students across 28 schools in Karachi, Hyderabad, Jamshoro, and Sukkur in Sindh province, offering digital content, educational applications in local languages, and a platform for students to learn at their own pace.[185] This initiative is a notable attempt in addressing the digital gender divide in Pakistan and in enhancing student learning outcomes.

[184] Imarat Institute of Policy Studies (IIPS). 2023. Enhancing Youth Involvement in Decision-Making and Public Services via Digital Technologies in Pakistan. Iqbal Blogs (blog). 9 August. https://iips.com.pk/enhancing-youth-involvement-in-decision-making-and-public-services-via-digital-technologies-in-pakistan/ (accessed 11 September 2024)

[185] S. Zuberi. 2024. The Digital Transformation of Public Education in Pakistan: UNICEF's Learning Passport Programme Empowers Students. UNICEF. 18 January. https://www.unicef.org/rosa/stories/digital-transformation-public-education-pakistan (accessed 2 September 2024).

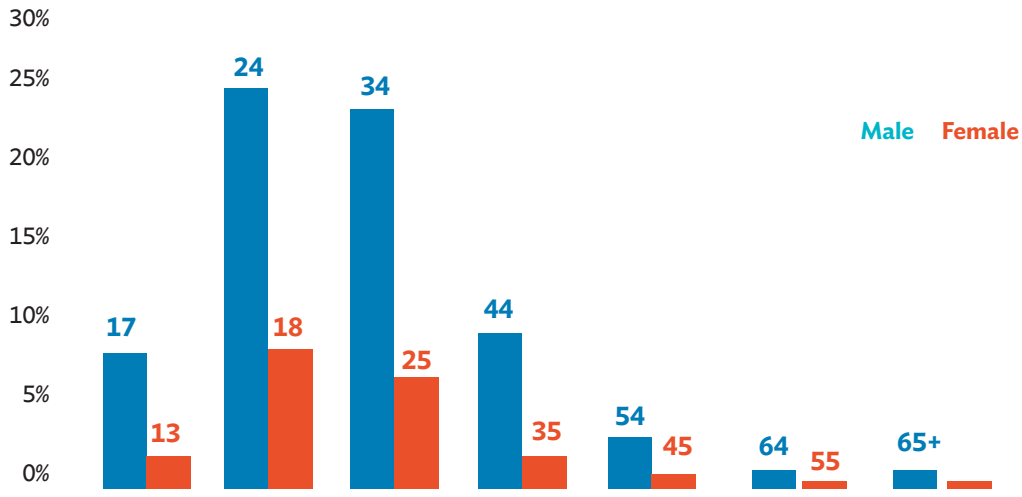
A survey conducted by the National Education Assessment System found that only 39% of students in rural areas had access to computers for educational purposes, highlighting disparities in access to digital education.[186] Moreover, only 3% of women in Pakistan are able to copy or move a file or folder on a computer, compared to 89% of women in Brunei Darussalam.[187]

Some local initiatives have also come forward to help. The CIRCLE digital literacy program is an initiative aimed at women from low-income households. It focuses on digital literacy, financial inclusion, and entrepreneurship. Supported by the Bill & Melinda Gates Foundation, UN Women, L'Oreal Fund for Women, and L'Oreal Pakistan, this program has expanded to over 80 cities in Pakistan. It includes training for women in internet use, social media, and essential digital skills, along with mentorship opportunities.[188]

Smartphones Could Support Digital Inclusion for Women

When it comes to gender parity in digital access, in 2024, women were disadvantaged (Figure 76), as only 38% own a mobile phone compared to 81% of men. Smartphone ownership is relatively low in Pakistan for both men (43%) and women (20%).

Figure 76: Number of Facebook Accounts According to Age and Gender



Source: NapoleonStats. 2023.

[186] CREDP. 2023. Bridging the Gap: The Impact of the Digital Divide on Education in Pakistan. Center for Research in Education and Development in Pakistan. 2 October. https://credp.com/bridging-the-gap-the-impact-of-the-digital-divide-on-education-in-pakistan/ (accessed 11 September 2024).

[187] A. Sey and N. Hafkin, eds. 2019. Taking Stock: Data and Evidence on Gender Equality in Digital Access, Skills and Leadership. United Nations University Institute on Computing and Society/International Telecommunications Union: Macau. https://sdghelpdesk.unescap.org/sites/default/files/2019-05/EQUALS-Research-Report-2019.pdf (accessed 2 September 2024).

[188] Digital Literacy Program CIRCLE. https://circlewomen.co/digital-literacy-project/ (accessed 2 September 2024).

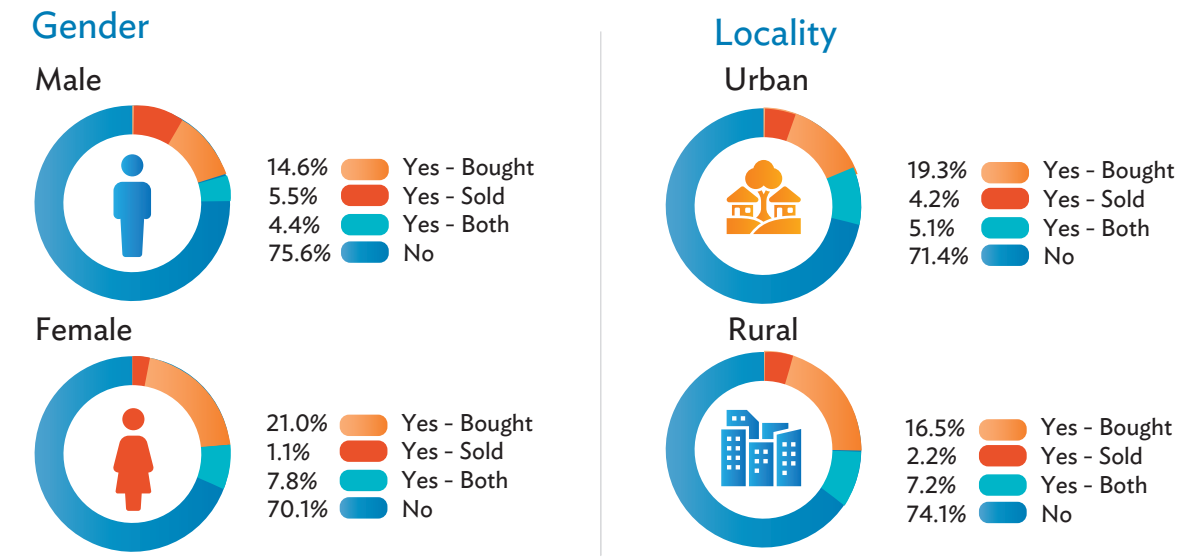
Comparatively speaking, based on the Global Gender Gap Report 2024, the Mobile Connectivity Index 2023, and the Inclusive Internet Index, Pakistan ranks among the lowest in terms of gender parity and digital inclusion.

The GSMA Mobile Gender Gap Report 2023 highlights that geography also matters regarding digital gender disparities (footnote 44).

Women's access to affordable mobile devices for internet usage is even lower in rural areas. For example, 37% of women use mobile phones in Khyber Pakhtunkhwa whereas only 16% do in Balochistan.[189] The WEF Global Gender Gap Report 2023 ranks Pakistan 145th out of 146 countries regarding gender equality, indicating significant disparities in access to education, economic participation, and digital inclusion (footnote 46).

Some of the key barriers to women's access to digital resources in Pakistan include "safety" issues, problems in obtaining CNIC, lack of access to SIM cards, illiteracy, absence of digital skills, sociocultural constraints, unaffordability, high taxes, and economic disparities (Figure 77). When women do have access to mobile phones and the internet, they tend to use them most for social media, information and education seeking, as well as for communicating with their families and friends (footnote 4). Social norms in Pakistan impose significant restrictions on women, who often have limited autonomy due to men's control over household decisions and access to communication devices (Figure 78). Women face taboos against having Facebook accounts or sharing personal information online in certain regions, exposing them to harassment risks.

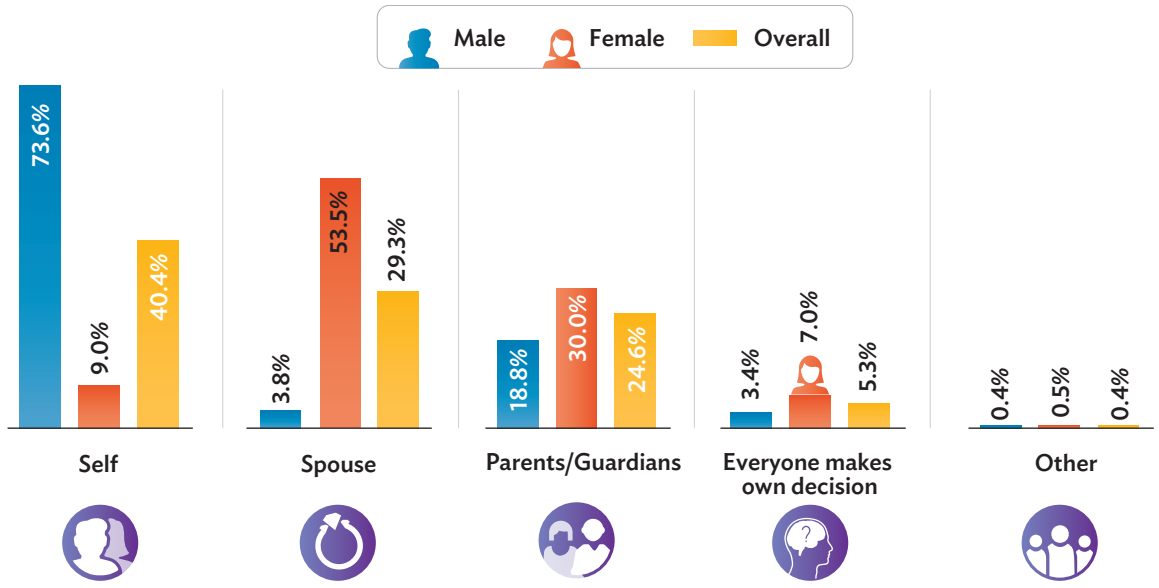
Figure 77: Use of Online Shopping Platforms



Source: Adapted from UNDP. 2024. *Doing Digital for Development*.

[189] S. Rana. 2023. Can Engaging the Grassroot Community Help in Closing the Digital Divide? Digital Rights Foundation. 28 April. https://digitalrightsfoundation.pk/can-engaging-the-grassroot-community-help-in-closing-the-digital-divide/ (accessed 2 September 2024).

Figure 78: Average Household Decision on Phone Ownership



Source: Adapted from UNDP. 2024. *Doing Digital for Development*.

PTA conducted an interactive voice response survey in collaboration with Jazz and Ufone that involved 103,832 respondents from across Pakistan. Almost half of the respondents (49%) reported that women in their families did not *own* a mobile phone. At least 20% fewer respondents reported that women in their households do not *use* mobile phones, compared to those who did. Around 35% stated that women in their households do not own a SIM in their name. Of those women who own SIM cards, 46% used mobile services. Women cited affordability as the major obstacle to internet usage. The findings indicate the need for more conducive policies to shape attitudes toward women's use of technology (footnote 4).

To navigate these challenges, women from lower-income backgrounds often resort to using aliases and unrelated profile pictures on social media for anonymity. While this may offer temporary liberation, journalist Sahabat Zakariya emphasizes the importance of female role models for long-term empowerment. Additionally, women's online activities are frequently monitored by family members, reflecting broader gender-based social surveillance in Pakistani society. Given societal intolerance and strict laws threatening free speech, women are particularly vulnerable to abuse for expressing dissenting opinions online.[190]

To effectively implement the Digital Gender Inclusion Strategy 2024, developed by PTA and UNESCO, it is essential to ensure alignment with tangible, gender-responsive actions. This includes dedicated budgeting and the design of inclusive digital government, social, and private sector programs. These efforts must prioritize access to affordable mobile devices, alongside the development of

[190] Q. Zaman. 2019. Missed Opportunities for Pakistan's Digital Society. Deutsche Welle. 27 March. https://akademie.dw.com/en/missed-opportunities-for-pakistans-digital-society/a-47885457 (accessed 2 September 2019).

women-friendly digital and mobile content that supports safe mobility, entrepreneurship, digital finance, e-commerce, employment, maternal health, and other key areas.

Digital innovation should be fully integrated into national curricula, with the establishment of forward-looking, market-aligned specialization tracks in technical and vocational education and training (TVET) as well as in higher education. Priority areas should include STEM, data science, AI, applied deep technologies, digital entrepreneurship, legal and ethical frameworks (such as data protection and AI governance), cybersecurity, biotechnology, biomedical technologies, green technologies, and space technologies.

In parallel, the government should establish and publish transparent criteria for internet shutdowns. This framework must aim to mitigate the economic and social impact of such disruptions while upholding principles of internet freedom and access to information.

Lack of Local Content

The production and promotion of local content in local and regional languages and dialects is vital for fostering digital inclusion. Despite various localized initiatives (such as UrduPoint), more efforts toward supporting localized content development are needed, particularly in currently untapped avenues (such as text-to-speech software in Urdu and other regional languages) making digital communication more inclusive and improving computer usability.

Age Dynamics

Age-wise, people in the 35+ age group participate less in digital activities than the 18–34 age group across all 14 activities examined in the analysis by GSMA. The Digital 2024: Pakistan report on social media use demographics in Pakistan shows that the 18–34 age group is the most active on social media. However, there is a noticeable decrease in social media usage as people age (footnote 99).

This calls for encouraging technology use among the older demographic to foster their digital inclusion and engagement. While specific data on digital literacy rates across age groups is not readily available, anecdotal evidence suggests that digital illiteracy is higher among older age groups.

Other Disparities

The digital divide in Pakistan goes beyond rural-urban gaps, extending to disparities among ethnic minorities, socioeconomic groups, and the underprivileged within urban centers. This divide has pronounced social effects, hindering marginalized groups' access to education and participation in the digital economy. Access to the internet is essential for engaging in critical discussions on platforms such as X (formerly Twitter) and YouTube. Deprivation of proper internet access diminishes digital literacy and the capacity for intellectual discourse.

The infrastructure digital divide is discussed separately under Chapter 2 (Digital Infrastructure).

5.3 Public Trust and Awareness

Misinformation and Fake News

Society must establish a structured response to combat manipulation tactics in the digital realm, especially in totalitarian regimes focusing on social media control.

Misinformation can influence public opinion and behavior, particularly on sensitive topics such as politics, religion, and health. It can potentially exacerbate social tensions and contribute to polarization.[191]

Various factors contribute to the spread of misinformation in Pakistan, including the lack of digital literacy among internet users, the proliferation of fake news websites, and the presence of malicious actors seeking to manipulate public discourse for political or financial gain.

Political polarization and religious sentiments in Pakistan exacerbate the challenges of dealing with the fallout of fake news. In 2018, various political parties came together to demand regulations for curbing fake news, while some media platforms (such as Geo News), introduced fact-checking tools on their websites to confirm the veracity of news and reports. Ultimately, this authenticity will become necessary, and propagandists can no longer blur the lines between facts and disinformation. Pakistan's government and private service providers have devised fact-checking mechanisms as well as tools such as *iVerify Pakistan* — a non-partisan fact-checking initiative of the Centre for Excellence in Journalism at the Institute of Business Administration University in Karachi, supported by the United Nations Development Programme (UNDP) — to counter disinformation, but the issue needs to be addressed at the legislative level.[192] According to findings, only one in five journalists has undergone fact-checking training, although 90% of them agree that fake news negatively impacts their credibility and profession.[193]

Fake news is as old as journalism itself, but the quantum of inaccurate material has increased in the era of social media. In Pakistan, X (formerly Twitter) and Facebook carry a sizeable amount of fake news relating to international relations, religion, politics and the economy. According to a study between July

[191] P. Otieno. 2024. The Impact of Social Media on Political Polarization. *Journal of Communication. 4(1). pp. 56–68.*

[192] IVerify Pakistan. 2023. About Us - IVerify Pakistan 19 December. https://pak.i-verify.org/about-us/ (accessed 2 September 2024).

[193] W. Naeem, and A. Rehmat. 2023. Review of Countering Disinformation in Pakistan: Lessons and Recommendations for Digital Journalism. Freedom Network. https://www.mediasupport.org/wp-content/uploads/2023/01/Countering-Disinformation-in-Pakistan-2023.pdf.

2018 and September 2018, 18 fake news items appeared on different media that attracted 40,688 likes, 19,522 shares, and 14,191 comments.[194]

In India, numerous fact-checking service providers (mostly International Fact-Checking Network [195] signatories) have focused attention to specialized areas. For instance, Alt News concentrates on verifying political disinformation, while D-FRAC specializes in detecting hate speech. Others, such as First Check and THIP, exclusively address medical misinformation. Furthermore, platforms such as Boom, NewsMeter, Factly, and Vishwas cater to regional audiences. Similarly in the US, PolitiFact—a fact-checking website compliant with the International Fact-Checking Network—has gained prominence for scrutinizing claims made by public officials and politicians, carving out a niche for itself.

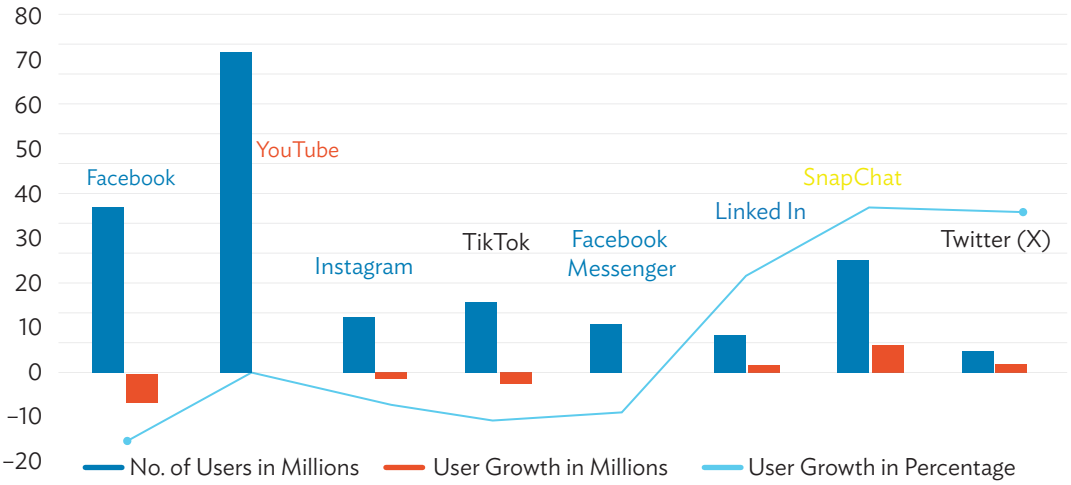
Impact of Social Media Platforms

Social media users are likely to be younger individuals. At the same time, non-users may include segments of the population with limited internet access or those less inclined toward these emerging digital trends.

The declining trend in usage of relatively mature platforms such as Facebook (Figure 79) and the substantial growth in LinkedIn, Snapchat, and X (formerly Twitter) users indicate a move toward professional networking and platforms prioritizing transient, instant content. This shift suggests that Pakistani users are increasingly seeking value in connectivity that aligns with their career aspirations.

Analytically, this trend may reflect a broader change in habits. Users are gravitating toward platforms that offer more direct engagement and networking, possibly driven by the entrepreneurial dynamics of the younger population.

Figure 79: Number and Growth of Users on Various Social Media Platforms



Source: Pakistan Telecommunication Authority.

[194] A. Dahri, S. Massan, and A. Maitlo. 2020. Usability of eGovernance Application for Citizens of Pakistan. *3C Tecnología_Glosas de Innovación Aplicadas a La Pyme*. April (2020). pp. 256–77.

[195] International Fact-Checking Network (IFCN). https://www.poynter.org/ifcn/ (accessed 2 September 2024).

Awareness of Use by People with Disabilities and Safe-and-Responsible Use

Technology companies and developers are incorporating accessibility features into digital tools and platforms to make them more inclusive and user-friendly for people with physical disabilities. These features may include screen readers, voice commands, magnification options, and alternative input methods. The Access to Information and Communication Technology for Persons with Disabilities project, as implemented by the Pakistan Telecommunication Authority (PTA), focuses on empowering individuals with disabilities to leverage digital technologies for education, employment, and social inclusion.[196]

The PTA conducts public awareness campaigns to educate citizens about the safe and responsible use of digital technologies. Organizations such as Digital Pakistan Foundation and Ignite National Technology Fund offer digital skills training programs to equip individuals with the knowledge and skills needed to navigate digital platforms and tools effectively.

According to a survey by the Pakistan Cyber Security Report, 56% of Pakistanis reported experiencing cyberattacks or security breaches in 2020, highlighting the need for improved awareness and education on digital security. Apart from private users, according to PTA, among the key sectors for targeted cybersecurity threats included Internet backbone infrastructures, health care entities, and organizations affiliated with the government.

Data privacy gained traction in the wealthiest societies as usage and awareness about the impacts of technology became a concern for individuals (footnote 79). Pakistan has begun raising public awareness about data privacy. The Personal Data Protection Act 2023 was presented in the Senate on 13 February 2023.

Awareness of Hacktivism

Hactivism encompass various motivations and objectives, ranging from loosely connected hacktivist groups seeking to deface symbols to more coordinated attacks. It can involve leaking sensitive information such as bank records, contact details, and identification documents of government officials, judges and security personnel. Disclosing officials' personal information potentially endangers lives and constitutes a significant breach of privacy.[197]

Risks and Threats

Pakistan confronts a significant challenge with the rise of digital hate and extremism, largely propagated via social media. This divisive trend undermines social cohesion and political stability, necessitating a robust response. The Violent Extremism Prevention Unit of Islamabad Police, established in 2023, identified over 700 accounts responsible for disseminating religious and terrorism-related content in

[196] V. Kaziukonis. 2024. Five Data Privacy Trends to Watch in 2024. Forbes Technology Council.12 August. https://www.forbes.com/councils/forbestechcouncil/2024/01/29/five-data-privacy-trends-to-watch-in-2024/ (accessed 11 September 2024).

[197] A. Niazi. 2023. Breach of Privacy. DAWN. 24 February. https://www.dawn.com/news/1738862 (accessed 12 September 2024).

the 6 months prior to August 2023. Collaborating with the Federal Investigation Agency, the unit acted against more than 200 accounts propagating religious, sectarian, and linguistic hatred.[198]

The proliferation of online hate speech in Pakistan has surged dramatically, increasing 400-fold, covering various forms such as racism, xenophobia, gender-based animosity, and religious intolerance, often spread through memes, text, images, and videos. Despite efforts to address the issue, instances of hate-driven violence persist, indicating a lack of a comprehensive strategy to counter misinformation and polarization. This underscores the significant role of social media in shaping political narratives and emphasizes the urgent need to tackle and mitigate online hate, which poses a substantial threat to Pakistan's social cohesion and political stability.[199]

Ethical Concerns

Ethical dilemmas arising from using emerging technologies such as AI and facial recognition can lead to public mistrust and calls for greater technology governance, transparency and accountability.

Faisal Nasr (an advocate, research scientist, futurist, and professor) suggests that ethical advancements in algorithm usage could be achieved through a reformed legal framework and global governance system to prevent unethical practices. Nasr also addressed the complexity of improving the economic stability of the news media, which requires coordination among government branches and private sector involvement to enhance trust in democratic institutions and promote self-expression through social media platforms.[200]

5.4 Emerging Opportunities

Health

Digital technologies have immensely improved the health sector possibilities around the world. In Pakistan, trends in telemedicine and telehealth systems are growing. Patients are being remotely connected to doctors abroad for advice and even treatment, which can bring benefits in lowering the treatment price or having access to medical expertise.

Digitally equipped mobile clinics and data collection by community health practitioners through handheld devices offer greater access to patients in deep rural areas. At the same time, digital apps in the mental health sector also provide new opportunities to encourage openness and improved patient communication.[201] Apart from advancements in digitalizing the formal health sector, in the future, the

[198] J. Ikram. 2023. Islamabad Police Seek Closure of over 700 Social Media Accounts. DAWN.COM. 21 August. https://www.dawn.com/news/1771255 (accessed 2 September 2024).

[199] South Asia Press. 2023. Dark Side of Social Media in Pakistan: Pressing Challenges and Prospects. 17 September. https://www.southasiapress.org/2023/09/17/dark-side-of-social-media-in-pakistan-pressing-challenges-and-prospects/ (accessed 2 September 2024).

[200] E. A. Vogels, R. Lee, and J. Anderson. 2020. The Innovations These Experts Predict by 2030. Pew Research Center: Internet, Science & Tech. June 30. https://www.pewresearch.org/internet/2020/06/30/innovations-these-experts-predict-by-2030/ (accessed 2 September 2024).

[201] K. A. Schulman. 2023. Faculty Profile. https://www.gsb.stanford.edu/faculty-research/faculty/kevin-schulman (accessed 12 September 2024).

Government of Pakistan, in partnership with the private sector, startups, and social innovators, must encourage and stimulate diverse forms of innovation to make health care more inclusive, accessible, and affordable.

Education

The trends in society due to rapidly changing technology can also be seen in the education sector. People, as well as institutions, are shifting toward remote learning platforms with individual preferences. Learning methods have undergone great transformation due to a wide variety of online educational tools and courses.

In Pakistan, online primary and secondary education got a boost during the coronavirus disease (COVID-19) pandemic. However, the salient initiatives faced challenges due to the low quality and speed of mobile internet and the lack of availability of internet devices. These challenges were in addition to the usual challenges of physically unsupervised online education of children worldwide. Consequently, with the end of COVID-19 restrictions, online education initiatives started waning as well.

On the other hand, college- and university-level students, as well as young professionals, have benefitted more by taking online classes. The trend is on an upward trajectory even now, although the challenges of low-quality internet and unaffordable internet devices persist.[202]

Social Connectivity

Communities and groups can now achieve their social goals by enticing support from like-minded people. Raising a voice favoring peaceful people and healthy communities will become more enriching and accessible (Figure 80).

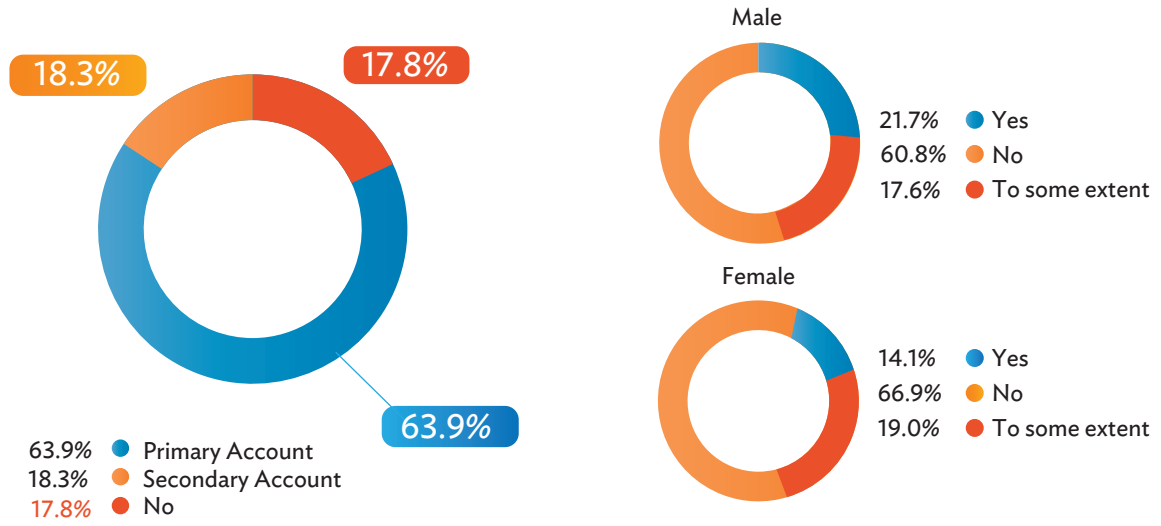
Pakistan has seen the benefits of social connectivity for marginalized people and underserved areas. The Kalash Tribe of Chitral has created an impressive social bond with the rest of the country through highlights in social media. For the first time in history, a Kalash representative was elected as a member of the respective provincial assembly. The Kalash community continues to attract tourists from across Pakistan by showcasing its rich and ancient culture through digital media. Many other such stories are in the offing in Pakistan for the future.

Artur Serra (deputy director of i2CQT Foundation and research director of Citilab in Catalonia, Spain), who coined the term "Techlash", believes that the social benefits of civic technologies will outweigh the threats. Around 4 billion people are now connected to the same infrastructure, namely the internet, which will create conditions for regions and groups with massive opportunities for growth and creativity.

Pakistan has also witnessed impressive growth in TV channels and websites. CSOs, commercial enterprises, and literary and creative platforms have successfully replaced the traditional patterns of association. This represents the potential to blur the political, religious, and racial tendencies for a better, peaceful, and harmonious society.

[202] Khalid et al. 2018. Promising Digital University: A Pivotal Need for Higher Education Transformation. *International Journal of Management in Education. January (2018). pp.18–34.*

Figure 80: Social Media and Political Activism



Source: Adapted from UNDP. 2024. *Doing Digital for Development*.

Legal Justice

The rise of social media platforms as virtual communication spaces has transformed interpersonal connections in Pakistan. Families separated by distance find comfort in the instant connectivity offered by platforms such as WhatsApp and Facebook, enabling them to share moments, thoughts, and emotions across geographical boundaries. Beyond personal interactions, the digital sphere has reshaped public discourse, with real-time thought exchanges becoming a defining feature of social media. This phenomenon fosters a collective identity among Pakistan's citizens, transcending traditional barriers.

In the legal justice domain, technology has brought good news for relief seekers as experiments with e-courts have been successful. Digital access to justice is a reality in legal domains such as family laws where e-courts work to resolve childcare, divorce and custody cases. In a country such as Pakistan, access to justice is needed the most at the grassroots level, and the digital revolution can improve the situation, especially for the distressed and downtrodden.

Civic Engagement

Concurrently, civic entrepreneurship and engagement are instrumental in driving social accountability and community development. These encompass a range of activities that enable citizens to connect with relevant governments and institutions transparently and accountably.

For example, introducing the Technology Transfer for Sustainable Industrial Development program in Pakistan, led by SDPI, facilitated a dialogue between industry representatives and government bodies. This resulted in specific provisions in national legislation regarding pollution taxes and environmental standards.[203]

[203] H. Khan. 1998. Implementing NEQS Pakistan's Experience in Industrial Pollution Control. *SDPI Working Paper Series. No. 38. Sustainable Development Policy Institute.* https://sdpi.org/sdpiweb/publications/files/W38-Implementing%20NEQS.pdf.

Through such efforts, civic entrepreneurs have created new policy spaces and encouraged domestic businesses to focus on environmental technologies, contributing to sustainable industrial development. Table 17 provides the contributions of select organizations in promoting civic engagement and relevant capacity building.

Table 17: Key Organizations Advancing Civic Engagement and Capacity Building

Organization	Focus Areas	Activities and Initiatives
Citizens for Good Governance	Strengthening the capacity of civil society organizations, journalists, social media activists, and citizens for efficient local governance	Promoting efficient, transparent, responsive, and accountable local governments Focusing on informed debates, dialogues, and technical support for effective engagement with local governments and other institutions
Aga Khan Foundation	Community-driven development approach supporting local communities	Supporting communities to address challenges through participatory planning involving women, youth, and other key groups Creating local development strategies Enhancing civil society organizations, particularly those focused on women and gender equality
Code for Pakistan	Strengthening civic engagement and promoting public transparency and accountability	Conducting fellowship programs Developing open-source civic applications Organizing workshops, hackathons, and meetups to promote citizen contributions to open and participatory governance
Bytes for All, Pakistan	Promotes the use of technology for sustainable development, democracy, and social justice	Engaging in research to inform and support evidence-based policy advocacy Implementing field projects and enhancing the capabilities of citizens and civil society organizations
Digital Rights Foundation	Focus on enhancing digital rights and security for women, emphasizing policy advocacy and awareness against cyber harassment	Enhancing privacy awareness in digital space, through research, monitoring, and reporting surveillance tactics, advocating stronger legal privacy protections The foundation is actively opposing restrictive censorship policies, proposing solutions to safeguard digital freedoms The foundation introduced the Cyber Harassment Helpline that offers legal assistance and counselling to individuals facing online harassment
SDPI's Center for Ecological Sustainability and Circular Economy	Carrying out research in evidence-based policy and building capacity in climate and environmental technologies (in collaboration with Nestle, PepsiCo, and Cargill).	Using digital means to identify opportunities for waste reduction, resource efficiency, and closed-loop systems that can promote long-term economic growth. It involves analyzing circular business models, product design, and resource management practices that aid in waste reduction, resource conservation, and environmental impact reduction.

SDPI = Sustainable Development Policy Institute.

Source: Author.

Traditionally, civil society organizations, political activists, and rights activists have conducted campaigns that involved physical presence and person-to-person interaction. The new era of digital connectivity is data-driven and virtual, and it can reduce barriers to social and civic innovation. Challenges related to human capital, networking, fundraising, and advocacy have now become more responsive and results-oriented.[204]

Research Development and Innovation

A strong RDI program will involve planning, funding, research, development, knowledge sharing, evaluation, and talent development. RDI is crucial to solving future digital challenges, continuously strengthening the digital-ready workforce, and building a secure, inclusive digital future.

5.5 Digital Rights and Internet Freedom

Internet Freedom

Freedom on the Net stems from international human rights standards, particularly Article 19 of the Universal Declaration of Human Rights which upholds everyone having the right to freedom of opinion and expression. On a scale of 0 (not free) to 100 (most free), the Freedom House Survey scores countries on the free flow of information, protection of free expression, access to information, privacy rights, rights-enabling online environment, and freedom from legal repercussions arising from online activities. Pakistan's score in 2024 was 27 out of 100.

Article 14 of the Constitution of Pakistan guarantees the right to privacy to its citizens. The 2017 Right of Access to Information Act empowers citizens to access any information from the government.[205] Although contradictory, the Government of Pakistan regulates online space through the Prevention of Electronic Crimes Act, 2016 (PECA), which allows law enforcement agencies to monitor cyberspace extensively. PTA has broad powers under Section 37 of PECA to block and remove content based on ambiguous criteria, often justifying these actions on the pretext that certain platforms promote "vulgarity" or "corruption of youth". The laws grant the Federal Investigation Agency powers when it comes to surveillance on social media and to retain data and seize digital tools.[206]

In addition to legal measures, the state has redefined the role of the National Database and Registration Authority (NADRA). The agency is a national database, but it has been empowered to provide citizen's data to the government when demanded.

[204] J. Jahani. 2023. *Data Driven Decisions*. https://jahaniandassociates.com/data-driven-decisions-a-book-by-joshua-jahani/ (accessed 12 September 2024).

[205] Government of Pakistan. 2017. The Right of Access to Information Act, 2017. https://pakistancode.gov.pk/pdffiles/administrator3599d65bc5ecb2dd1915d04c7db91e8f.pdf (accessed 2 September 2024).

[206] Government of Pakistan. 2016. Prevention of Electronic Crimes Act, 2016. https://www.na.gov.pk/uploads/documents/1470910659_707.pdf (accessed 2 September 2024).

Although business as usual goes on, there are disruptions in access to digital information when exigencies demand. It is mostly the judiciary, media, and NGOs that raise voices for internet freedom and digital rights, but their role in promoting and protecting digital rights is minimal.[207]

"Open Data" is a collection of easily accessible data for general use without restrictions.[208] Open data systems impact people's lives in three major ways: they make the government well-organized, empower the residents by directly affecting their lives, and create economic opportunities for the people.

The model suits Pakistan as well. It allows the government to fight society's ills in real-time and provides reasonable solutions to problems such as corruption and terrorism. Public sector organizations are the biggest source of open data sets, and Pakistan's level of openness needs improvement.[209]

Activism for Digital Rights

CSOs in Pakistan are engaged in research, advocacy, and capacity building to interact with policymakers, raise public awareness, and address internet access issues, particularly for women and rural areas. Their initiatives underscore the importance of inclusive policies, digital literacy programs, bridging the digital gap, and ensuring technological progress aligns with human rights principles. These organizations stress the significance of securing equal and affordable internet access for all citizens, regardless of location or socioeconomic status. They also advocate for a responsible and ethical approach to digital development, emphasizing the importance of respecting and protecting individual privacy, freedom of expression, and other fundamental rights.

Social media users in developing countries see the respective platforms as facilitators. Social media platforms provide a space for political mobilization and activism in Pakistan. Political and rights activism-based campaigns such as *Aurat March* gained momentum through social media campaigns.[210] Platforms such as Facebook and X (formerly Twitter) have become integral tools for political advertising and voter outreach.[211] This raises concerns about freedom of expression and the stifling of dissenting voices.[212]

In Pakistan, the introduction of the 2016 PECA Act focused on strengthening digital safety. Pakistan's civil society is actively participating in dialogue to advocate for digital rights, with a strong focus on issues such as data protection, privacy, and ensuring widespread internet access (Table 18). This effort underscores a commitment to balance regulatory measures with the preservation of digital liberties.

---

207 Z. S. Ahmed et al. 2023. Digital Authoritarianism and Activism for Digital Rights in Pakistan. European Center for Populism Studies. 20 July. https://www.populismstudies.org/digital-authoritarianism-and-activism-for-digital-rights-in-pakistan/ (accessed 12 September 2024).

208 T. Shabbir, M. Nadeemullah, and S. Memon. 2020. Uses and Impact of 'Open Data' Technology for Developing Social Sector in Pakistan. *Pakistan Journal for Multi-Disciplinary Research. 1(1). pp. 50–64.*

209 M. M. Khurshid et al. 2019. Diffusion of Big Open Data Policy Innovation in Government and Public Bodies in Pakistan. In: I. Bajwa, F. Kamareddine, and A. Costa (eds) *Intelligent Technologies and Applications. INTAP 2018. Communications in Computer and Information Science, vol 932. Springer, Singapore.* https://doi.org/10.1007/978-981-13-6052-7_28.

210 A. Bukhari. 2021. The Media and Aurat March: Friends or Foes? *Paradigm Shift. 7 May.* https://www.paradigmshift.com.pk/media-and-aurat-march/ *(accessed 12 September 2024).*

211 A. Mir, T. Mitts, and P. Staniland. 2023. Political Coalitions and Social Media: Evidence from Pakistan. *Perspectives on Politics.* 21(4). pp. 1337–56.

212 Amnesty International. 2019. Freedom of Expression. https://www.amnesty.org/en/what-we-do/freedom-of-expression/ (accessed 12 September 2024).

Table 18: Select Organizations Working on Digital Rights in Pakistan

Organization	Focus Areas	Activities
Digital Rights Foundation	Promotion of digital rights in Pakistan	Addresses issues such as online harassment, data security, freedom of speech, and women's digital rights. Conducts research, offers legal support, and runs awareness programs on digital security
Bolo Bhi	Internet freedom, digital security, open access	Engages in policy advocacy, research, and digital literacy initiatives. Raises public awareness on topics such as internet censorship, surveillance, and privacy
Media Matters for Democracy	Freedom of expression, digital rights, media	Focuses on research, policy advocacy on internet governance regulation and initiatives to enhance online civic spaces, digital democracy, and digital media literacy
Internet Policy Observatory Pakistan	Recommendations on data privacy and monitoring	Offers policy recommendations on data privacy, monitoring, and censorship. Tracks internet governance challenges in Pakistan
Privacy International	Advocacy for privacy rights, opposition to monitoring	Globally advocates for privacy rights and opposes intrusive monitoring practices, including activities in Pakistan

Source: Author.

Role of Civil Society Organizations

There are an estimated 45,000 active nonprofit organizations in Pakistan, with over 6 million members and a quarter-million staff members. The sector engages in diverse activities, from performing religious rites to lobbying for civic amenities, and running neighborhood vocational centers to national human rights advocacy organizations.[213]

These CSOs have played a crucial role in shaping public discourse, stressing the importance of unrestricted information flow through digital channels for a well-informed society and fair electoral processes. They have underscored instances of digital platform suppression, particularly when conducted without transparency, and highlighted the importance of adhering to due legal processes, which uphold Pakistan's international law commitments.[214]

These CSOs have voiced concern regarding the escalating occurrences of internet shutdowns and the blocking of social media platforms in Pakistan. They have emphasized that these actions violate fundamental rights such as freedom of expression and access to information and establish a precedent of hindering genuine political dialogue and diverse voices in the nation.

Politics in the Digital Age

The fear of imprisonment for expressing dissenting ideas is pervasive due to cultural acceptance of surveillance. Recent crackdowns have prompted individuals to deactivate their social media accounts, fearing privacy breaches and government intervention. Consequently, content generators prioritize

[213] Asian Development Bank. 2022. *Overview of CSOs in Pakistan.*

[214] C. Wallraven, C. Liu, and A. Ross, eds. 2024. *Pattern Recognition and Artificial Intelligence. In Proceedings, Part I. Singapore: Springer.* https://link.springer.com/book/9789819787012

entertainment topics such as fashion and travel to avoid censorship risks. However, this focus on non-controversial content perpetuates conservative social norms and lacks innovation.

Social media can exacerbate ethnic and sectarian tensions by spreading hate speech, inflammatory rhetoric, and divisive narratives. This can fuel communal violence and contribute to social instability.[215] Pakistan's government has the ability to control and censor social media, including blocking access to certain websites and monitoring online activities.

5.6 Barriers

Pakistan is eager to embrace new technology. Public and private sector organizations have operationalized many digital services for the public, and it is expected that both the public and private sectors can join hands in the journey toward a digital society.[216]

Fear of Unemployment

A digital society will ultimately introduce workplace automation, reducing employment opportunities, which can be a huge challenge in a highly populated country such as Pakistan.

Lack of Public Trust, Attitude, and Use of Technology

Trust is essential for the adoption of digital technologies and online transactions. Financial fraud and scams affect individuals, businesses, and financial institutions. Online scams and fraudulent transactions are reported nationwide.[217] Lack of trust in online platforms and payment systems is a significant barrier to the growth of e-commerce and digital payments in Pakistan.

According to the Global Cybersecurity Index, Pakistan ranks relatively low regarding cybersecurity preparedness and resilience (Table 2). The country faces cybersecurity risks such as malware attacks, data breaches, and cyberfraud, which can undermine trust in digital systems and deter organizations from embracing digital transformation initiatives.[218]

Pakistan needs a plan and vision that every unit of governance in the respective governments leads the digital activities in line with their departmental needs and local requirements.

Policy and Regulatory Barriers

Technology is liberating individuals. The big question is whether the government and the institutions will allow them to liberate and develop a shared objective. Policy barriers can be both national and international. Inadequate or inconsistent data privacy and protection laws can impede digital

[215] Author's own research.

[216] U. Ahmad Siddiqui and W. Mahmood. 2021. E-Government in Pakistan—Implementation and Challenges. *International Journal of Education and Management Engineering*. 11. pp. 10–19. 10.5815/ijeme.2021.06.02.

[217] Economic Crime Wing. Federal Investigation Agency. 2022. https://www.fia.gov.pk/ecw (accessed 12 September 2024).

[218] ITU. 2021. *Measuring Digital Development: Facts and Figures 2021. International Telecommunication Union.* https://www.itu.int/itu-d/reports/statistics/facts-figures-2021/ *(accessed 12 September 2024).*

transformation by undermining trust in online services and hindering cross-border data flows. Dealing with policy debate about openness and privacy is a challenge in Pakistan.

Burdensome digital taxation policies can create barriers for businesses operating in the digital economy and hinder cross-border trade and investment. Several countries have "connectivity taxes" on mobile and fixed internet connections. These taxes drive up consumer costs, making the Internet unaffordable for many, including investors. Emphasis should be on policies that support transparent, accountable fiscal policy for the general people. The need of the hour in Pakistan is to reform the tax regime for the telecom and ICT sectors to reduce the burden on consumers and providers and encourage investment and innovation.[219]

According to the World Economic Forum's Global Competitiveness Report 2020, Pakistan ranks relatively low regarding regulatory quality and government effectiveness.[220] Thus, streamlining regulatory processes and creating an enabling policy environment are essential to accelerating the journey toward a digital society. Outdated regulatory frameworks hinder digital transformation.

Cultural Barriers

In conservative countries such as Pakistan, traditional gender roles and societal norms often limit women's access to and use of digital technologies.[221] Cultural conservatism can lead to resistance toward adopting digital innovations.[222] Fear of unknown change, concerns about privacy and security, and distrust of digital platforms may inhibit individuals' willingness to engage with digital technologies. Limited access to information and digital communication platforms hampers innovation, creativity, and democratic participation, inhibiting the development of a dynamic digital culture.

Linguistic Barriers

Most internet usage in Pakistan is in English. Some newspapers do maintain an Urdu language presence on the web; however, Roman Urdu is more commonly used online (footnote 4). Language barriers hinder individuals' access to digital information and services, particularly in rural and marginalized communities. The lack of local language content in countries such as Pakistan limits individuals' ability to engage with digital platforms and participate in online activities, perpetuating digital exclusion.[223] Cultural attitudes toward technology in Pakistan have low adoption rates and usage patterns, particularly among older generations and rural communities.[224]

---

219 News Desk. 2024. GSMA Urges Pakistan to Eliminate High Taxes on Telecom Services. *Profit by Pakistan Today*. 8 August. https://profit.pakistantoday.com.pk/2024/08/08/gsma-urges-pakistan-to-eliminate-high-taxes-on-telecom-services/ (accessed 13 September 2024).

220 World Economic Forum. 2020. *Global Competitiveness Report 2020.* https://www.weforum.org/publications/the-global-competitiveness-report-2020/(accessed 2 September 2024).

221 Y. Zaidi et al. 2020. Young Women in Pakistan - Status Report 2020. UN Women. Islamabad, Pakistan. https://pakistan.unwomen.org/en/digital-library/publications/2020/11/young-women-in-pakistan-status-report-2020.

222 R. Roberts et al. 2021. Psychological Factors Influencing Technology Adoption. *Technovation. 4(1). pp. 45–87.*

223 K. McIntyre. 2017. Corruption, Language, Lack of Confidence Hurt Pakistan's Digital Workers. *The Express Tribune. 19 February.* https://tribune.com.pk/story/1331986/corruption-language-lack-confidence-hurt-pakistans-digital-workers *(accessed 13 September 2024).*

224 M. Akram.2023. Digitalisation and Women in Pakistan. National Commission on the Status of Women and United Nations Development Programme, Pakistan, Islamabad. https://www.undp.org/sites/g/files/zskgke326/files/2023-07/digitalisation_women_in_pakistan_-_ncsw_report_2023.pdf.

Gap Between Education and the Practical World

Theoretical education often lacks practical training and hands-on experience with digital technologies. Many countries, including Pakistan, have education systems that rely on traditional teaching methods and outdated curricula that do not prepare students for the demands of the digital age. The skills gap, particularly in digital skills such as data analysis, and digital marketing, hampers the growth of the digital economy and impedes efforts to build a digital society. Establishing a digital society will require a paradigm shift in the education system in Pakistan.

5.7 Systemic Risks

Inconsistencies in the Legal Framework

Existing consumer protection laws do not guarantee the quality of products and services. The efficiency and impact of consumer courts have also been minimal. Inconsistencies in Pakistan's legal framework pose challenges to protecting consumer rights and enforcing cybersecurity measures.[225]

There is a lack of clarity on legal mechanisms for addressing cybersecurity breaches and holding perpetrators accountable. Pakistan's legal framework for e-commerce is fragmented and outdated, with inconsistencies in regulations governing online transactions, digital payments, and consumer protection.[226] There are at least five consumer laws in Pakistan, all of which are unsymmetrical. For a digital society to take root, a well-defined and consistent legal framework will be required.

Disconcerting Economic Conditions

Pakistan invested PRs70 billion in 2023 for digital projects. The government's Vision 2025 estimates PRs1 trillion for the digital transformation of society.[227] Because of uncertain economic turndown, individuals and organizations may delay their investments in digital technologies.[228] Startups and small businesses, which often drive innovation in the digital space, struggle to secure funding and resources, limiting their ability to develop and scale digital solutions.

Transforming Pakistan into a digital society requires a holistic approach with clear financial arrangements. However, the federal government has not allocated sufficient resources for this purpose in the respective future estimates.[229]

[225] K. Adil. 2023. Legal Framework for Policing Cyberspace in Pakistan. Research Society of International Law | RSIL. 7 March. https://rsilpak.org/2023/legal-framework-for-policing-cyberspace-in-pakistan-an-overview/ (accessed 13 September 2024).

[226] State Bank of Pakistan. 2024. Payment Systems Review for the 3rd Quarter of Fiscal Year 2023-24. https://www.sbp.org.pk/psd/pdf/PS-Review-Q3FY24.pdf.

[227] Author's estimate.

[228] P. Carter et al. 2019. IDC FutureScape: Worldwide Digital Transformation 2020 Predictions. International Data Corporation (IDC. https://www.informatiquenews.fr/wp-content/uploads/2020/11/idc-futurescape-worldwide-digital-transformation-predictions-analyst-paper.pdf (accessed 23 September 2024).

[229] Author's own research.

Yet another problem in Pakistan is the tedious funds approval processes and cash flow visibility challenges that result in uncertain payment timelines, affecting project engagement and morale. In the ICT sector, prices of commodities and the nature of procurements may vary and may not be covered under traditional mechanisms.[230] Notably, in Pakistan, there are no separate procurement rules for software and digital equipment. Their absence can slow down the digital transformation process.

Resistance to Change

Resistance to new technology stems from disrupting the status quo and demanding careful cultural change management.[231] Humans are inclined to be biased, but machines can be programmed to work without discrimination. Resistance to this technological approach is a big bottleneck to a digital society.

Lack of Domain Knowledge

The transition toward digital transformation will render organizations' existing "rules of business" useless, as the work in a digital environment is executed differently. The existing employees in various organizations must adapt to a new knowledge domain. Lack of knowledge of the digital domain, especially in public sector organizations, will complicate projects in future.[232] Fundamentally, most digital technologies provide efficiency gains and customer intimacy possibilities. However, digital technology will simply magnify those flaws if people lack the right mindset to change and the current organizational practices are flawed.[233]

Frequent Leadership Changes

Pakistan is at the threshold of digital transformation. Life and work in Pakistan are changing quickly, and there is no option but to accept the challenge. In Pakistan's system of governance, initiatives to go digital depend on the top leadership and their sustained commitment (whose turnover disrupts digital transformation projects leading to panic and unrealistic demands). IT is a subject that is dealt with by the Government of Pakistan as a discipline that has a limited domain and scope. Transforming a digital society is a policy decision that requires long-term and sustainable commitment.[234]

---

230 J. Pearce, E. Epstein, and A. Conde. 2018. The Future of Procurement: Say No to Mediocre Technology. A.T. Kearney. 11 July. https://www.middle-east.kearney.com/service/procurement/article/-/insights/the-future-of-procurement-say-no-to-mediocre-technology (accessed 23 September 2024).

231 H. Rasool. 2021. Behavior Leverage: Bringing Beneficial Cultural Change in Organisations, *Pakistan Institute of Development Economics Working Papers* 2021:8. Pakistan Institute of Development Economics. https://ideas.repec.org/p/pid/wpaper/20218.html.

232 S. Gupta. 2018. The Future of Work (Ers) Rights! Public Interest Tech. Ford Foundation. https://www.fordfoundation.org/news-and-stories/videos/how-can-public-interest-tech-change-our-world-for-good/sarita-gupta-the-future-of-workers-rights-public-interest-tech/ (accessed 13 September 2024).

233 B. Tabrizi et al. 2019. Digital Transformation Is Not about Technology. *Harvard Business Review*. 13 March. https://hbr.org/2019/03/digital-transformation-is-not-about-technology (accessed 13 September 2024).

234 M. Alojail and S. B. Khan. 2023. Impact of Digital Transformation toward Sustainable Development. *Sustainability. 15(20). 14697.*

5.8 Enabling Environment

Policy Dimensions Related to Digital Society

The 2000 ICT Policy and Action Plan set the early digital agenda in Pakistan by focusing on workforce development, business incentives, legislative frameworks, and ICT infrastructure. Later the Telecommunications Policy 2015 prioritized universally available, affordable, and quality telecommunication services.

Subsequently, the 2018 Digital Pakistan Policy emphasized digital society and inclusion, supporting youth, women, and rural communities through ICT education, skills development, and employability enhancement. Additionally, the policy promised to promote equal opportunities for women in the ICT industry and address the digital divide in rural and marginalized areas through digitalization, entrepreneurship, and targeted funding initiatives (Table 19).

Table 19: Relevant Policies and Their Influence on Digital Society

Policy	Digital Inclusion	Public Trust, Attitude, and Use of Technology	Civic Engagement: Transparency, Accountability, and Participation
Mobile Cellular Policy 2004	Articulated a strategic vision for expanding mobile cellular access, focusing on bridging the digital divide by enhancing connectivity in all regions, particularly in underserved communities through the promotion of infrastructure development	While the policy primarily focused on regulatory and infrastructure aspects, measures such as quality of service requirements contributed to building public trust and positive attitudes toward mobile technology	The policy implications for improving service delivery indirectly promote a framework conducive to greater civic engagement and digital transparency
Broadband Policy 2004	Outlined strategies to extend broadband access across Pakistan, emphasizing infrastructure development, reducing service costs, and promoting local content to ensure broader digital accessibility and connectivity	Enhanced public confidence and engagement with broadband technologies through quality assurance, regulatory clarity, and consumer protection, ensuring a secure and user-centric digital environment	It emphasized accessible and reliable broadband services indirectly supporting enhanced civic engagement through improved access to digital government services, thereby fostering transparency and accountability

continued on next page

Box 18 *continued on next page*

Policy	Digital Inclusion	Public Trust, Attitude, and Use of Technology	Civic Engagement: Transparency, Accountability, and Participation
Telecom Policy 2015	Advocates for strategic expansion of digital infrastructure and services, aiming to ensure equitable access across all regions, with a focus on enhancing connectivity in unserved or underserved areas through sustainable and innovative initiatives It emphasizes infrastructure development (fiber rollouts, right of way, utility infrastructure use, etc.) and the use of Universal Service Fund	Sets measures to reinforce a regulatory framework that nurtures consumer confidence and adoption of digital technologies, thereby enhancing the user experience and trust in digital services. It also advocates a regulatory framework for Over-The-Top digital services to "safeguard" consumer interests and ensure quality	While not explicit, the emphasis on quality of service, consumer rights, and regulatory framework for digital services contributes to a transparent, accountable, and participatory digital environment by ensuring that stakeholders are protected and have access to reliable services
Digital Pakistan Policy 2018	Aims to bridge the urban-rural digital divide and enhance the ICT infrastructure to ensure widespread access. Supports development of local content and text to speech software for Urdu and regional languages Has several provisions for facilitation of online access to people with disabilities Emphasizes the development of software technology parks and ICT zones, aiming to foster digital skills and literacy	While it does not explicitly address public trust and attitudes, it supports these aspects through the promotion of ICT education and literacy, aiming to foster a positive attitude toward technology adoption among the general population	Advocates for e-governance initiatives designed to improve transparency, accountability, and public participation in governance. It aims to utilize digital platforms for citizen engagement, policy feedback, and to streamline government services delivery

ICT = information and communication technology.
Source: Author.

Institutional Framework

Article 14 of the Constitution of Pakistan guarantees the right to privacy for its citizens. The Government has also promulgated the Right of Access to Information Act, 2017 which empowers the citizens to know and get access to any information from the government (footnote 211).

Although contradictory, the Government of Pakistan regulates online space through the Prevention of Electronic Crimes Act (PECA), which allows law enforcement agencies to monitor cyberspace extensively. The PTA has broad powers under Section 37 of PECA to block and remove content based on ambiguous criteria, often justifying these actions on the pretext that specific platforms promote "vulgarity" or "corruption of youth" (footnote 212).

Open Data Innovation Ecosystems

"Open Data" is a collection of easily accessible data available for general use without restrictions. Open data systems (ODS) impact the lives of people in three significant ways: they make the government well organized; they empower the residents by affecting the lives of citizens directly; and they create economic opportunities for the people.

Countries such as Australia, India, New Zealand, Spain, the US, and the UK, have adopted ODS models to develop their digital ecosystems. The ODS model suits Pakistan as well. This system allows it to fight society's ills in real time and provides reasonable solutions to problems such as corruption, terrorism, and development. The most significant source of open data sets are public sector organizations, and the level of openness in Pakistan needs improvement.

Emerging Technologies

Emerging technologies such as AI and machine learning are being leveraged to promote digital inclusion and literacy by providing personalized learning.[235] Emerging technologies such as decentralized networks and peer-to-peer platforms empower individuals to exercise their internet freedom and participate in digital communities without central control or censorship.[236]

[235] UNESCO. 2019. Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development. https://unesdoc.unesco.org/ark:/48223/pf0000366994 (accessed 2 September 2024).

[236] S. Shilina, S. 2023. The Future of Social Networking: Decentralization for User Empowerment, Privacy, and Freedom from Censorship. *Medium*. 6 November. https://medium.com/paradigm-research/the-future-of-social-networking-decentralization-for-user-empowerment-privacy-and-freedom-from-a0a8f74790cb (accessed 13 September 2024).

Pakistan's Digital Ecosystem

A Diagnostic Report

This report provides a comprehensive analysis of Pakistan's digital landscape. Using global tools and indices tailored to the local context, it provides actionable recommendations and insights for stakeholders. It examines four areas—digital infrastructure, digital government, digital economy, and digital society—and considers factors including policy and regulatory frameworks, emerging technologies, digital literacy, climate change, and cybersecurity. The analysis aims to support the development of a 10-year digital sector road map and tailored upskilling for policymakers, and to help inform decision-making to promote sustainable digital growth in Pakistan.

About the Asian Development Bank

ADB is a leading multilateral development bank supporting inclusive, resilient, and sustainable growth across Asia and the Pacific. Working with its members and partners to solve complex challenges together, ADB harnesses innovative financial tools and strategic partnerships to transform lives, build quality infrastructure, and safeguard our planet. Founded in 1966, ADB is owned by 69 members—50 from the region.

ADB

ASIAN DEVELOPMENT BANK
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org