



RECOMMENDATIONS FOR
PAKISTAN'S
DIGITAL FUTURE

OICCI DIGITAL REPORT 2025



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FOREWORD

The Overseas Investors Chamber of Commerce and Industry (OICCI) is pleased to present the 2025 Digital Economy Report, titled “Recommendations for Pakistan’s Digital Future.” OICCI, the oldest (since 1860) and largest chamber in Pakistan in terms of economic contributions, represents the top 200 plus foreign investors in the country, including many Fortune 500 companies. The Chamber continues to serve as the first point of contact for foreign investors exploring investment in Pakistan.

This report has been developed to accelerate the growth of Pakistan’s digital ecosystem

and to position the country on a path towards greater financial inclusion and the achievement of the Sustainable Development Goals (SDGs). The OICCI’s recommendations are aligned with key global digital economy trends that underscore the urgent need for countries like Pakistan to leapfrog traditional stages of development and embrace the ongoing technological revolution. We firmly believe that this digital opportunity can enable Pakistan to emerge as a significant regional player by promoting a thriving local ecosystem that enhances the country’s participation in the global economy.



OICCI acknowledges the guidance of Asif Ahmad, Group Chief Business Strategy Officer, Pakistan Telecommunication Company Limited (PTCL), and Sardar Abubakr, Vice President, New Business Development and Fintech Future, Pakistan Mobile Communications Limited (PMCL), for steering this initiative and contributing to a comprehensive policy framework which we hope will be adopted by relevant government departments and private sector stakeholders. OICCI also extends its gratitude to the Digital Core Team and Subcommittee Members, whose collaborative efforts played a pivotal role in the development of this report. The framework, analysis, and conclusions

presented herein would not have been possible without the valuable insights and expertise shared by multiple consultants and stakeholders. OICCI would like to thank Waqar Arif, Sundas Kazmi, Riva Effandi, and the PMCL team for their dedicated contributions to this report's development.

For more information, please visit www.oicci.org and follow us on Twitter: [@oicci_pakistan](https://twitter.com/oicci_pakistan).

EXECUTIVE SUMMARY

Pakistan stands at a defining moment in its digital evolution, where inclusive technology adoption can transform economic potential, public services, and everyday life.

From students in remote villages attending virtual classes to farmers using mobile apps for weather updates and market prices, technology is slowly but surely becoming a part of everyday life. But this change also brings urgency. The world is moving fast, and for Pakistan to keep up, the government, the private sector, and the citizens need to come together with a shared purpose: to build a digital future that includes everyone.

The attached report presents a comprehensive overview of Pakistan's digital transformation journey across six key segments in the 2025 context. It covers Pakistan's digital transformation ranging from infrastructure and connectivity to governance, private sector enablement, widespread digital adoption, the integration of emerging Web 3.0 technologies, the digital regulatory evolution and assesses progress on prior policy commitments. Each chapter provides in-depth insights into specific sectors and technologies that are shaping the future of a digitally empowered Pakistan.

The global digital economy is projected to reach USD 24 trillion by the end of 2025. For Pakistan, embracing digital transformation is no longer a choice; it is a necessity which means to prioritize coordinated and accelerated efforts across all sectors.

The OICCI Digital Report 2025 discusses the critical role of foundational infrastructure. While significant projects and partnerships are underway to improve broadband penetration and fiber connectivity, challenges like limited fiber coverage, affordability constraints, and policy

bottlenecks hinder expansion. The government is currently focused on fiber rollout, 5G, and smartphone access, but progress is slowed by delays and spectrum issues. For instance, only 10% of cellular towers are currently fiberized, far below the global benchmark of 40%. Addressing these gaps is essential for equitable access and accelerated progress.

The attached report reflects how digitalization is permeating all aspects of life. From e-governance platforms like the Pakistan Citizens' Portal, launched in October 2018, that has over 4 million users and a complaint resolution rate exceeding 90%, to fintech innovations like JazzCash, which has surpassed 50 million users, and Raast, which processed PKR 8.5 trillion in peer-to-peer transactions in Q1'25 alone, digital services are transforming financial inclusion, governance, and e-commerce. Under the leadership of the Ministry of IT & Telecom, flagship programs such as the National Incubation Centre network, managed by Ignite National Technology Fund, have accelerated digital skills training and incubation across major cities.

The OICCI Digital Report 2025 also explores the growing relevance of AgriTech, HealthTech, EdTech, Digital Literacy, Public Safety Reforms, Sustainability and Driving Diversity in Digitization, where new solutions are beginning to address long-standing challenges. However, issues such as low digital literacy, unreliable infrastructure in rural areas, and trust deficits in digital systems remain persistent barriers.

With initiatives driving women's digital inclusion and addressing environmental sustainability, Pakistan's digital future must be inclusive, ensuring that underserved communities are actively brought into the fold.

The OICCI Digital Report 2025 delves into Pakistan's early engagement with transformative technologies such as blockchain, digital currencies, artificial intelligence. These technologies have the potential to reshape the economy, support decentralized finance, and create new digital experiences. The creation of the Pakistan Crypto Council in 2025 highlights growing institutional interest, while the Ministry of Education's initiative to introduce courses on AI, blockchain, and data science in educational institutes represents a forward-thinking step. However, the report also emphasizes that without clear regulation and strategic planning, Pakistan risks falling behind. A strong foundation in governance, skills, and infrastructure is essential to leverage the global shift towards Web 3.0 technologies.

The OICCI Digital Report 2025 also highlights Pakistan's evolving policy and regulatory environment. While the GoP's approval of the Personal Data Protection Bill in 2023 marked a positive step, the bill's pending status in Parliament continues to create uncertainty around enforcement. The State Bank of Pakistan's launching of the Cyber Risk Management Department in 2024 also represents a significant institutional development, aiming to enhance cybersecurity oversight and resilience. However, gaps remain in legal clarity, implementation capacity, and public accountability.

Lastly, Follow-up on OICCI's 2022 Digital Recommendations focuses on revisiting key strategies introduced in the previous report and assessing the progress made on those that have been implemented. As of mid-2025, about one-quarter of the recommendations from the 2022 report have been implemented, with the majority either still in progress or yet to be initiated which may be an area of concern for many stakeholders. Advancements include fiber optic expansion through the Universal Service Fund (USF), tax reductions to improve broadband and smartphone affordability, and expanded 4G coverage.

Ultimately, Pakistan's digital transformation is not just about apps, platforms, or data; it is about people. It is about the young graduate looking for work online, the farmer trying to survive climate shocks, the teacher bridging gaps through a phone screen, and the mother seeking reliable healthcare for her child. To make this transformation real, Pakistan needs to build trust, ensure fairness, and bring everyone along. That means bridging rural-urban divides, aligning with the provincial and federal strategies, simplifying approvals, and opening space for experimentation.

Pakistan's digital transformation is no longer optional; it is a national imperative. The next five years will determine whether digital technology becomes an engine of inclusive growth or another missed opportunity. Bold action, inclusive strategy, and sustained collaboration must now follow.

CHAPTER 1: THE SCOPE AND BENEFITS OF THE DIGITAL REVOLUTION AT THE COUNTRY AND SOCIETY LEVEL

Digital transformation represents a fundamental shift in how organizations and societies operate, leveraging technologies like Artificial Intelligence, Cloud Computing, Internet of Things (IoT), and advanced analytics to create new value, improve efficiency, and enhance user experiences. By the end of 2025, the global digital economy is projected to reach approximately USD 24 trillion, representing 21% of global GDP, growing significantly faster than the overall global economy.^{1,2} For countries like Pakistan, embracing digital transformation is strategically imperative to unlock significant economic potential, streamline government services, enable innovation in sectors like fintech and e-commerce, and empower a future-ready workforce. While offering immense opportunities for growth and inclusion, it also necessitates addressing critical challenges such as the digital divide, ensuring cybersecurity, and adapting regulatory frameworks to build a resilient and equitable digital future.³

Contribution of the IT Sector ^{4,5}

Total IT, ITes Exports

\$3.8

Billion as of **FY24-25**

Total IT exports

\$15

Billion by **2030**

CAGR of past 20 years

15-20%[↑]

Contribution of Digital Economy to Pakistan's GDP is projected to climb to **5-7% by 2030**)

Pakistan's digital IT sector now employs over 600,000 professionals,⁶ and has experienced a solid 15-20% annual growth rate over the past two decades. Looking ahead, the sector is projected to grow at an even faster pace, an implied CAGR of 28% by 2029,⁷ driving new hiring and expanding job opportunities across the country. In addition, excelling in this emerging internet economy can help Pakistan leverage its talent to generate significant export revenues necessary to achieve sustainable economic development and stability in the country. It also creates new opportunities for growth, by helping to capture and retain customers directly, allowing companies to gain and maintain a competitive edge.⁸

1 dco.org/wp-content/uploads/2024/12/Digital-Economy-Trends-2025.pdf,

2 Digital Economy to Exceed \$24 Trillion in 2025 | UNION OF ARAB CHAMBERS

3 <https://psde.pide.org.pk/wp-content/uploads/Abstract-Book-38th-AGM-PSDE-Conference-2025-1.pdf>

4 IT exports hit record at \$4.6b

5 Pakistan's digital leap: trillion-dollar opportunity - Opinion - Business Recorder

6 IT sector warns of relocation if tax reforms are not carried out - Profit by Pakistan Today

7 Pakistan's IT Sector: A Digital Frontier Brimming with Promise - Invest2Innovate

8 <https://profit.pakistantoday.com.pk/2025/05/16/pakistans-it-exports-grow-2-to-317-million-in-april-10-month-total-reaches-3-1-billion/>

Developing an enabling digital environment continues to be central to Pakistan’s economic strategy, with recent data showing clear strides in job creation, social mobility, and household wealth accumulation. Pakistan now boasts over 150 million broadband subscriptions, over 200 million telecom connections, with the mobile ecosystem contributing an estimated USD 17 billion to the national economy.⁹ A vibrant ecosystem of National Incubation Centers (over 1,480 startups) alongside women-focused Software Technology Parks reflects the sector’s capacity to generate export revenue, stimulate innovation, and attract foreign investment. The government is actively advancing digital transformation across key sectors, with a focus on education, health, and agriculture.¹⁰



Information Technology Sector

Pakistan’s Information Technology (IT) sector continues to grow as a key source of software exports, business process outsourcing (BPO), and freelancing. In FY2024–25, the technology and IT sector peaked at a total of USD 3.8 billion and IT and ITeS exports, with USD 779 million from freelancers and remote work. This was an increase of 26% from the previous year.¹¹ To support global expansion, SBP has introduced a new Equity Investment Abroad category, allowing export-focused IT firms to invest directly in overseas ventures using their foreign currency accounts. This move enables Pakistani tech companies to scale internationally and build strategic partnerships, especially across the gulf region and other key markets. Looking ahead, the government has set a five-year digital vision roadmap aiming to reach USD 25 billion, with USD 15 billion from IT exports and USD 10 billion from national digitization efforts. The sector’s recent performance indicates strong potential in meeting this goal, provided there is consistent policy support and investor confidence.¹²



9 Prime Minister’s Office, Islamabad, Pakistan

10 <https://ciltinternational.org/wp-content/uploads/2021/11/Digitalization-Pakistans-Vision-2025.pdf>, Ignite Inks Agreement with Pakistan Services Limited - Hashoo Group to Manage National Incubation Center Islamabad | Ignite | National Technology Fund

11 IT exports hit record at \$4.6b, Pakistan’s IT, ITeS, and freelance exports hit record \$4.6 billion in FY 2024–25 - Profit by Pakistan Today

12 IT exports hit record at \$4.6b, Pakistan’s IT exports hit record \$342mn in March 2025 - Profit by Pakistan Today

Connectivity

Beyond merely facilitating communication, enhanced connectivity is a critical driver for economic growth, accelerated financial inclusion, improved educational equity, and expanded access to healthcare, particularly for underserved populations. It is crucial for Pakistan to foster a globally competitive IT sector and to further cultivate its thriving freelance and digital services markets. The continued success of Pakistan's digital transformation depends on sustained government incentives and strategic investments to expand and densify digital infrastructure across the entire nation, especially in remote and rural areas.^{13,14,15}



Digital Banking

Pakistan's digital banking sector has seen rapid and sustained growth, becoming a key driver of the country's digital transformation. Backed by strong support from the Government and State Bank of Pakistan (SBP), platforms like Raast, that processed PKR 8.5 trillion in P2P transactions by Q1'25, while also expanding to include more financial institutions and G2P payments. Financial inclusion has improved through fully digital account openings and mandatory digital tax payment channels. The rise of branchless, mobile-first digital banks has intensified competition and

innovation in the fintech space, with the SBP projecting the digital payments sector to reach USD 36 billion by the end of 2025.^{16,17}



E-Governance

Pakistan accelerated its e-governance efforts to ensure uninterrupted delivery of essential public services through digital platforms. Pakistan Citizens' Portal has grown to over 4 million registered members with a 90% complaint resolution rate.¹⁸ The majority of registered users on the portal are from Punjab, with students making up the largest group of complainants. The highest number of complaints fall under 'Energy and Power,' 'Municipal Services,' and 'Education,' reflecting the key problem areas faced by citizens.¹⁹ The Digital Nation Pakistan Act, enacted in January 2025, establishes the Pakistan Digital Authority to streamline initiatives, develop digital public infrastructure, and expand online government services. These efforts significantly enhance citizen service delivery, improve administrative efficiency, and promote transparency.^{20,21}



13 <https://datareportal.com/reports/digital-2025-pakistan>

14 <https://profit.pakistantoday.com.pk/2025/06/20/pakistan-hits-200-million-telecom-subscribers-with-150-million-broadband-users/>

15 <https://www.brecorder.com/news/40358813>

16 https://dailylimes.com.pk/1316824/can-the-digital-economy-drive-pakistans-growth-surge/#google_vignette Digital payments surge as mobile apps and Raast drive growth in third quarter - Profit by Pakistan Today

17 The Fintech Landscape in Pakistan: Progress and Potential - Invest2Innovate

18 PM's Performance Delivery Unit

19 PCP-Report-23-09-2024.pdf

20 <https://citizenportal.gov.pk/>

21 <https://www.brecorder.com/news/40358813>

Digital Finance Services

Digital Finance Services (DFS) in Pakistan has expanded significantly by 2025, with digital transactions comprising majority of retail payments. Players like JazzCash, SadaPay, NayaPay, and Easypaisa are leading innovations in payments, micro-lending, and embedded finance.

JazzCash's registered user base has surpassed 50 million customers, making strides in bridging the digital divide in Pakistan.²² It leads the market and offers an integrated suite of services from micro lending to insurance. JazzCash is continuously making strategic partnerships, recently unveiling a three-year roadmap to drive Pakistan's cashless transition. Recently, it has partnered with du Pay (Western Union) to enable seamless cross-border remittances.²³ Further, in the fintech space, Easypaisa became the country's first fully licensed digital retail bank this year. SBP has fully licensed 6 Electronic Money Institutions (EMIs), improving access to wallets and contactless payments.²⁴ FinTech solutions for credit scoring, insurance, and women-focused savings (e.g., Oraan) are gaining ground.



Regulatory support continues with frameworks for digital banks and virtual assets, including the recent launch of the Pakistan Crypto Council to guide digital

asset governance. While challenges around rural inclusion, cybersecurity, and Islamic FinTech persist, the sector is increasingly seen as critical to financial inclusion and sustainable economic growth.

Health Sector

Digital technologies are significantly impacting Pakistan's health sector, notably improving access and efficiency, particularly for underserved rural populations. Beyond traditional telemedicine, there is a strong push for comprehensive digital health solutions. The Ministry of National Health Services, Regulations and Coordination is actively implementing its National Digital Health Strategy (2023-2028), which aims to digitize patient records, establish national health registries, and integrate AI for improved diagnostics and public health surveillance.



The telemedicine sector, which saw substantial growth during the pandemic, continues to expand its reach, with numerous private health-tech startups contributing to innovations like online pharmacies and remote patient monitoring, attracting growing investment.²⁵

22 Jazz Embarks on Digital ServiceCo Transformation, Expanding Beyond Telecom Services - Technology news and insights in the Middle East, South Asia, and Africa

23 JazzCash plans to expand its regional footprint - Business & Finance - Business Recorder

24 List-of-EMIs.pdf

25 https://www.apo-tokyo.org/wp-content/uploads/2025/03/P-analysis_Digital-Transformation-and-Workforce-Skills-Strategy-for-Pakistans-Manufacturing-Sector_PUB.pdf

Labor Market

Digital transformation is reshaping Pakistan's labor market by increasing demand for tech-enabled and digitally skilled workers across sectors. Traditional roles are being augmented or replaced by automation, AI, and data-driven systems, especially in manufacturing and services.



Pakistan's labor market is shifting fast as digital skills become the ticket to global opportunities. With rising demand for freelancers and IT professionals abroad. By FY2025, ICT sector exports reached USD 3.8 billion, with USD 779 million coming from freelancers alone.²⁶ Pakistan has been identified as the third most financially attractive digital labor supplier. In particular, areas such as software development and technology services are where Pakistan meets the global demand.²⁷ However, a significant skills gap persists, with many graduates lacking training in digital tools and emerging technologies.

This has created an urgency for targeted reskilling, vocational programs, and stronger industry-academia collaboration. Bridging this gap is essential to ensure workforce readiness and inclusive economic growth in the digital era. The government has stepped in through efforts like the National Digital Skills Policy and a Huawei-backed training portal to help people upskill for international work., The

Ministry of Information Technology and Telecom has actively been taking steps towards training the current work force with programs like DigiSkills that is currently in its third phase. Programs like this empower the workforce and increase the supply of digital talent globally.³⁰

The Agriculture and Food Sector

The agriculture and food sector in Pakistan is increasingly benefiting from digitalization and tech-driven solutions. Digitized land records are improving transparency and efficiency, while digital platforms are connecting farmers directly to markets and vital information. Technologies like precision agriculture, IoT, AI-based crop prediction, smart irrigation, and drone monitoring are boosting yields, resource efficiency, and food security. These innovations are enhancing farmer incomes and productivity. The government is also supporting agri-tech startups and digital tools to further empower the farming community.^{31,32} Recent government and private initiatives are addressing gaps in agriculture financing through digital loans, electronic warehouse receipts, and public-private collaborations aimed at financial inclusion and productivity gains for smallholder farmers.



26 IT exports hit record at \$4.6b

27 Pakistan leads IT outsourcing rankings – Pakistan & Gulf Economist

28 <https://www.arabnews.com/node/2585146/pakistan>

29 <https://netmag.pk/2024/08/01/it-ministry-to-launch-national-digital-skills-policy/>

30 Why DigiSkills - DigiSkills Training Program | Free online training in Pakistan

31 <https://www.brecorder.com/tag/agriculture>

32 <https://www.fao.org/pakistan/en/>

Platforms like Bakhbar Kissan, partnerships by Jazz, Neem, and HBL, and innovation challenges by Karandaz are fostering a growing AgriTech ecosystem. However, many small farmers in remote areas, poor internet, low digital know-how, and high costs still stand in the way. Unless these gaps are closed, the promise of AgriTech risks leaving the most vulnerable behind. Making digital tools truly inclusive is key to long-term impact.

Education and training

Digital education is reshaping learning in Pakistan by expanding access and addressing long-standing educational challenges. However, with an estimated 25.3 million out-of-school children, the sector still faces significant barriers, particularly in rural areas with poor internet and mobile connectivity. To bridge this gap, efforts are focused on scaling e-learning platforms, creating digital learning hubs, and promoting blended learning models. Government initiatives are developing online curricula, enhancing digital literacy, and equipping teachers with the skills needed for hybrid education delivery, aiming to make quality education more inclusive and accessible.^{33,34}



Impact of Digital Transformation

Pakistan is increasingly well-positioned to become a key player in the global digital economy over the next decade. Fueled by a young, tech-savvy population and a growing startup ecosystem, it is emerging as a digital-first economy. The digital economy is projected to unlock up to USD 75 billion in economic value by 2030 through gains in the expansion of e-commerce, increasing IT exports, innovations in areas like fintech, and supportive government policies. Digitizing Pakistan's industrial sector through automation and smart technologies could boost efficiency by up to 25%, reduce costs, and potentially add up to USD 150 billion to GDP by 2035.³⁵

As digitalization continues to drive progress across sectors, comprehensive adoption is essential for building economic resilience and improving long-term socio-economic outcomes.³⁶ Under the Digital Pakistan policy, strategic initiatives such as the development of 43 Software Technology Parks in Tier-II and Tier-III cities, now home to over 350 IT/ITes companies, expanding innovation.

33 Pakistan's out-of-school children crisis: A call for urgent reform - DAWN.COM

34 <https://learnobots.com/digital-education-in-pakistan-challenges-opportunities/>

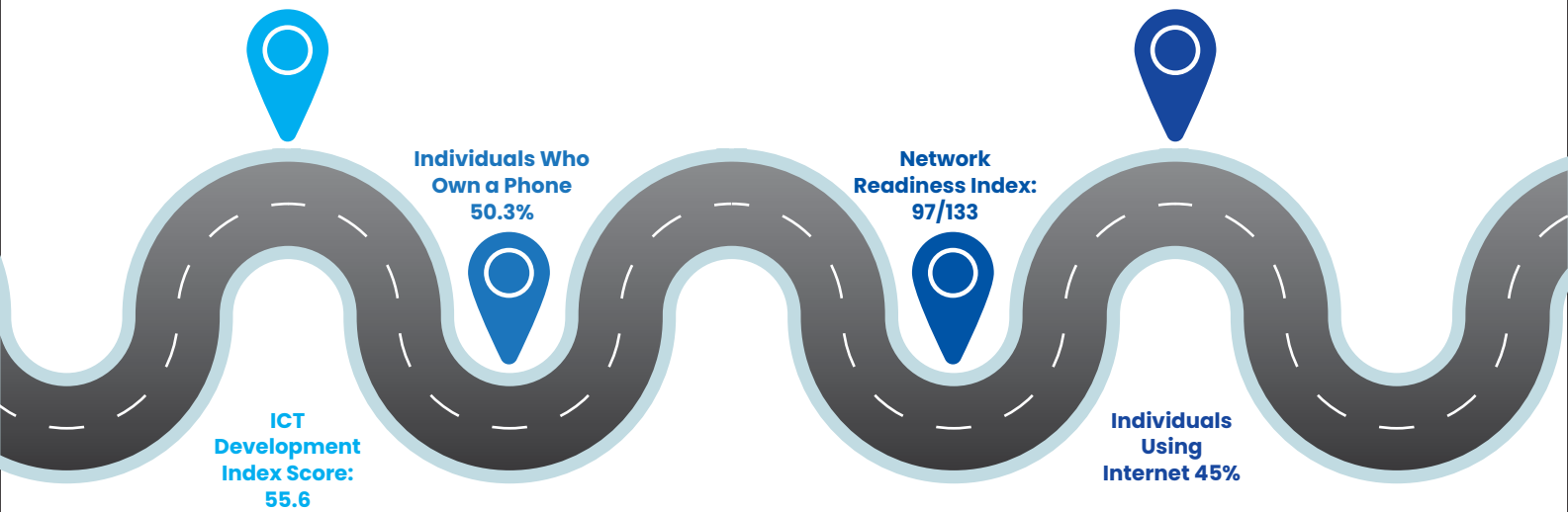
35 Pakistan's digital leap: trillion-dollar opportunity - Opinion - Business Recorder

36 <file:pide.org.pk/pdf/pideinpress/pip-pakistans-digital-leap-trillion-dollar-opportunity.pdf>, Unlocking Pakistan's PKR9.7-trillion digital potential by 2030 - Access Partnership

Pakistan's digital transformation narrative is not any longer just government-centric, there are large-scale private partnerships that are constantly challenging and improving the regulatory landscape. Pakistan's private sector is accelerating the shift to a digital-first economy through high-impact partnerships and product launches. From Visa and IINK working to expand digital payments tenfold,³⁷ to JazzCash integrating with Google Wallet,³⁸ innovation is happening at a fast pace. Commercial banks are also taking active steps, like Bank Alfalah bringing e-commerce to WhatsApp,³⁹ while Allied Bank is experimenting with virtual branches in the metaverse.⁴⁰ These efforts show how private innovation is actively shaping a more connected, accessible, and forward-looking digital landscape.



Roadblocks Towards Digital Transformation^{41,42,43}



37 IINK, Visa ink partnership agreement, Visa aims for 10-fold increase in Digital Payment acceptance across Pakistan with IINK partnership - Islamabad Scene
 38 Media Center Detail Jazzcash Boosts Digital Payments In Pakistan With Google Wallet - Jazz
 39 Bank Alfalah revolutionizes E-Commerce with AlfaMall on WhatsApp - Trade Chronicle
 40 Allied Bank Partners with Synapsify & Fasset for Web 3.0, Allied Bank Metaverse Branch - Pakistan's First Virtual Bank
 41 ICT Development Index by Country 2025
 42 The ICT Development Index 2024: ITU Publications, Measuring digital development The ICT Development Index 2024
 43 download.networkreadinessindex.org/reports/countries/2024/pakistan.pdf

KEY DIGITAL MILESTONES

Pakistan has made strong progress in digital transformation in recent years. Coordinated efforts by the government, regulators, and the private sector have advanced financial inclusion, expanding digital infrastructure, and equipping youth with essential skills to support an inclusive, future-ready economy.⁴⁴ Key recent milestones include:

Digital Pakistan – Uraan 5Es Plan

Pakistan's Uraan 5Es Plan sets out a bold strategy to transform the economy into a trillion-dollar powerhouse by 2035, built on five pillars: Exports, E-Pakistan, Environment, Energy, and Equity. The E-Pakistan agenda is a key driver, aiming to produce 75,000 IT graduates annually, grow IT exports by 178%, and establish 43 software parks to position Pakistan as a regional technology hub. These reforms seek to modernize infrastructure, boost trade capacity, and create a business-friendly environment while addressing climate risks and promoting inclusive growth. For foreign investors, particularly in real estate, the expanding digital economy and rising urban demand present a strong opportunity.⁴⁵

Unlike past strategies, Uraan is supported by a unified implementation mechanism that brings together provinces, ministries, and sectors, reducing vulnerability to political changes. It is grounded in global best practices and draws lessons from countries like Malaysia, Turkey, and South Korea. E-Pakistan also targets a USD 5 billion ICT freelancing industry, 200,000 IT graduates per year, and stronger capabilities in artificial intelligence and cybersecurity. These efforts will create jobs, empower youth, and help position Pakistan as a global technology player.⁴⁶

Cashless Economy Efforts

Raast, the country's first instant digital payment system launched by the State Bank of Pakistan, has processed over 1.5 billion transactions with a total value exceeding PKR 34 trillion. This growth is supported by a 62% rise in transactions through mobile and internet banking, signaling increased public trust in digital financial services.^{47,48}

Building on this progress, the State Bank launched its "Go Cashless" campaign in 2025. The initiative aims to raise awareness among vendors and consumers about the benefits of digital payments and encourage broader adoption. By promoting secure and convenient payment options, the campaign supports the goal of a cash-lite economy where digital transactions become the norm. In 2024 alone, digital transactions increased by 35%, reaching 6.4 billion in volume and PKR 547 trillion in value.⁴⁹

Institutional Developments In Data Protection And Cybersecurity

Pakistan has taken significant strides in digital governance and cybersecurity. The draft "Personal Data Protection Bill" (2023), by the Ministry of Information Technology and Telecommunication marks a milestone in Pakistan's digital governance. It establishes a comprehensive legal framework for data privacy, governing the collection, processing, use, and transfer of personal data. It introduces penalties for privacy violations and paves the way for a dedicated data protection commission, aligning national standards with global best practices.⁵⁰

44 Ministry of Planning, Development & Special Initiatives

45 Breaking Down the Uraan Pakistan's 5 Es Plan!


46 Ministry of Planning, Development & Special Initiatives

47 Raast processes over 892m transactions – Business Recorder

48 SBP Releases its Third Quarterly Payment Systems

49 Pakistan's central bank launches 'Go Cashless' drive at Karachi mall to promote digital economy | Arab News

50 Personal Data Protection Bill 2023 • Page 38 • CYRILLA: Global Digital Rights Law



In parallel, the launch of the Cyber Risk Management Department by SBP in December 2024 marks a critical step in enhancing SBP's cybersecurity readiness. The Cyber Risk Management Department (CRMD) was established to conduct on-site and off-site supervision of cyber security risks within regulated entities. The department leads the development and enforcement of IT security policies, operates a centralized information security operations center, and integrates cyber risk management into business continuity planning. It ensures proactive oversight of digital threats and fosters a cyber-aware institutional culture.^{51,52,53}

5G Rollout Plans

In line with the vision to provide faster speed internet, the Ministry of IT and Telecom has officially announced the launch of 5G services in Pakistan by 2025, marking a transformative step in the country's digital progress. With planning underway since 2022, the rollout is expected to enhance connectivity for both consumers and businesses, enabling innovation across various sectors. Despite reported regulatory challenges and possible delays in the spectrum auction as of May 2025, the government remains firmly committed to the initiative, recognizing its potential to drive economic growth and accelerate digital transformation.⁵⁴

Reduction In Mobile Internet Gender Gap

Pakistan has achieved a major breakthrough in reducing the digital gender divide. The GSMA Mobile Gender Gap Report 2025 highlights Pakistan's strong progress, with 8 million women gaining mobile internet access in 2024. This reduced the gender gap from 38% to 25%, the first major drop since 2021. Women's usage rose from 33% to 45%, the highest jump among surveyed countries, driven primarily by rural outreach. In total, around 13 million Pakistanis (8 million women and 5 million men) started using mobile internet in 2024.⁵⁵

PRIVATE SECTOR INITIATIVES TOWARDS DIGITIZATION

Pakistan's private sector is actively taking steps towards creating omni channels and marketplaces through digitization. Sectors like Banking and Telecom are bringing innovation to the current landscape. The initiatives below illustrate the pace of activity since the last edition of this report (2022). Recent initiatives taken by the private sector are directed towards accelerating digital transformation, broadening financial inclusion and large-scale deployments.

Recent Strategic Partnerships

- **Visa Targets 10x Growth In Digital Payment Acceptance Across Pakistani Businesses**
ILINK, Pakistan's largest payment service provider, partnered with Visa to integrate the Visa Alias Directory Service into its network. This collaboration aims to simplify incoming remittances, enhance user security, and enable real-time cross-border payments through Visa Direct, supporting the broader goal of advancing Pakistan's digital payment ecosystem.⁵⁶ Visa aims to expand the number of businesses accepting digital payments in Pakistan by ten times over the next three years.

51 State Bank of Pakistan

52 State Bank of Pakistan

53 SBP Establishes New Cyber Risk Management Department - Raised by Numbers

54 Pakistan Set to Launch 5G in July 2025: Everything You Need to Know! - TEC Spectrum

55 Pakistan Television Official Web Portal

56 ILINK, Visa ink partnership agreement, Visa aims for 10-fold increase in Digital Payment acceptance across Pakistan with ILINK partnership - Islamabad Scene

- **Pakistan Software Houses Association And Asian Development Bank Partnership**

Under this public-private agreement, P@SHA and ADB will jointly launch initiatives in key areas including emerging tech research, data-driven policy development, advanced digital skills training, multi-stakeholder policy dialogues, and platforms to recognize innovation. These efforts aim to strengthen Pakistan's IT sector by addressing gaps in infrastructure, talent, and investment.

- **Bank Alfalah – Alfa Mall**

Bank Alfalah has launched AlfaMall on WhatsApp, becoming the first in Pakistan to offer a full-fledged e-commerce experience within a messaging app. This innovative platform allows users to browse products, make purchases, and utilize Buy Now Pay Later (BNPL) options through any credit card issued in Pakistan. Aimed at enhancing digital accessibility and convenience, AlfaMall on WhatsApp marks a major step in merging digital banking, e-commerce, and everyday mobile communication.⁵⁷

- **JazzCash**

Jazz is spearheading Pakistan's digital transformation by transitioning into a digital-first ServiceCo. Beyond connectivity, Jazz is driving financial inclusion and digital adoption through innovative services in fintech, cloud, and AI. Its digital wallet platform, JazzCash, serves over 20 million monthly users and has expanded its offerings through partnerships like Google Wallet, enabling secure tap-to-pay transactions. Additionally, JazzCash launched Salaam Investments in collaboration with Salaam Family Takaful Limited: a Shariah-compliant digital investment platform that combines daily profit returns with accidental insurance, supporting underserved communities including students and women entrepreneurs in building financial security.^{58,59}

- **Allied Bank – metaverse**

Allied Bank has launched Pakistan's first virtual branch in the metaverse, allowing customers to explore services, open accounts, and conduct transactions in a fully immersive digital environment. Developed in partnership with Synapsify Systems and UAE-based Fasset, the initiative reflects ABL's ongoing push to enhance customer engagement through innovative digital platforms tailored to tech-savvy users.⁶⁰

57 Bank Alfalah revolutionizes E-Commerce with AlfaMall on WhatsApp - Trade Chronicle

58 Media Center Detail Jazz Invests Pkr 53.9 Billion In 2024 To Drive Pakistans Digital And Financial Future - Jazz

59 Media Center Detail Jazzcash Boosts Digital Payments In Pakistan With Google Wallet - Jazz

60 Allied Bank Partners with Synapsify & Fasset for Web 3.0, Allied Bank Metaverse Branch – Pakistan's First Virtual Bank

CHAPTER 2: DIGITAL INFRASTRUCTURE AND CONNECTIVITY

Information and Communication Technology (ICT) adoption index consists of variables such as internet users and mobile cellular subscriptions, both of which Pakistan scores in the lowest brackets. As such, Pakistan's digital infrastructure falls behind its regional counterparts for several reasons. One key reason is the limited fiber optic coverage in rural areas, with only 9–11% of cell towers connected via fiber optic, resulting in slow and limited internet.⁶¹

High taxes and duties have made it difficult to expand internet services in Pakistan, pushed up the cost of internet development and hindered mobile accessibility. For example, a 20% import duty on fiber optic cables has slowed down the rollout of internet infrastructure.⁶² Furthermore, 33% tax on mobile services, the highest among Pakistan's regional peers, limits mobile connectivity.⁶³

As of 2025, Pakistan ranks 97th out of 133 economies on the Network Readiness Index (NRI), with a score of 41.4 out of 100. The NRI is designed to guide digital policy and investment and measures how well a country accesses, uses, and benefits from digital technologies across four pillars: technology, people, governance, and impact. Pakistan shows strength in future technology adoption (ranked 23rd) and international bandwidth (ranked 19th) but lags considerably in rural digital payment use and e-commerce legislation.⁶⁴

Whilst Pakistan's mobile market has significant potential, current levels of mobile internet adoption, smartphone adoption, and digital services lag behind those of other countries in the region. Internet penetration reached 45.7% of the population (~150 million users) as of early 2025.^{65,66} The gender gap remains a significant barrier: although 45% of Pakistani women now use mobile internet (up from 33% in 2023), men are still substantially more likely to be connected, highlighting persistent digital exclusion for women.^{67,68}

Improving and expanding the current digital infrastructure would catalyze the growth of the digital revolution in Pakistan. This section analyzes some of the key components of digital infrastructure and connectivity and their potential for Pakistan, providing recommendations and global examples.

61 Pakistan has alarmingly low fiber-teledensity - Pakistan - Business Recorder
62 Additional duties, taxes to stall telecom growth - Business - DAWN.COM
63 GSMA Urges Pakistan to Reduce Taxes on Mobile Services in Next Budget
64 pakistan.pdf
65 Digital 2025: Pakistan - DataReportal - Global Digital Insights,
66 Pakistan hits 200 million telecom subscribers, with 150 million broadband users - Profit by Pakistan Today
67 8 million women come online in Pakistan in 2024 - Profit by Pakistan Today
68 gsma.com/r/wp-content/uploads/2025/06/The-Mobile-Gender-Gap-Report-2025.pdf

FIBER OPTIC

Fiber optic is a more suitable option for internet installation due to its high-speed connectivity, support for long-distance transmission, reliability, and resilience to weather conditions. The development of fiber optic cables is a critical enabler of next-generation technologies, including artificial intelligence, smart cities, and edge computing, all of which require low-latency and high-bandwidth connectivity.

Globally, the fiber optic connector market is growing at a CAGR of 4.3% (2024–2032), valued at USD 10 billion as of 2023, and is expected to exceed USD 15.2 billion by 2032.⁶⁹ This growth is driven by the increasing demand for high-speed internet, coupled with the rise of cloud computing and data centers, which necessitate extensive fiber optic infrastructure. Additionally, the deployment of 5G networks demands a fiber optic infrastructure further driving market growth.

In the Asia Pacific region, the fiber optic penetration rates for countries like Vietnam and Malaysia are 44.5% and 32.1%, respectively. By the end of 2024, Malaysia had connected 9 million premises to its fiber network.⁷⁰ Vietnam has made significant progress in expanding fiber-optic broadband, with 17 million “Fiber to the Home” (FTTH) subscribers and 82% of households now connected.⁷¹ Vietnam is ambitiously working toward making fiber-optic access universally available to all households.⁷²

Taking in the Pakistani context, over 211,000 kilometers of optical fiber has been deployed in the country, with presently 2 million FTTH subscribers.^{73,74} The fiber tele-density is 0.45%, which is considerably low as compared to global benchmarks. Only 10% of the total cellular towers are currently connected via OFC,⁷⁵ which is also lower compared to the global benchmark of 40%. Compared to the regional players, fiber optic reach is relatively limited, and the current infrastructure fails to meet the country’s digital demands, especially with the recent anticipated rollout of 5G and increasing reliance on cloud services and IoT devices.^{76,77}

Pakistan’s current fiber optic landscape, while showing signs of policy-driven progress, remains significantly behind regional peers. Pakistan trails behind countries including Bangladesh, Egypt, Indonesia, and Philippines, by approximately 5.1 million Fiber-to-the-Home (FTTH) connections. To close half of this gap by 2027, Pakistan would require an estimated USD 2.5 billion in fixed broadband investment over the next few years.⁷⁸

The MoITT has planned to expand fiber optic connectivity to 7.5 million homes nationwide within the next five years. It is also targeting an 80% fiber to the site coverage. This is an ambitious initiative and is being developed under the Digital Economy Enhancement Project (DEEP), which is aiming to raise the average internet speed to 60 Mbps.⁷⁹

69 Fiber Optic Connector Market Opportunity, Growth Drivers, Industry Trend Analysis, and Forecast 2024 to 2032, Fiber Optic Connector Market Size, Growth Outlook 2024–2032, Fiber Optic Connector Market to record \$15.6 Bn by 2032,

70 Malaysian telcos make solid progress on mobile, fibre coverage | Communications Today

71 The deplorable state of Pakistan’s digital divide - Perspectives - Business Recorder, Vietnam Broadband Services Market Report- Q4 2024

72 Over 82% of Vietnamese households now connected to high-speed fiber Internet

73 PTA Celebrates Landmark Achievement: Pakistan Surpasses 200 Million Telecom Subscribers

74 The deplorable state of Pakistan’s digital divide - Perspectives - Business Recorder

75 Pakistan Plans Major Fiber-Optic Expansion to Boost Digital Connectivity -

76 PTA Celebrates Landmark Achievement: Pakistan Surpasses 200 Million Telecom Subscribers

77 The deplorable state of Pakistan’s digital divide - Perspectives - Business Recorder

78 World Bank Document

79 Pakistan to expand fiber connectivity to 7.5m homes in five years

Recent Developments

- **PTCL WDM System:**

PTCL Group, in collaboration with Huawei, has launched Pakistan's first 800 Gbps per wavelength Super C+L WDM system, delivering data transmission capacities of up to 64 Tbps per fiber.⁸⁰ Built on advanced fiber optic technology, this major upgrade enhances service quality, reduces latency, and strengthens the country's digital backbone, preparing the network for future technologies like Fixed 5.5G while supporting sustainability and growing data demands.⁸¹

- **StormFiber - High-Speed Internet:**

StormFiber, powered by Cybernet, has expanded its high-speed fiber-optic internet services to Chitral, marking its 25th city in Pakistan. The move reflects a commitment to bridge the digital divide and empower remote communities through better access to education, healthcare, e-commerce, and entrepreneurship.⁸²

- **VEON Partnership With Engro:**

VEON Ltd. has finalized its partnership with Engro Corporation for the pooling and management of telecom infrastructure in Pakistan, transferring its assets under Deodar (Private) Limited to Engro Connect. Jazz will continue nationwide operations by leasing this infrastructure, supporting its shift toward a digital services portfolio spanning fintech, entertainment, healthcare, and enterprise solutions.⁸³

- **Expanding National Connectivity Through USF Projects:⁸⁴**

The Universal Service Fund (USF) has significantly enhanced Pakistan's digital infrastructure through 161 connectivity projects:

- Provided high-speed connectivity to over 37.1 million people.
- Deployed 4,400 telecom sites across the country.
- Laid 17,200 kilometers of fiber optic cable, extending coverage to more than 1,000 towns.

These projects have played a pivotal role in transforming access in previously underserved areas. Looking ahead, USF is prioritizing the extension of high-speed fiber and telecom infrastructure to strategic districts including Sialkot, Sanghar, Jhang, Sujawal, and Tando Muhammad Khan, aiming to bridge the digital divide and unlock new growth opportunities across rural and semi-urban regions.

- **Strategic Foreign Investment In Fiber Infrastructure:**

The Chinese Sunwalk Group, a leading telecom and technology company and holder of a Telecommunication Infrastructure Provider License in Pakistan, has committed an investment of USD 2 billion to deploy a 100,000 kilometer nationwide optical fiber network.

This large-scale investment reflects growing foreign confidence in Pakistan's digital infrastructure ecosystem and is expected to significantly accelerate high-speed broadband penetration across the country, supporting future-ready industries, smart cities, and enhanced digital inclusion.⁸⁵

- **Enabling Nationwide Fiber Expansion Through Policy And Planning:**

The World Bank, in partnership with the Ministry of IT and Telecom (MoITT) and the Pakistan Telecommunication Authority (PTA), will be conducting a feasibility study for the National Fiberization Plan under the Digital Economy Enhancement Project.

80 Pakistan's first 800GB WDM System' Rolled Out for Faster Connectivity » LCCI

81 PTCL Group Launches Pakistan's First 800G Wavelength Division Multiplexing System in Partnership with Huawei

82 StormFiber Expands to Chitral: Empowering Pakistan's Digital Future

83 VEON and Engro Corporation Complete Pioneering Infrastructure Partnership in Pakistan | VEON

84 USF to Lay 2000km Optical Fiber Cable Across Pakistan, Pakistan's USF Brings Digital Connectivity to Over 37 Million People -, , USF's Internet Connectivity Projects Have Served 37.1 Million Citizens, Deployed 4400 Telecom Sites, and More PID

85 <https://propakistan.pk/2023/03/14/sunwalk-group-to-invest-2-billion-in-pakistans-fiber-optic-network/>

Led by MoITT, the initiative involves close collaboration with both public and private sector stakeholders to develop a practical, investment-ready roadmap. The plan aims to facilitate private sector participation in the rollout of long-haul, metro, and Fiber-to-the-Site (FTTS) networks, ensuring timely and cost-effective deployment of high-speed connectivity infrastructure across Pakistan.

Challenges

- **Pakistan's 5G And 4G Coverage And Connectivity Gaps:**

Despite regional advancements, Pakistan remains one of the few countries in the region without active 5G coverage, primarily due to limited fiber optic infrastructure, low tower density, and an absence of commercially viable use cases.

Broader internet access also remains constrained by supply-side bottlenecks across the connectivity value chain, including infrastructure shortfalls, as well as demand-side barriers such as digital literacy, skill gaps, socio-cultural norms, and affordability challenges.⁸⁶

Although 4G dominates mobile connections, Pakistan's 4G population coverage (85.3%) still lags behind the regional average, with nearly one-third of users still stuck on 2G networks.⁸⁷

The rollout of nationwide fiber optic infrastructure, critical for high speed 4G performance, is constrained by challenges in securing right of way permissions, leaving most ISPs dependent on PTCL's sole comprehensive network.⁸⁸

- **Implementation Challenges In The National Fiberization Policy:**

The Ministry of IT and Telecom's (MoITT) National Fiberization Policy, launched in April 2025, sets ambitious targets including 80% fiber to the site (FTTS) coverage and fiber-optic connectivity to 7.5 million households via fiber-to-the-home (FTTH) within five years.^{89,90,91}

However, these targets raise serious implementation concerns, given the current ground realities. With only 20% FTTS coverage and 2 million FTTH subscribers to date, the announced targets highlight the need for a clearly defined execution roadmap, efficient resource mobilization and coordination to bridge this gap and ensure feasibility and sustained progress.^{92,93,94}

- **Regulatory Duties Impacting Fiber Deployment Costs:**

The Finance Bill (2025–26) has retained the 20% regulatory duty on imported fiber optic cables, up from 10% in 2021. This sustained high duty has significantly increased material costs, posing a challenge to large-scale fiber deployment and discouraging investment in local network expansion.

The government's high licensing fees and duties hinder the local development of fiber optics. The 20% regulatory duty on importing fiber optic cables was an effort to promote local development, but it only served to increase the costs by 107%, deterring the local development and expansion of fiber optic network.⁹⁵

86 Pakistan-Development-Update-Report-April-2025-FINAL.pdf

87 <https://www.statista.com/outlook/co/digital-connectivity-indicators/pakistan>

88 Pakistan-Development-Update-Report-April-2025-FINAL.pdf

89 Pakistan to expand fiber connectivity to 7.5m homes in five years

90 PTA Calls 2025 The Year of 5G With Ambitious Targets

91 2024-12-16-pta_annual_report.pdf

92 2024-12-16-pta_annual_report.pdf

93 Pakistan to expand fiber connectivity to 7.5m homes in five years

94 Pakistan hits 200 million telecom subscribers, with 150 million broadband users - Profit by Pakistan Today

95 Pakistan's Optical Fiber Penetration at 1%, Far Below Regional Average: Report



- **Security And Right-Of-Way Challenges Hindering Fiber Expansion:**

Security concerns in Pakistan’s western provinces continue to obstruct the development of broadband infrastructure, limiting investment in these regions.

Additionally, right-of-way challenges like complex and inconsistent approval processes across jurisdictions have discouraged internet service providers (ISPs) from developing nationwide fiber networks, slowing the deployment of critical digital infrastructure.⁹⁶

Recommendations

- **Recommendations For The Universal Services Fund:**

To achieve the target of 80% Fiber-to-the-Site (FTTS) coverage within five years, the National Fiberization Policy must be supported by well-defined implementation plans, clear milestones, and effective coordination amongst stakeholders to ensure timely and efficient deployment of telecom infrastructure.^{97,98}

Prioritize connecting anchor institutions, such as rural schools, Basic Health Units/Sehat Centers, agri-extension offices, and local government e-kiosks, so that every subsidized route includes at least one public anchor per Union Council (UC).

- Subsidize fiber connectivity to all unserved UCs in a phased manner, ensuring coverage for mobile broadband towers, rural schools, local government offices, healthcare centers, and Wi-Fi hotspots within each Union Council.
- Introduce a coverage heatmap to operationalize the anchor-first routing approach, with priority given to schools, BHUs, agricultural offices, and UC e-kiosks, promoting equitable access and maximizing utilization across communities.

Follow World Bank DEEP guidelines to ensure climate-resilient builds by introducing dual-path diversity in flood-prone segments and using armored cable or aerial spans in areas where high water levels pose a risk to underground ducts.⁹⁹

Provide one-time capital subsidies to address upfront deployment barriers, subject to thorough cost-benefit analysis and with a clear focus on ensuring long-term commercial viability.

- **Tower Fiberization For Enhanced Network Performance:**

Pakistan should prioritize the fiberization of cell towers as a strategic step to strengthen its telecom infrastructure. Replacing microwave backhaul with fiber optics is necessary to meet growing data demands, improve service reliability, and ensure network resilience, particularly in regions vulnerable to climate-related disruptions such as floods.

- **Reduce Taxes On Fiber Optic, Broadband Users, And USF Funding:¹⁰⁰**

Reduce the import duty from 20% back to the original 10%, to promote the local development of fiber optic cables.¹⁰¹

Allow tax-free and mandatory universal internet access across the country (especially in small cities and far-flung areas) for education and healthcare purposes. For instance, introducing a 0% “Edu-Health” rate for fixed lines installed in schools, BHUs and e-health hubs.

96 Pakistan-Development-Update-Report-April-2025-FINAL.pdf

97 <https://meatechwatch.com/2025/04/22/pakistan-plans-major-fiber-optic-expansion-to-boost-digital-connectivity/>, USF Unveils plans to lay 2000km of fiber optic across Pakistan - Engineering Post Leader in Engineering Journalism.

98 Pakistan to expand fiber connectivity to 7.5m homes in five years

99 Pakistan-Development-Update-Report-April-2025-FINAL.pdf

100 Pakistan-Development-Update-Report-April-2025-FINAL.pdf

101 Pakistan's Optical Fiber Penetration at 1%, Far Below Regional Average: Report

Reconsider the current GST of 19.5% charged to broadband users. Doing so will increase the adoption of fiber connected to the home and businesses. As of 2025, this is the highest GST rate among South Asian peers. According to EY, the sector can now claim input tax of up to 18%, while the end-user rate remains at 19.5%.¹⁰²

Global Case Studies ^{103,104,105,106}

Digital Superhighway and NOFBI-II, Kenya (2023-32)

Nairobi's "Digital Super-Highway" aims to stretch national fiber from 8,900 km to 100,000 km by 2032. Phase I is financed by a USD 390 million World Bank loan blended with Treasury bonds and private investment. The government prepays bandwidth for 40,000 schools and 400 health facilities, guaranteeing anchor demand for the build-operate-transfer contractor and underpinning 25,000 planned public Wi-Fi hotspots and digital-village hubs in every ward.

Pakistan can replicate this approach by prepaying bandwidth for public institutions to create anchor demand, attracting private investment in fiber rollout. Blending public funds with multilateral loans and private capital can further enable cost-effective, climate-resilient expansion through structured public-private partnerships.

Digital Egypt Wholesale JV, Egypt (2024-34)

Telecom Egypt and Hungary's 4iG Group formed a USD 600 million wholesale-only joint-venture that will pass at least six million premises with FTTH/FTTS over ten years and lease capacity to all ISPs. Ring-fencing the build in a separate vehicle attracts hard-currency equity, limits the retail arm's market power and locks in open-access pricing under the regulator's oversight, all aligned with Egypt's Vision 2030 "Digital Egypt" strategy.

This can be an example for Pakistan to follow by establishing a wholesale-only fiber model through a ring-fenced joint venture that separates infrastructure from retail, ensuring open-access pricing and curbing monopolistic control. This approach, paired with strong regulation and a clear digital vision, would attract foreign investment, boost ISP participation, and support universal fiber access.

HANDSET / SMARTPHONES

The Pakistan Telecommunication Authority recently announced that the total telecom subscriptions have surpassed 200 million. This marks a key milestone achieved in PTA's goal towards connectivity growth.¹⁰⁷ The current number of smartphone users in Pakistan are about 73 million, and with a total population of 235 million, the smartphone penetration is lower than its comparable peers.¹⁰⁸ The telecom market is primarily dominated by Jazz, Zong, Telenor, and Ufone, all of which continue to drive mobile access across urban and rural regions.

102 Pakistan adopts changes to Provincial sales tax laws | EY - Global

103 Kenya and the World Bank Group Provide a \$390 Million Boost the Digital Economy

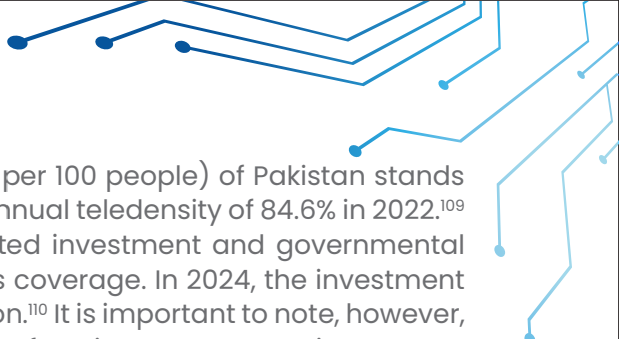
104 Kenya national digital masterplan [2022-2032] - Kenya Yearbook Editorial Board

105 Kenya expands fibre network to 13,590km in 2025, boosting digital access and govt services

106 Telecom Egypt and 4iG Group to Partner in Modernizing Egypt's Digital Infrastructure - Telecom Egypt :: Corporate News

107 <https://pakistanpressfoundation.org/telecom-subscribers-in-pakistan-reach-200-million-pta-highlights-connectivity-growth/>, PTA Reports Rise in 3G/4G Users and Teledensity in Pakistan for March 2025, <https://www.ibanet.org/Telecommunications-industry-in-Pakistan-growth-challenges-opportunities>

108 New Report Exposes Pakistan's Low Smartphone Penetration Amid PTA's 200M Mobile Subscriber Celebrations - PhoneWorld



The overall teledensity (the number of mobile connections per 100 people) of Pakistan stands at 81% as of May 2025. This is a decrease from the average annual teledensity of 84.6% in 2022.¹⁰⁹ This drop in teledensity highlights gaps that require targeted investment and governmental support to sustain growth and expand telecommunications coverage. In 2024, the investment in the telecommunication sector amounted to USD 765 million.¹¹⁰ It is important to note, however, that tele-density figures are based on the total number of active SIMs, not unique users. According to the 2018 ICT survey, approximately 20% of customers in urban areas and 26% in rural areas use multiple SIMs. This means the actual number of unique mobile users is lower than the reported tele-density, as many individuals maintain more than one active SIM.

Globally, smartphone penetration has reached approximately 78%. Developed economies like the United States and Japan reported higher rates at 81.6% and 78.6%, respectively. Developing economies like Nigeria stand at a smartphone penetration rate of 38.1%. Despite steady growth, Pakistan continues to fall behind its regional and global peers, with only 31% of its population using smartphones, a figure notably lower than comparable economies in Asia and Africa.¹¹¹

On the other hand, a positive trend can be seen in the adoption rate of Next Generation Mobile Services (3G/4G subscriptions), which has reached 59%, driven by increasing smartphone usage and the local manufacture of devices. This growth continues to make Pakistan a dynamic and expanding market for handset/smartphone production and digital connectivity.^{112,113}

Complementing this trend, local mobile manufacturing production in Pakistan saw steady growth in 2024, reaching production of 31.4 million units. Of these, 59% of the local production consisted of smartphones while the remaining 41% were 2G feature phones. Importantly, local manufacturing met 95% of the country's smartphone demand, which has risen from the five-year average of 67%. Local production is helping save 15-20% in foreign exchange, even with the local assemblers importing nearly all mobile phone components from abroad.^{114,115}

Recent Developments

- **PTA's Women-Centric Connectivity Push:**
To mark 200 million telecom subscribers, PTA is distributing 2,000 smartphones to female SIM owners through a computerized ballot. It also launched free six-month Wi-Fi at women's universities and gave all users 2GB data and 200 minutes on June 20, 2025. The initiative promotes digital inclusion, women's empowerment, and online learning.¹¹⁶
- **CMO Installment Framework:**
MoITT, PTA, and industry stakeholders are working together to create a framework that enables CMOs to provide smartphones through simplified installment plans. The goal is to make smartphones more affordable and promote digital inclusion across all income groups.¹¹⁷

¹⁰⁹ Teledensity

¹¹⁰ Foreign direct investment in Pakistan's telecom sector drops 21% in FY24 - Profit by Pakistan Today

¹¹¹ New Report Exposes Pakistan's Low Smartphone Penetration Amid PTA's 200M Mobile Subscriber Celebrations - PhoneWorld, How Many People Own Smartphones? (20252029)

¹¹² Pakistan Adds 1.38 Million New 3G/4G Users in June 2025: PTA Report - PhoneWorld

¹¹³ Pakistan's 3G/4G Users Surpass 143 Million in March 2025, Teledensity Hits 81.3% - PhoneWorld

¹¹⁴ Pakistan meets 95% of mobile demand through local manufacturing in 2024: report - Profit by Pakistan Today

¹¹⁵ 'Made in Pakistan' mobile phones meet 95% demand

¹¹⁶ PTA Launches Free Smartphones for Female SIM Owners in Pakistan

¹¹⁷ 2024-12-16-pta_annual_report.pdf

- **Local Manufacturing Policy:**

The PTA and government are progressing on a 2025–28 Mobile Devices Manufacturing and Export Policy (MDMEP), proposing zero-duty on CKD/SKD parts (like batteries and displays) to support local smartphone assembly.¹¹⁸

- **5G Readiness:**

The PTA projects 5G spectrum auction by 2025; the regulator has already initiated training programs with Huawei. Although commercialization is nascent, 5G-capable devices may soon enter local assembly lines, supporting future smartphone exports.¹¹⁹

Challenges

- **Economic And Infrastructure Barriers:**

Uncompetitive industrial energy costs: Pakistan's industrial users paid ~13.5 ¢/kWh in 2024, nearly double the rates in China, and the U.S., making high-tech smartphone manufacturing economically difficult.¹²⁰

Component ecosystem is still underdeveloped, with local suppliers for key components like PCBs, battery systems, displays, are still elementary, forcing dependency on imported semi-knocked-down kits and raising production costs.

Key risks including underdeveloped logistics infrastructure, a limited component supply chain, and low average purchasing power persist, which could constrain investment and further growth in smartphone accessibility.

- **Access And Adoption Gaps:**

Women in Pakistan are 25% less likely to own a mobile device, hindering overall market expansion and their participation in the digital economy. The gender gap in mobile ownership and internet use in Pakistan is among the widest in the world, limiting women's participation in education, finance, and the workforce.¹²¹

Around 2023–2024, Pakistan had an approximate smartphone penetration rate of 31%. This means 69% of the population remained non-smartphone users, highlighting a substantial digital inclusion gap. This limited penetration presents a significant challenge for the widespread adoption of digital public services, financial inclusion, and e-governance initiatives, particularly in rural and underserved areas.¹²²

Teledensity in Pakistan has dropped to 84.6% in 2022 and further to 81% in 2025. This decline reflects gaps in the telecom infrastructure and highlights the need for targeted investment and governmental focus.

Recommendations

- **Inclusive And Sustainable Ecosystem For Local Manufacturing Of Phones:**

Pakistan has made important strides with initiatives like the “Device Identification, Registration and Blocking System” which has helped curb grey market imports and advanced legal device manufacturing. To build on this momentum, the government should introduce performance-based incentives for local handset makers, and actively promote joint ventures with global tech players to scale domestic production and create high-value jobs.¹²³

118 <https://fiare.pk/2025/04/pakistan-proposes-new-tariff-structure-to-boost-mobile-device-manufacturing/>

119 <https://www.dawn.com/news/1885246/>

120 Pakistan's industry paying double power costs of US, China, India: report - Business - DAWN.COM

121 <https://www.gsma.com/r/wp-content/uploads/2025/06/The-Mobile-Gender-Gap-Report-2025.pdf>

122 How Many People Own Smartphones in the World? (2024-2029) | Priori Data

123 <https://www.ibanet.org/Telecommunications-industry-in-Pakistan-growth-challenges-opportunities>

The government should be taking active steps towards development of renewable energy resources for the industrial sector. The diesel prices currently stand at USD 1 per liter and are expected to further increase by 10% given the current inflationary environment.¹²⁴ Furthermore, the electricity cost of Pakistan's industrial sector are twice as compared to China, India and the USA.¹²⁵ The switch to renewable energy sources impacts the cost structure for local smartphone manufacturing and helps them compete more effectively with imported brands.

Imported smartphones lack support for regional languages like Punjabi, Sindhi, and Pashto, limiting accessibility for non-Urdu and non-English speakers. Local production creates an avenue for software level customization at source with pre-installed customized operating systems and apps tailored to linguistic preferences. This enhances usability, particularly in rural areas. For example, Sindh's "Dharti" app, offered in Sindhi, achieved a 55% adoption rate among previously disconnected cotton farmers, proving the value of language localization.¹²⁶

- **Making Smartphones Accessible To All:**

To increase 4G devices accessibility, the government has introduced a device financing scheme that allows users to buy smartphones through simple, low-interest installments. Building on this, Jazz launched "smart subsidies" for first-time users in rural areas, which led to a 12% rise in 4G adoption in trial zones. Telecom operators are also experimenting with flexible pricing models, offering customized packages based on users' needs and usage habits.¹²⁷ Specialized strategies like this target the lower-income market and improve teledensity, which is currently at decline.

The government should build on existing initiatives, such as BISP collaboration with Jazz for the distribution of funds to over 1.3 million beneficiaries across the country. This program aims to provide smartphones to over 9 million women who will be given cash assistance for a period of 3 years from 2024 via biometrically enabled withdrawals. This enables the beneficiaries to access their digital wallets securely, receive timely updates, and gain a better understanding of their rights. To maximize the impact of this program, the government should scale up handset distribution in collaboration with mobile service providers and integrate digital literacy support to ensure meaningful use, particularly in remote and underserved regions.^{128,129}

Expanding smartphone access for low-income and underserved groups requires the same bold approach that once transformed vehicle ownership in Pakistan. By partnering with banks and microfinance institutions, the government can offer flexible financing. The State Bank of Pakistan's National Financial Inclusion Strategy 2024-28 already prioritizes digital access, gender inclusion, and outreach to unserved areas.¹³⁰ It is this kind of coordinated effort that could drive real progress in smartphone adoption across the country.

124 Double-digit fuel inflation looms

125 Pakistan's industry paying double power costs of US, China, India: report - Business - DAWN.COM

126 <https://agrieconomist.com/bridging-the-digital-divide-in-pakistani-agriculture>

127 <https://www.phoneworld.com.pk/why-3g-4g-subscribers-are-declining-in-pakistan-and-how-to-fix-it/>

128 Media Center Detail Jazzcash Chosen As Key Partner For Benazir Income Support Program Bisp Fund Disbursements - Jazz

129 BISP's women beneficiaries to get smartphones - Business - DAWN.COM

130 <https://profit.pakistantoday.com.pk/2025/01/13/sbp-sets-75-financial-inclusion-target-under-national-strategy-2024-28/>

- **Bridging The Gender Gap Of Phone Ownership:**

Pakistan has made notable progress in digital inclusion, with the proportion of women using mobile internet rising from 33% in 2023 to 45% in 2024. This marked the largest increase in female mobile internet adoption globally in 2024, driven primarily by uptake among rural women. However, phone ownership remains a key barrier and it stands behind mobile ownership and smartphone ownership. Gender gap in smartphone and mobile ownership stand at 48% and 37% respectively, both being the widest gaps in Asia.¹³¹ These gaps highlight the wide gender divide that needs to be addressed.¹³² Social norms, limited digital literacy and affordability, especially in rural and low-income areas, hold women back in mobile and smartphone ownership.

Further, partnering with microfinance institutions and mobile manufacturers to offer low-interest installment plans and micro-leasing options exclusively for women can bridge the gender divide. By reducing upfront costs, these schemes will make smartphones attainable for women across socioeconomic backgrounds, including entrepreneurs, students, home-based workers, and rural users, broadening participation in Pakistan's digital economy.

- **Reducing Sales Tax On Lower Priced Smartphones:**

To support digital inclusion, the government should reduce or eliminate the 18% sales tax on smartphones priced under USD 500, currently applied to both imported and locally assembled devices.¹³³

This would make smartphones more affordable for students, low-income users, and first-time buyers, while discouraging grey market purchases and promoting PTA-approved devices. A targeted tax cut would expand formal market demand and accelerate access to essential digital services.

- **Smartphone Cloning And PTA-Bypass Tampering:**

The rise of cloned and "patched" smartphones is disrupting Pakistan's mobile market and putting users at serious risk. In May 2025, Pakistan Telecommunication Authority (PTA) and National Cyber Crime Investigation Agency (NCCIA) raided shops in Karachi where devices were being illegally altered using advanced software.¹³⁴ These tampered phones not only hurt local businesses and customer trust but also pose threats like fraud, cybercrime and other unlawful activities. Despite strict policies, the black market persists.¹³⁵

A stronger crackdown with stricter and routine inspections, along with public awareness and easier reporting, is needed to ensure only PTA-approved devices make it into the hands of the public.

131 GSMA – The Mobile Gender Gap Report 2025

132 <https://www.dawn.com/news/1911146>

133 FBR imposes 25% Sales Tax on high-value imported mobile phones – Profit by Pakistan Today

134 <https://www.pta.gov.pk/category/pta-cracks-down-on-illegal-imei-tampering-and-cloned-mobile-devices-108098722-2025-05-27>

135 PTA Raids Mobile Repair Shop Tampering IMEIs And Selling Patched Phones in Karachi

Global Case Studies ^{136,137,138,139}

Indonesia: Strengthening Local Content Requirements

Since 2017, Indonesia has enforced a Local Content Requirement (LCR) policy, mandating that at least 30-40% of smartphone parts must be sourced locally to stimulate domestic manufacturing.

- Local production surged dramatically: from just 0.1 million units in 2013 to 60.5 million units in 2017, with approximately 34 domestic and foreign brands participating.
- By late 2024, Indonesia increased the LCR threshold to 40%. This even led to a temporary ban on iPhone 16 sales for non-compliance.
- In response, Apple announced plans for a USD 1 billion investment in an Indonesian manufacturing plant to meet LCR requirements and restore iPhone 16 market access.

Indonesia's experience shows that strong local content policies can rapidly boost domestic smartphone production, attract global investment, and reduce reliance on imports. By requiring companies to source more components locally, Indonesia encouraged brands like Apple to invest directly in the country. This approach also opened the door for future exports and improved handset quality. However, such policies need to be carefully managed to avoid supply issues and ensure long-term sustainability, offering valuable lessons for Pakistan as it rolls out its own smartphone manufacturing and export strategy.

Philippines: DICT Model

The Department of Information and Communications Technology (DICT) in the Philippines is at the forefront of the country's efforts to enhance digital inclusion. Recognizing that connectivity alone is not enough, the DICT has implemented a multi-pronged approach that combines expanding internet access with establishing community-based digital literacy and skills training centers. Their programs specifically target geographically isolated and disadvantaged areas (GIDAs) and vulnerable populations, aiming to empower citizens to participate fully in the digital economy and access essential online services.

Based on this model, Pakistan should integrate its efforts to expand internet access by establishing localized digital literacy centers, especially in underserved areas, to ensure practical smartphone skills empower all citizens for online engagement and economic participation.

INTERNET, SPECTRUM AND LANDING STATIONS

As of early 2025, about 5.6 billion people use the internet, these internet users approximately account for 68% of the worldwide population.¹⁴⁰ China has the highest number of internet users nearing 1 billion.¹⁴¹

Pakistan has made notable progress in expanding mobile broadband coverage and internet access. With over 200 million telecom users, including 150 million broadband subscribers and more than 2 million Fiber-To-The-Home (FTTH) users,¹⁴² the country is rapidly advancing its digital connectivity. Broadband penetration increased from 53.6% in June 2023 to 60.8% by June 2025.

136 (PDF) The Political Economy of Local Content Requirements Policy in Indonesia's Telecommunication Manufacturing Industry 2015-2020

137 <https://ieomsociety.org/proceedings/2022dhaka/189.pdf>

138 <https://www.reuters.com/technology/apple-plans-manufacturing-plant-investment-indonesia-minister-says-2024-12-05/>

139 The Philippines: Connectivity and Digital Skills for Inclusive Growth - OpenGov Asia

140 Internet Users by Country 2025

141 STATISTICAL COMMUNIQUÉ OF THE PEOPLE'S REPUBLIC OF CHINA ON THE 2024 NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT

142 PTA Celebrates Landmark Achievement: Pakistan Surpasses 200 Million Telecom Subscribers

The Pakistani government is supporting this growth through initiatives such as mobile broadband spectrum auctions and policies enabling smartphone access through installment plans. These efforts reflect Pakistan's broader commitment to becoming a digital nation by integrating digital technologies across sectors to foster resilient, efficient, and inclusive economic development.^{143,144}

Pakistan is currently served by seven submarine cables, though one of which has reached the end of its operational life (SMW-3).^{145,146} Mobile broadband faces ongoing challenges, but the PTA has increased its frequency capacity in the past two years, and the arrival of the world's largest submarine cable is expected to improve connectivity. The government, along with PTA and MoITT, is working to enhance spectrum allocation and planning, with a focus on supporting next-generation services.¹⁴⁷

A forthcoming 5G auction aims to attract investment through flexible terms and rollout obligations. Meanwhile, the National Fiberization Policy targets an increase in fiber coverage from 20% to 80% to boost broadband speeds and support growing demand.^{148,149,150}

Recent Developments

- **Nationwide 5G Auction & Spectrum Expansion:**

Pakistan had initially positioned 2025 as the "Year of 5G," with the Pakistan Telecommunication Authority (PTA) and the Ministry of IT & Telecom (MoITT) announcing a 5G spectrum auction this year. However, the rollout has faced repeated delays, primarily due to unresolved policy and legal issues, including the now approved PTCL-Telenor merger.^{151,152,153}

While these delays have temporarily stalled progress, the setbacks are largely the result of unclear policy direction and regulatory issues. Nonetheless, the government continues to emphasize spectrum expansion as a national priority. The National Spectrum Policy 2024 outlines plans for more transparent spectrum valuation, flexible licensing models, and stronger investment incentives. As of now, the technical assessment has been completed.¹⁵⁴

- **Submarine Cable Connectivity:**

Submarine cable connectivity has played a pivotal role in enhancing internet speed and reliability in Pakistan. According to the National Assembly, currently activated international bandwidth stands at 9.281 terabits per second.¹⁵⁵

A new wave of submarine cable projects, including Africa-1, SEA-ME-WE 6, 2Africa, PEACE, and MGG 1, is underway, which is expected to add approximately 26.5 terabits per second of international connectivity. This expansion will nearly triple Pakistan's international bandwidth, significantly improving network redundancy, data throughput, and long-term digital infrastructure resilience.¹⁵⁶

143 Pakistan hits 200 million telecom subscribers, with 150 million broadband users - Profit by Pakistan Today

144 Driving Pakistan's digital transformation with Ericsson

145 srl1_list_cable_landing_stations_06102023.pdf

146 <https://www.submarinenetworks.com/en/systems/asia-australia/smw3/smw3-retire>

147 World's largest submarine cable lands in Pakistan: IT minister - Profit by Pakistan Today

148 World's largest submarine cable lands in Pakistan: IT minister - Profit by Pakistan Today

149 Pakistan Plans Investment-Friendly 5G Spectrum Auction - Digital Pakistan

150 <https://mettisglobal.news/telecom-infrastructure-key-to-pakistans-digital-transformation/> Pakistan Announces 2025 as the Year of 5G with Ambitious Broadband and Fibre Expansion Plans - Technology news and insights in the Middle East, South Asia, and Africa

151 Pakistan's 5G Launch Faces Yet Another Delay - Digital Pakistan

152 5G spectrum auction stalled by delays in Telenor merger - Business - DAWN.COM

153 <https://digitalpakistan.pk/pakistans-5g-launch-faces-yet-another-delay/>

154 5G spectrum auction delayed by four months over Telenor-PTCL merger deadlock - Profit by Pakistan Today

155 <https://www.thenews.com.pk/print/1282261-na-told-about-5g-rollout-infrastructure-expansion-in-near-future>

156 Pakistan enhances connectivity with 26.5 Tbps international submarine cable projects - SAMENA Daily News

Projects like Africa-1 Submarine Cable Landfall have made progress. Earlier this year in February, PTCL successfully landed the Africa-1 submarine cable at the Sea View landing station in Karachi, marking its official landing.¹⁵⁷ PTCL has announced the cable will be operational by early 2026, reinforcing Pakistan's digital infrastructure roadmap.

- **Right of Way Charges Waiver for Fiber / IT Infrastructure:**

In August 2025, Pakistan's government abolished Right-of-Way (RoW) charges on the laying of optical fiber cables and related IT infrastructure across key federal domains, including the National Highway Authority (NHA) and Pakistan Railways.¹⁵⁸ The Capital Development Authority (CDA) also approved exemptions for fiber and IT infrastructure within Islamabad.¹⁵⁹

- **International Bandwidth Diversification:**

In September 2025, the Special Communications Organization (SCO) and Zeta Technologies announced the launch of Pakistan's first terrestrial Cable Landing Station (CLS), leveraging the Pak-China Optical Fiber Cable (OFC). The Cable Landing Station aims to diversify Pakistan's international bandwidth routes and reduce dependency on submarine cables concentrated in Karachi.¹⁶⁰

Challenges

- **Weak Digital Infrastructure And Limited Spectrum Capacity:**

Pakistan's internet users face slow speeds and frequent disconnections due to a strained and outdated digital infrastructure. According to the PTA, contributing factors include low levels of fiberization, frequent power cuts, and aging telecom infrastructure.¹⁶¹

The country operates on just 270 MHz of mobile spectrum, which is far below the Asia-Pacific average of over 700 MHz in low and mid-bands. This limited spectrum results in severe network congestion and hampers the quality and reach of internet services.¹⁶²

Pakistan relies only on approximately 8 terabytes of bandwidth from international submarine cables, which is insufficient to meet the rising demand for high-speed connectivity in both urban and rural regions.¹⁶³

- **Policy Constraints And Market Impact:**

Pakistan has one of the lowest spectrum allocations in the Asia-Pacific region, which has slowed 4G rollout, reduced mobile broadband adoption, and weakened overall service coverage.¹⁶⁴

Global studies, including those from GSMA Intelligence, have found a direct causal link between excessive spectrum pricing and poorer digital outcomes, such as slower data speeds, worse coverage, and delayed infrastructure expansion.¹⁶⁵

- **Concentrated Landing Infrastructure And Connectivity Vulnerabilities:**

Pakistan's international internet connectivity is overly concentrated, with all submarine cables landing at a specific location in Karachi. This creates a significant risk, as any disruption at this point can affect nationwide access.¹⁶⁶

157 <https://www.brecorder.com/news/40349548/ptcl-brings-africa-1-submarine-cable-to-pakistan>

158 Pakistan abolishes right-of-way charges on fibre rollout - Profit by Pakistan Today

159 CDA approves exemption from ROW charges for IT infrastructure development, fiberisation - Profit by Pakistan Today

160 Zeta Technologies and Special Communications Organization (SCO) Break the Digital Bottleneck

161 Slow internet speeds in Pakistan: The impact of weak infrastructure - Daily Times

162 Pakistan's spectrum delays could cost \$4.3bn in GDP losses, warns GSMA - Profit by Pakistan Today

163 5G spectrum auction delayed by four months over Telenor-PTCL merger deadlock - Profit by Pakistan Today

164 'Pakistan has lowest spectrum in region'

165 'Pakistan has lowest spectrum in region'a

166 Focusing on Technology Limits Understanding of Internet Resilience: Pakistan Case Study

Only three ISPs – Pakistan Telecommunication Company Limited (PTCL) Transworld Associates (TWA) – operate landing stations, infrastructure redundancy, and resilience against service disruptions.^{167,168}

- **Shutdowns, Cybersecurity Threats, And Digital Exclusion:**

Pakistan has experienced several major internet blackouts in recent years, often tied to political protests, unrest, or government-imposed restrictions. While authorities cite law and order concerns, such disruptions have negatively affected the economy, reduced personal incomes, and affected perception globally.

The digital divide remains a pressing issue, particularly in rural and low-income areas. Women in these regions often lack access to smartphones, computers, and affordable internet, due to both economic and social barriers, reinforcing gender-based digital exclusion.¹⁶⁹

- **High Spectrum Costs Driven By Currency Risk:**

Spectrum and licensing payments are currently tied to the US dollar, making them vulnerable to currency fluctuations. This creates financial uncertainty and adds heavy upfront costs for telecom operators, discouraging investment in infrastructure.

A 2025 GSMA report highlights that in countries like Pakistan, USD – denominated spectrum costs rose from 10% to 23% between 2014 and 2023 due to currency depreciation, raising investment risk for operators. The findings from the report urges the government to denominate spectrum fees in Pakistani rupees.^{170,171}

- **Taxation Burden:**

The telecom sector is facing extremely high taxation, ranking as the second highest in Asia. This has severely impacted business margins, leaving limited room for further development and innovation.¹⁷²

The current structure of GST (19.5%) and AIT (15%), creating a combined impact of 34.5%, is ultimately passed on to end users. This heavy burden reduces consumer spending and usage, directly lowering profitability for telecom operators.¹⁷³

Recommendations

- **Infrastructure Expansion And Investment Incentives:**

The government should expand the implementation of the National Fiberization Policy by incentivizing public-private partnerships to lay fiber, especially in underserved regions. Introduce tax exemptions or subsidies for telecom operators investing in network upgrades and energy-resilient infrastructure.

Partnerships with telecom operators should be established to accelerate fiber deployment through targeted tax incentives, duty exemptions, and right-of-way support. In parallel, PTA should allocate additional low and mid-band spectrum through affordable auctions with flexible terms to reduce congestion and enable 5G readiness.

Accelerated 4G penetration is a high-impact, near-term lever for digital inclusion that drives socioeconomic benefits: every 10% increase in mobile broadband use can increase GDP per capita by almost 2% (for middle-income countries).¹⁷⁴ To achieve this, the government should promote spectrum affordability and adopt flexible auction pricing models to incentivize network expansion by telecom operators.

167 sr11_list_cable_landing_stations_06102023.pdf

168 Focusing on Technology Limits Understanding of Internet Resilience: Pakistan Case Study

169 Digital divide and women | Pakistan Today

170 <https://www.gsma.com/connectivity-for-good/spectrum/wp-content/uploads/2025/05/Global-Spectrum-Pricing-Summary-v2.pdf>

171 Pakistan's spectrum delays could cost \$4.3bn in GDP losses, warns GSMA - Profit by Pakistan Today

172 GSMA urges Pakistan to cut telecom taxes to enhance affordability and sector growth - Profit by Pakistan Today

173 Taxation of the Telecommunications Industry in Pakistan (Updated 2025) - TaxationPk

174 The impact of digital transformation on the economy

To reduce connectivity risks, the government should establish a second submarine cable landing station outside Karachi – such as Gwadar, through a public-private partnership. PTA can fast-track approvals and offer tax relief to attract investors, improving network redundancy and international bandwidth capacity. However, due to limited infrastructure, shortage of skilled manpower, and an underdeveloped digital ecosystem in Gwadar, the project remains commercially unviable for private operators alone. To unlock its potential, strategic government support is essential, through capital participation, Right-of-Way waivers, and streamlined facilitation. This should be positioned not as a subsidy, but as a forward-looking digital investment. Such support will ensure business continuity, accelerate socio-economic development in Balochistan, and integrate Gwadar into the national digital and services economy.

- **Policy And Inclusion Measures:**

The government should introduce legal safeguards requiring judicial oversight for internet shutdowns. Digital access should be expanded through USF-funded programs that provide subsidized smartphones and rural connectivity solutions, especially targeting women and underserved communities.

- **Localization Of Spectrum And Licensing Costs:**

As addressed in the challenges earlier, license payments and spectrum fees in US dollars adds substantial upfront costs. Most countries globally make these payments in their local currency.¹⁷⁵ Setting spectrum auction and licensing fees to the local currency (PKR) instead of the US dollar will reduce exposure to currency volatility, promote financial predictability for operators, and encourage local reinvestment.^{176,177,178}

- **Spectrum Sharing Framework:**

Flexible and transparent spectrum sharing policies should be encouraged, allowing licensed operators to share or lease underutilized spectrum. This would improve spectrum efficiency, reduce network rollout costs, and enhance coverage in underserved regions.^{179,180, 181}

A recent example is Australia's Optus and TPG spectrum sharing arrangement in 2024, which expanded 4G coverage to over 98% of the population,¹⁸² showing how such frameworks can effectively reduce duplication and extend access. Such models demonstrate how well-structured sharing arrangements can balance competition and cooperation while improving overall network coverage.

175 Spectrum-Policy-Pakistan.pdf

176 Policy gaps, economic constraints cloud 5G rollout plans - Business - DAWN.COM

177 <https://www.phoneworld.com.pk/pakistan-spectrum-auction-2025-high-prices-risk-digital-progress>

178 <https://www.phoneworld.com.pk/reforming-pakistans-telecom-regulations-for-a-5g-and-iot-future/>

179 <https://www.phoneworld.com.pk/reforming-pakistans-telecom-regulations-for-a-5g-and-iot-future/>

180 Spectrum-Sharing-Positions.pdf

181 GSMA REPORT REVEALS LICENSED SPECTRUM FOR MOBILE OFFERS BEST POSSIBLE ECONOMIC BENEFIT - Spectrum

182 Optus announces \$1.6bn network sharing deal with rival TPG | Optus | The Guardian

- **Temporal Pause On USF Payments:**

USF fund has faced operational and structural challenges, having liquidity issues and difficulties in project execution, as highlighted in an Asian Development Bank report.¹⁸³ This is mainly due to bureaucratic hurdles and complicated access to the funds itself. In contrast, enabling infrastructure providers to directly invest in digital infrastructure is likely to deliver faster, more efficient, and cost-effective outcomes.¹⁸⁴ Further, telecom operators having contributed approximately PKR 20 billion to the USF over the past two years, currently do not have representation on the USF Board of Directors. The absence of industry input, alongside limited project activity during this period, highlights the need to revisit governance and operational effectiveness of the fund.¹⁸⁵

A temporary pause (3–5 years) on Universal Service Fund (USF) contribution, conditioned upon reinvestment of equivalent funds into infrastructure, would accelerate the expansion of digital connectivity across unserved areas and ensure effective utilization of resources.

- **National Roaming In Remote Areas:**

Prioritize national roaming agreements in regions with no telecom presence, such as Gilgit-Baltistan and the northern areas of Pakistan. Operators can invest in these zones to ensure coverage for their subscriber base and offer premium services where feasible.

- **Whitelisting Of Critical Numbers And Services During Forced Network Closures:**

In instances where government-mandated network outages occur (e.g., during special events like Muharram), critical services should remain accessible. This includes:

- Banking & financial transaction services
- Food delivery & ride-hailing applications
- Emergency helplines & hospitals
- Selected essential websites/IPS

Implementing a whitelisting framework will help balance national security concerns with the uninterrupted availability of critical services for citizens.

183 Pakistan's Digital Ecosystem: A Diagnostic Report

184 <https://www.phoneworld.com.pk/usf-faces-cash-flow-issues-and-policy-gaps-stalling-rural-connectivity/>

185 <https://tribune.com.pk/story/2536809/telecom-fund-utilisation-stalls>

Global Case Studies ^{186,187}

Strengthening Malaysia's Digital Connectivity

Malaysia is making significant strides in strengthening its digital infrastructure, supported by 29 submarine cable networks (including those under development) and six landing stations. This growing network is crucial for enabling advanced digital services such as cloud computing, big data, and IoT. Increasing submarine cable landings is expected to reduce latency, improve bandwidth, and enhance internet quality nationwide. With a goal to host the highest number of landings in Southeast Asia by 2025, Malaysia has reinstated the cabotage exemption to expedite deployments. These efforts are projected to drive economic growth, with improved connectivity potentially increasing GDP per capita by 6.9%.

Malaysia's expansion of submarine cable networks and multiple landing stations offers a strong example for Pakistan to diversify its international connectivity. Establishing a second landing point in Gwadar can reduce outages, improve bandwidth, and attract investment through regulatory and fiscal incentives.

Accelerating 4G and 5G Rollout in Indonesia

Indonesia is rapidly advancing its digital economy, guided by national strategies like "Making Indonesia 4.0" and the Digital Indonesia Roadmap 2021 - 2024, with a strong focus on expanding 4G coverage and developing a nationwide 5G network.

The government, through the Ministry of Communication and Information Technology (Kominfo), is prioritizing digital infrastructure upgrades to support high-speed connectivity, particularly in underserved regions. Key initiatives, including the "100 Smart Cities" program and the National AI Strategy, are driving the integration of advanced technologies across sectors. With internet penetration at 79.5% and growing demand for digital services, Indonesia is seeing major investments from global tech firms in cloud infrastructure and data centers. As 4G access broadens and 5G deployment gains momentum, sectors like e-commerce, fintech, health tech, and edtech are expected to thrive.

Indonesia's rapid 4G and 5G rollout, driven by public-private collaboration and targeted government support, highlights how Pakistan can accelerate nationwide connectivity by offering tax relief, flexible spectrum auctions, and infrastructure support, especially in underserved regions.

DATA CENTERS

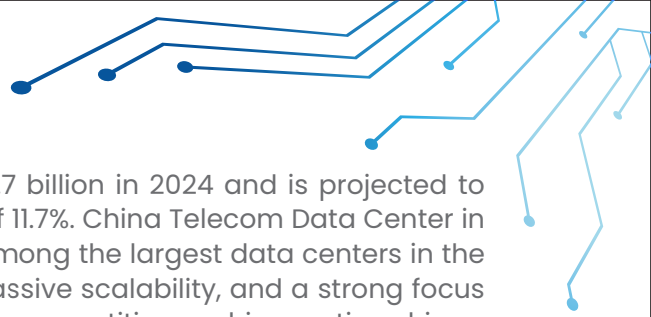
As digital interactions continue to grow, data centers have become increasingly essential for both businesses and individuals. Evolving from early computer rooms, they now support massive data volumes, with IDC predicting 175 zettabytes of data by 2025.¹⁸⁸ Data now exists across multiple locations, including on premises, the edge, and public or private clouds, requiring seamless communication between all sites. Even cloud services depend on the resources of physical data centers.¹⁸⁹

¹⁸⁶ Digital Inclusion: Bridging the Connectivity Divide in Malaysia - MIDA | Malaysian Investment Development Authority

¹⁸⁷ Indonesia Digital Economy

¹⁸⁸ What is a Data Center? Meaning, Definition, Operations & Types | Fortinet

¹⁸⁹ What is a Data Center? - Cisco



Globally, the data center market was valued at USD 242.7 billion in 2024 and is projected to reach about USD 585 billion by 2032, growing at a CAGR of 11.7%. China Telecom Data Center in Inner Mongolia and The Citadel Campus in Nevada are among the largest data centers in the world, showcasing cutting-edge cooling technologies, massive scalability, and a strong focus on energy efficiency.¹⁹⁰ The global market remains highly competitive and innovation driven, with trends such as cloud computing, edge computing, and green data centers shaping the future landscape.¹⁹¹ For Pakistan, these mega-facilities highlight the potential to develop regional data hubs and cloud services, but this requires major investment, reliable green energy, skilled talent, and strong regulatory support.

Pakistan's data center industry is evolving rapidly, supported by increasing demand for digital services and infrastructure, and has the potential to become a regional digital hub, especially for Central Asian countries.¹⁹² Revenue in Pakistan's data center and solutions market is projected to reach USD 1.7 billion by the end of 2025 and grow to USD 2.44 billion by 2030, reflecting a compound annual growth rate (CAGR) of 7.43%.¹⁹³ These figures for 'Data Center and Solutions' represent the full spectrum of the data center landscape, covering physical infrastructure (servers, storage, power, cooling), software and management tools, and managed and colocation services, rather than just operational or hosting services alone. Despite this progress, Pakistan still lags behind some regional peers. Malaysia's data center market was valued at USD 4.04 billion in 2024 and is expected to reach USD 13.5 billion by 2030, indicating a much higher growth trajectory. This highlights the significant gap between Pakistan and more developed markets in terms of investment, infrastructure, and scalability.¹⁹⁴

Pakistan has 22 data centers located in major cities. Karachi leads with 10 data centers, highlighting its importance as a business and technology hub. Lahore follows with 8 data centers, supported by its growing IT and industrial base, while Islamabad hosts 4 data centers, serving government and educational institutions. In Pakistan, data centers are operated by both private companies such as PTCL, Jazz (Jazz Digital Park), Multinet Pakistan, Cybernet, Supernet Limited and Data Vault Pakistan, and public sector entities including the State Bank of Pakistan, National Transmission and Despatch Company, Pakistan Telecommunication Authority, NADRA, and OGDCL.¹⁹⁵

In Pakistan, the relevance of data sovereignty has grown in parallel with the expansion of digital services and increasing volumes of citizen and institutional data. Sensitive information generated across sectors, such as financial transactions, government services, and healthcare records, requires secure and locally governed infrastructure to manage associated privacy, compliance, and operational risks. With expanding cloud adoption and greater reliance on digital platforms, local data centers have become critical to ensure that data remains within national jurisdiction, enabling continuity, regulatory oversight, and greater control over digital assets.¹⁹⁶ Pakistan's ability to bridge current infrastructure gaps and localize data storage will be key to unlocking the next phase of digital growth, improving service delivery, and asserting greater control over its data economy.



190 An Overview of the 5 Largest Data Centers in the World

191 Data Center Market Size, Share & Trends | Growth Report [2032]

192 Pakistan's Data Centre Industry Faces Growth Potential and Challenges, Experts Say -

193 Data Center - Pakistan | Statista Market Forecast

194 Malaysia Data Center Market Analysis 2025-2030: New

195 Pakistan's first prefabricated data center launched - The Daily CPEC

196 The case for data sovereignty

Recent Developments

- **AI Data Center:**

Data Vault Pakistan has launched Pakistan's first AI-focused, solar-powered data center in Karachi, offering high-performance GPU computing to support AI startups, researchers, and public sector innovation. The facility enables advanced solutions through secure, local infrastructure.¹⁹⁷

- **Quantum Cloud Investment:**

In a bold pivot from textiles to technology, Chakwal Spinning Mills Limited rebranded as Quantum Cloud and AI Technologies in mid-2024, announcing a PKR 7.78 billion (~USD 28 million) investment plan in partnership with PNO Capital to establish data centers and cloud infrastructure. The company disclosed to the Pakistan Stock Exchange, that PKR 500 million will be assigned as equity, PKR 400 million from sponsors while the remaining PKR 7.3 billion will be provided through convertible bonds. Optimus Capital Management (Private) Limited has been appointed as financial advisor for the investment process.¹⁹⁸

- **Astrolabes Launch:**

Huawei Pakistan, in partnership with the Higher Education Commission and DWP Technologies, has launched the country's first prefabricated containerized data center Astrolabes Data Center at NED University, Karachi. The facility will strengthen digital infrastructure and support Pakistan's shift to a knowledge-based economy under the E-Pakistan strategy.¹⁹⁹

- **National Open Data Portal:**

The National Open Data Portal (NODP) has officially been launched by the Ministry of Planning at the Pakistan Open Data Conference 2025. Developed by the National Centre in Big Data and Cloud (NCBC), the portal provides centralized, open access to over 1,100 government datasets across 14 sectors including health, education, economy, and environment, aiming to enhance transparency, support research, and enable evidence-based policymaking.²⁰⁰

Developed in partnership with key institutions such as the World Bank, Government of Pakistan, and Pakistan Institute of Education (PIE), NODP serves as a unified platform integrating provincial databases. With encouraged innovation and informed decision-making, it positions open data as a catalyst for inclusive development and data-driven progress across multiple sectors.²⁰¹

- **Data Protection Law:**

Data protection laws are essential for regulating the data center market in Pakistan. While sector-specific regulations currently address customer privacy within individual industries, a more comprehensive framework is underway. The Ministry of Information and Technology and Telecommunication has drafted the Personal Data Protection Bill (2023), which closely aligns with the European Union's General Data Protection Regulation (GDPR). Although the Draft Bill has completed the consultation phase, it awaits parliamentary approval.²⁰²

197 Pakistan launches first AI-powered data centre in Karachi, aiming for digital independence - Daily Times

198 Pakistani textiles company pivots to data centers - DCD

199 Pakistan's first Prefabricated Data Center, powered by Huawei and built by DWP, launches at NED - Islamabad Scene

200 Pakistan's first open data portal launched

201 National Open Data Portal, Pakistan Launches National Open Data Portal to Promote Transparency and Evidence-Based Policy | Welcome to LUMS

202 Data Protection & Privacy 2025 - Pakistan | Global Practice Guides | Chambers and Partners

- **NCPDP Formation:**

The Draft Bill proposes the creation of the National Commission for Personal Data Protection (NCPDP), an autonomous body responsible for regulating and implementing data protection measures. The NCPDP will have the authority to seek information from data controllers and processors and to establish a compliance framework for data audits, ensuring accountability and protection of digital information.²⁰³

Challenges

- **Government Competition In The Sector:**

Direct competition from government institutions is a major barrier to private sector growth. These entities often receive bidding relaxations, making it difficult for private players to compete on a level playing field. This discourages investment in what is otherwise a high-potential, high-growth sector.²⁰⁴

- **Energy Dependency And Infrastructure Gaps:**

Data centers generate a large amount of heat and require extensive energy to maintain ideal cooling conditions. Most data centers in Pakistan rely on traditional power sources and outdated cooling systems. Despite global trends toward sustainability, the lack of green transformation in legacy centers continues to increase operational inefficiencies. Energy remains the largest operational cost, with single data centers consuming 15–20 MW of power and requiring nearly USD 100 million in investment.²⁰⁵

The sector's expansion will depend on a reliable power supply, as transmission and distribution infrastructure remain inadequate. Grid congestion, fluctuating electricity prices, and long approval times for renewable projects (averaging over four years) further strain development. Since 2020, the costs of renewable projects have more than doubled. Developers are also required to contribute capital for building high-voltage power lines and substations, increasing financial burdens, and discouraging investment in clean energy solutions essential for the data center industry.²⁰⁶

- **Regulatory Uncertainty And Fragmentation:**

While initiatives like the Cloud First Policy and Digital Nation Act 2025, mark progress, the absence of a comprehensive, finalized legal framework creates uncertainty for operators and investors. Pakistan's data governance remains fragmented, with overlapping laws, institutional silos, and enforcement gaps. Conflicts between open data initiatives and privacy laws hinder innovation, while outdated compliance requirements slow modernization. Regulatory inconsistency also affects investor confidence and market predictability.²⁰⁷

Government data is siloed across administrative levels due to a lack of standardized protocols and interoperable systems. Poor oversight of sensitive data, fragmented regulatory authority, and outdated data classification practices limit effective digital service delivery and integration. Regulatory inconsistency also affects investor confidence and market predictability.²⁰⁸

203 Data Protection & Privacy 2025 - Pakistan | Global Practice Guides | Chambers and Partners

204 Pakistan's Data Centre Industry Faces Growth Potential and Challenges, Experts Say -

205 Pakistan endeavors to become regional hub of data center industry-*INP*

206 Data Centers | CBRE Pakistan

207 Data Governance in Pakistan: Policy Reforms and opportunities for digital transformation - Teletimes International

208 Data Governance in Pakistan: Policy Reforms and opportunities for digital transformation - Teletimes International

Recommendations

- **Support Private Sector Growth And Promote Green Data Centers:**

The government should focus on enabling policies rather than directly competing with private enterprises. Offering incentives such as tax credits and affordable land can attract investment, create high-value jobs, and accelerate digital infrastructure growth.²⁰⁹

Establishing data centers in cooler regions like Gilgit-Baltistan can significantly reduce cooling costs, improving energy efficiency. However, site selection must also account for risks such as floods and earthquakes, as well as access to internet connectivity, energy supply, and skilled labor. Leveraging renewable resources in wind-rich areas like Sindh and Balochistan, along with the use of solar energy, can help reduce operational costs and carbon emissions while tapping into Pakistan's renewable energy potential of over 60,000 megawatts.²¹⁰

- **Enabling The Portal's Sustainability:**

To ensure the National Open Data Portal's long-term utility, a formal policy should be implemented mandating that all contributing government entities refresh their datasets at least on a quarterly basis. A consistent refresh cycle warrants that the datasets are up-to-date and reliable, which in turn drives actual data reuse and enables real-time, data-driven policymaking.

A tiered pricing model would drive wider adoption and would make the portal more sustainable. By offering free access for academia, a low-cost tier for startups, and a standard commercial tier, the portal can promote fair access, encourage innovation, and generate revenue to fund future infrastructure needs.

- **Establish A Data Center Task Force:**

A specialized Data Center Task Force should be formed to coordinate between government and private stakeholders, ensuring that cloud computing policies are implemented in line with industry needs. This will improve transparency, regulatory responsiveness, and investment confidence.²¹¹

- **Invest In Human Capital And Strengthen Local Cloud Services:**

Strengthening the talent pipeline is critical for sustaining long-term sector growth. Partnerships between industry and academic institutions, such as the collaboration between DWP and Knowledge Stream, can ensure a steady supply of skilled data center professionals to handle data and reduce cybercrimes.²¹²

Supporting local cloud service providers through targeted incentives and tax relief will build domestic capacity, reduce reliance on foreign platforms, and make the local digital economy more resilient and competitive.²¹³

- **Reform Legal Frameworks:**

A National Data Governance Council should be established to bring together regulators, civil society, technical experts, and the private sector to coordinate national-level strategies. A comprehensive data standardization policy must be enacted to ensure consistency, interoperability, and machine readability across public sector data.

The Personal Data Protection Bill must be passed to secure individual rights and ensure lawful dataprocessing. Alongside this, an Open Data Law should be introduced to promote transparency and innovation while ensuring alignment with the Digital Nation Act and the forthcoming artificial intelligence policy.²¹⁴

209 Pakistan's Data Centre Industry Faces Growth Potential and Challenges, Experts Say -

210 Pakistan's Data Centre Industry Faces Growth Potential and Challenges, Experts Say -

211 Pakistan is Behind Regional Peers in Setting Up Data Centers: Report

212 Pakistan's Data Centre Industry Faces Growth Potential and Challenges, Experts Say -

213 Pakistan is Behind Regional Peers in Setting Up Data Centers: Report

214 Data Governance in Pakistan: Policy Reforms and opportunities for digital transformation - Teletimes International

- **Local Data Centers:**

As Pakistan transitions toward a digital-first economy, the establishment of modern, energy-efficient, local data centers is critical. With national digitization efforts accelerating, surplus power earmarked for high-performance infrastructure, and enhanced global connectivity through Africa-2, Pakistan is positioned to attract strategic investment in this space. Fast-tracking local data center development will address data sovereignty, unlock efficiency gains, and anchor the country's emergence as a competitive regional hub for cloud, fintech, and digital services.²¹⁵

Global Case Studies ^{216,217}

Data Center Development In Malaysia

The Malaysia Data Center Market was valued at USD 4.04 billion in 2024 and is expected to reach USD 13.57 billion by 2030, reflecting a strong compound annual growth rate of 22.38 percent. The growing demand and promising market potential has attracted a large number of new entrants, which is likely to increase competition in revenue generation over the coming years. The market also benefits from the active participation of global support infrastructure vendors, resulting in a more competitive landscape for infrastructure solutions. Several local and international construction firms are operating in the market, including AEON Services, Advance Power Engineering, China Construction Industrial and Energy Engineering Group, DSCO Group, Gamuda, and MN Holdings, among others. In a notable development, Asima Architects was selected by Amazon Web Services in August 2024 to support the development of its first data center in Cyberjaya.

Malaysia's rapid growth suggests Pakistan can attract significant foreign investment and accelerate digital infrastructure development by offering incentives and fostering a competitive environment for global and local players.

Renewable Energy Driving Data Center Growth In South Africa

The South Africa data center market was valued at USD 2.16 billion in 2024 and is projected to reach USD 3.40 billion by 2030, growing at a CAGR of 7.86 percent. It remains the largest data center market in Africa, driven by a large consumer base, supportive data regulations, and a dynamic tech sector. The growth of artificial intelligence, IoT, and smart city initiatives is fueling digital innovation, supported by ten operational submarine cables and plans for two more. To manage ongoing power shortages, operators are turning to renewable energy through power purchase agreements and self-developed sources. Teraco (Digital Realty) is building a 120-megawatt solar farm, and Vodacom Business has partnered with Eskom for energy supply. The country's renewable energy potential continues to attract strong investment interest.

This shows Pakistan can overcome energy challenges by prioritizing renewable energy solutions for data centers, and that a strong legal framework and national strategy are crucial for driving digital innovation and investment.

215 Data centres and a digitisation opportunity - Business - DAWN.COM

216 South Africa Data Center Market Size & Share Analysis | Growth 2025-2030

217 Malaysia Data Center Market Analysis 2025-2030: New

SATELLITE INTERNET

With greater speeds and lower latency, satellite internet has quickly advanced to compete with fiber and cable. From a global perspective, it has the potential to bridge the digital divide by extending internet access to remote and underserved areas.²¹⁸

Satellites are classified by their orbits—Low Earth Orbit (LEO) and Geostationary Earth Orbit (GEO), each offering unique coverage and latency characteristics. LEO satellites circle close to Earth's surface and move quickly, requiring large constellations for complete coverage, while GEO satellites remain fixed over a single spot, providing broad and stable coverage with just a few satellites.²¹⁹ Traditional terrestrial networks often struggle to reach remote locations; however, LEO satellites enable high-speed, low-latency connectivity across the globe. Currently, LEO satellites typically orbit at 160 to 2,000 miles above Earth's surface, allowing for real-time communication, strengthening their ability to connect people across vast distances.^{220,221}

The global satellite internet market is projected to grow from USD 5.9 billion in 2024 to USD 6.5 billion in 2025 at a CAGR of 11.2%, and reaching USD 24 billion²²² by 2029 driven by rural connectivity, disaster recovery, and global access.²²³ Regional peers of Pakistan are also seeing strong growth: China satellite internet market generated a revenue of USD 716.6 million in 2024 and is expected to reach USD 1,495.4 million by 2030. Meanwhile, Malaysia's satellite services market size was valued at USD 433.47 million in 2023 and is projected to reach USD 621.04 Million by 2031, growing at a CAGR of 4.60% from 2024 to 2031.^{224, 225} SpaceX's Starlink and Amazon's Project Kuiper aim to provide high-speed broadband, particularly in rural areas, and are gaining significant attention for their potential to transform telecommunications. The expansion of low earth orbit satellite internet is evolving rapidly across North America, Europe, Australia, and parts of Asia and Africa, primarily driven by Starlink and OneWeb.²²⁶

In Pakistan, satellite internet is gaining traction, especially in isolated and underdeveloped regions that lack access to DSL or traditional fiber infrastructure. The government has responded with enabling regulations, the Pakistan Telecommunication Authority (PTA) and Pakistan Space Activities Regulatory Board (PSARB) granted Starlink provisional approval in 2025, allowing pilot testing in mountainous and border areas, while Kacific's partnership with PAKSAT and SUPARCO is delivering Ka-band satellite connectivity to many underserved public-sector sites. Satellite terminals can be deployed for cheaper in rural areas with no preexisting infrastructure, compared to fiber optics per kilometer cost, offering a rapid and lower-cost path to connectivity.²²⁷

Beyond affordability, satellite internet offers critical advantages in resilience, ensuring connectivity during terrestrial network outages or natural disasters and acts as a complement to fiber and mobile networks by enabling 4G/5G backhaul in hard-to-reach regions. This positions satellites as a bridge for underserved communities and not a replacement for terrestrial broadband in urban cores. While these advancements mark important progress, low Earth orbit satellite internet in Pakistan remains in its early deployment phase and is not yet widely available for commercial use.²²⁸

218 Satellite Internet Market Size, Share, Industry Report, Revenue Trends and Growth Drivers

219 LEO, MEO, and GEO, Oh My! Modern Satellite Connectivity, Explained - Telarus

220 Satellite Internet Market Size, Share, Industry Report, Revenue Trends and Growth Drivers

221 LEO, MEO, and GEO, Oh My! Modern Satellite Connectivity, Explained - Telarus

222 Global Satellite Internet: The Future of High-Speed Connectivity

223 Satellite Internet Market Size Report 2025 Industry Share To 2034

224 <https://www.grandviewresearch.com/horizon/outlook/satellite-internet-market/china> china satellite internet market size - Google Search

225 In-Depth Industry Outlook: Malaysia Satellite Services Market Size & Forecast

226 Global Satellite Internet: The Future of High-Speed Connectivity

227 Kacific and PAKSAT partner to bring affordable satellite Internet to Pakistan - PR Newswire APAC

228 Information on Space Sector Regulations in Pakistan | PSARB - Pakistan Space Activities Regulatory Board

Geostationary Satellite Internet In Pakistan

PAKSAT International (Pvt) Limited offers PAKSAT-MMI, a High Throughput Satellite (HTS) in Geostationary Earth Orbit (GEO), which is a significant asset for Pakistan's communication infrastructure. Paksat International launched its new high-throughput satellite Paksat-MMI on May 30, 2024.

Paksat-MMI utilizes high-throughput service (HTS) with Ka-band technology to provide reliable high-speed internet across Pakistan, including remote areas. It offers speeds of up to 160 Mbps with 24/7 connectivity and cost-effective solutions for businesses and public services. Its low power requirement of 60W and simplified, portable terminal setup enables flexible and accessible deployment.²²⁹

Recent Developments

Established in May 2024, the Pakistan Space Activities Regulatory Board (PSARB) regulates the space sector, and multiple LEO operators are currently applying for licenses and approvals.²³⁰

- **Starlink:**

Starlink, owned by Elon Musk, is a leading provider of internet via low-Earth orbit satellites, offering connectivity in remote areas without reliance on traditional cables. It has officially registered with SECP Pakistan as Starlink Internet Services (Private) Limited.²³¹

The Pakistan Space Activities Regulatory Board (PSARB) has appointed a consultant to draft regulations for LEO satellite services. Meanwhile, Starlink is in the process of securing necessary licenses from the Pakistan Telecommunication Authority (PTA), including a Long Distance International (LDI) license submitted on February 24, 2022, and 14 Local Loop licenses applied for on April 29, 2022. Starlink's services are expected to launch in Pakistan once the regulatory process is completed.^{232,233}

The provisional license allows Starlink to proceed with installing its infrastructure and prepares the way for service rollout by December 2025. Starlink received provisional approval from PTA and regulatory clearance from PSARB in early 2025. Pilot testing has started in satellite-to-cell service in Pakistan's border and mountainous zones, such as northern KP and Gilgit-Baltistan, to eliminate coverage gaps in areas underserved by fiber or mobile networks. These pilot tests are part of Starlink's broader plan to establish two or three ground stations, and the company has expressed confidence in completing setup within five to six months, contingent on final approvals from relevant authorities.^{234,235,236}

- **Kacific Broadband Satellites Group Partnership With PAKSAT:**

Kacific Broadband Satellites Group, a leading Ka-band satellite operator, provides affordable, high speed internet across Asia and the Pacific using advanced space and ground technologies. In Pakistan, Kacific is partnering with PAKSAT International (Pvt) Limited, SUPARCO, and Supernet Limited to expand satellite broadband coverage. Utilizing 11 Ka-band spot beams on Paksat-MMI, the collaboration aims to connect over 20,000 sites, enhance rural connectivity, and bridge the digital divide through reliable, high-throughput internet services.²³⁷

229 HTS – PAKSAT International

230 Information on Space Sector Regulations in Pakistan | PSARB – Pakistan Space Activities Regulatory Board

231 Starlink plans to set up multiple ground stations in Pakistan

232 Pakistan Keeps Satellite Internet Market Open – Digital Pakistan

233 Starlink plans to set up multiple ground stations in Pakistan

234 Pakistan's ambassador highlights Starlink's potential to bridge digital divide ahead of launch – Profit by Pakistan Today

235 Starlink plans to set up multiple ground stations in Pakistan

236 Musk's Starlink gets licence to operate in Pakistan – Newspaper – DAWN.COM

237 Kacific and PAKSAT partner to bring affordable satellite internet to Pakistan

Kacific offers end-to-end support, from satellite operations to network management, for seamless and cost-effective service expansion in Pakistan. Its “Gigstarter” plans provide unlimited data with affordable, easy installation for both homes and businesses. Services will be delivered through licensed operators, with Kacific training and certifying hundreds of Authorized Distributors to install, resell, and maintain connections nationwide. In partnership with PAKSAT, this initiative aims to transform Pakistan’s digital landscape by empowering communities and enabling economic growth, especially in remote areas.²³⁸

- **Galaxy Space:**

Chinese satellite firms, including Galaxy Space, have also shown interest in entering Pakistan’s space tech market, although no formal applications have been submitted yet. Galaxy Space develops low cost, mass-production LEO satellites for commercial communications and operates a constellation of seven satellites, exploring applications for satellite internet to help connect communities and improve lives.²³⁹

A delegation led by the chairman of Galaxy Space expressed strong interest in investing in Pakistan’s space technology industry and pursuing joint ventures with local institutions and telecom companies. Pakistan is deepening its space cooperation with China to strengthen its satellite capabilities and telecommunications infrastructure, reflecting growing regional interest in space-based economic development.²⁴⁰

- **Shanghai Spacecom Satellite Technology (SSST):**

Shanghai Spacecom Satellite Technology (SSST) is launching a Low Earth Orbit (LEO) satellite constellation of over 1,000 satellites. By 2027, this system aims to provide global users with high-speed internet, real-time high-precision navigation, quasi-real-time remote sensing, and comprehensive business services.^{241,242}

SSST has successfully completed its registration with the Securities and Exchange Commission of Pakistan (SECP). Only companies registered locally are eligible to apply for licenses from the PTA. SSST, with the backing of the Shanghai municipal government, is committed to establishing a new “satellite internet” infrastructure, and like Starlink, has already submitted its application for a PTA license, moving a step closer to realizing its vision in Pakistan.²⁴³

Challenges

- **Connectivity Gaps And Fiber Limitations:**

Reliable internet connectivity is often limited or expensive in rural and low-income areas, widening the digital divide and making it harder for students there to keep up with schoolwork or attend remote classes.

Pakistan’s broadband demand is growing, yet over 130 million people remain offline. Fiber penetration is extremely low, with less than 5% of homes connected, and only 10% of cell towers connected to fiber, well below the international benchmark of 40%.²⁴⁴

238 Kacific and PAKSAT partner to bring affordable satellite Internet to Pakistan – PR Newswire APAC

239 GalaxySpace

240 Pakistan and China to boost space cooperation with focus on satellite tech and manned missions – Profit by Pakistan Today

241 Shanghai Spacecom Satellite Technology

242 Chinese firm SSST registers in Pakistan to compete with Starlink

243 Chinese firm SSST registers in Pakistan to compete with Starlink

244 Pakistan’s Internet Access Frontier: Fiber Optics, 5G Delays, and Starlink’s Big Promise

- **Satellite Internet Constraints:**

Satellite internet access has been available for decades using geosynchronous satellites, but their large distance from Earth, which is about 22,300 miles, results in high latency and delays in receiving signals.²⁴⁵

Pakistan's satellite communications sector has attracted significant interest from global LEO operators, but regulatory delays are holding back their entry. None of the companies have yet received the mandatory No Objection Certificate (NOC) from the Pakistan Space Activities Regulatory Board (PSARB). This delay is a major hurdle to expanding satellite internet connectivity and securing substantial foreign investment.²⁴⁶

- **Barriers To Starlink Accessibility In Pakistan:**

The high cost of Starlink's internet service initially will limit its accessibility to higher-income users, but prices are expected to ease as subscriptions grow. Currently, the projected monthly fee for a basic residential package starts at approximately PKR 35,000, with a one-time hardware cost of PKR 110,000, which is significantly higher than the average internet price of PKR 3,000 to PKR 4,000 in Pakistan. However, these prices are within reach for businesses and organizations looking to improve their operational efficiency. The need for ground stations to support service delivery further adds to the challenges of LEO satellites integration in Pakistan.^{247,248}

Recommendations

- **Accelerate Regulatory Approvals:**

Time-bound and transparent procedures should be adopted for issuing NOCs under the Pakistan Space Activity Rules (2024). A standard compliance checklist should be published to guide applicants and reduce uncertainty for global players such as Starlink and SSST.

PTA and PSARB should establish a dedicated fast-track pathway for LEO satellite operators. This should include simplified documentation, clear evaluation timelines, and reduced processing delays for space-based internet services.

- **Enhance Affordability And Accessibility:**

To lower barriers for residential users, the government should provide targeted subsidies or financing schemes for satellite equipment. Duty exemptions on hardware and tax incentives for early adopters can also help improve affordability.

- **Strengthen Infrastructure And Policy Support:**

PSARB and the Ministry of IT and Telecom should partner with satellite operators to co-develop shared ground stations. This approach will reduce costs, avoid duplication, and ensure faster deployment in remote regions.

The policy should set clear objectives for reducing service costs, encouraging local assembly of user terminals, and phasing national LEO satellite deployment. This will guide investment decisions and align private initiatives with national goals.

245 Kacific and PAKSAT partner to bring affordable satellite Internet to Pakistan - PR Newswire APAC

246 Three global satellite internet operators seek entry into Pakistan - Profit by Pakistan Today

247 Starlink in Pakistan

248 'Concerns' delay Starlink service launch - Business Recorder

Global Case Studies ^{249,250,251}

LEO Satellite Expansion In North America

In 2024, North America led the market, reaching a value of USD 3 billion, driven by significant funding in LEO satellite technologies aimed at strengthening internet connectivity, securing borders, enhancing surveillance, and improving missile tracking. As an example, in July 2024, Amazon revealed that it had accelerated the production and testing of small satellites for its Project Kuiper network at its Kirkland, Washington facility, where over 3,000 satellites are expected to be manufactured in the years ahead.

Project Kuiper is Amazon's venture aimed at delivering high-speed, reliable broadband to users and communities across the globe, particularly in areas that currently lack sufficient internet and communication services. To make this happen, Amazon plans to launch a vast constellation of satellites in low earth orbit (LEO), connected to a network of ground stations, fiber links, and internet access points.

The rollout of Project Kuiper underscores how public private partnerships and localized satellite manufacturing hubs can fast track LEO deployment. Pakistan should adopt similar infrastructure and policy support measures such as co-developing ground stations and encouraging local assembly to expand satellite internet access in remote areas.

Government Funding Driving LEO Deployment In Europe

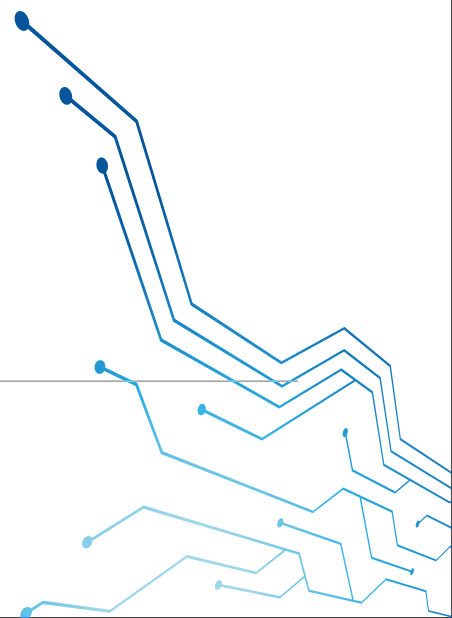
Europe is expected to experience strong growth during the forecast period due to the growing deployment of LEO constellations aimed at improving internet quality and expanding coverage. The LEO industry is gaining significant momentum as many organizations invest in this evolving technology and its applications, reflecting its growing role in delivering true global connectivity. In 2023, the European Parliament approved USD 2.6 billion in funding for its new IRIS2 constellation, demonstrating the region's strong commitment to advancing LEO satellite communications.

This initiative demonstrates the impact of government backed funding and regulatory clarity in accelerating LEO deployment. Pakistan can learn from this by establishing fast track approval mechanisms and transparent licensing processes to attract global satellite operators and boost broadband investment.

249 LEO Satellite Market Size, Share | Industry Growth [2032]

250 Amazon's satellite internet network Project Kuiper plans new Everett facility

251 ESA - ESA to support the development of EU's secure communication satellites system





CHAPTER 3: GOVERNMENT, PRIVATE SECTOR, AND MASS DIGITAL USE CASES

The digital transformation of Pakistan's public sector is a critical enabler of sustainable economic growth, transparency, and inclusive service delivery. E-Governance, or the use of digital tools to enhance governance and public administration, is now an indispensable pillar of the national digital strategy. It encompasses digitizing public services, automating internal government processes, improving citizen engagement, and fostering data-driven decision-making.

Pakistan stands at a pivotal moment in its digital transformation journey. Both the government and private sector have made notable strides in recent years. To build this momentum, a clear and collaborative approach is essential to scale digital adoption across public services, industrial verticals, and the broader population.

This section outlines how key stakeholders can drive sustainable digital progress, structured across the following critical domains: E-Governance, FinTech, AgriTech, EdTech, and HealthTech, Cloud, E-commerce, Export of IT and IT-Enabled Services, Overall Start-up Ecosystem and the Role of Accelerators and Incubation Programs, Sustainability through Digitalization, Improving Diversity, Equity and Inclusion (DEI) and Women Empowerment, Digital Literacy, and Public Safety Reforms.

E-GOVERNANCE


Pakistan is moving forward in its e-governance journey, indicating an increasing institutional focus on improving the accessibility, efficiency, and transparency of government services. While progress is ongoing, these efforts aim to enhance public service delivery and contribute to broader economic development. Globally, countries are focusing on single digital platforms that let citizens access multiple services in one place. Many are utilizing automation to handle routine tasks and exploring blockchain for secure processes like land records and voting. As more services go online, protecting citizen data and ensuring equal access, especially for those in remote or low income areas, are top concerns.

Pakistan's progress can be tracked through global benchmarks like the UN E-Government Development Index.^{252,253,254,255,256}



- **E-Participation Index:** Pakistan's ranking in the E-Participation Index has improved to 88th place in 2024, compared to 106th in 2022. This indicates a greater emphasis on citizen engagement through digital platforms and a move towards more interactive and participatory governance.²⁵⁷
- **UN E-Government Development Index (EGDI):** Pakistan's EGDI score rose to 0.5095 in 2024 (from 0.4238 in 2022), marking a notable increase in its digital governance performance.²⁵⁸ As a result, Pakistan ranked 136th out of 193 countries in the 2024 UN E-Government Development Index. This represents a jump from its 150th position in 2022 and marks the country's first entry into the "High EGDI category." This advancement reflects enhanced online service delivery, improved telecommunications infrastructure, and strengthened human capital development.²⁵⁹ This progress, however, still lags behind regional peers like Bangladesh, which achieved an EGDI of 0.6570 in 2024 and ranked 100th, surpassing both the South Asian and Global averages.^{260,261}

252 The Future of E-Government: Trends and Innovations for 2025 and Beyond - CODO Ltd
253 EGOVKB | United Nations > About > Overview > E-Government Development Index
254 Digital 2025: Global Overview Report — DataReportal — Global Digital Insights
255 https://reports.weforum.org/docs/WEF_The_Global_Public_Impact_of_GovTech_2025.pdf
256 EGOVKB | United Nations > Data > Country Information
257 EGOVKB | United Nations > Data > Country Information
258 Pakistan rises to 136th position in UN e-government index
259 EGOVKB | United Nations > Data > Country Information
260 EGOVKB | United Nations > Data > Country Information
261 Bangladesh climbs 11 notches on UN's digital govt services index | The Business Standard



Across South and Southeast Asia, countries like Bangladesh, Vietnam, and Indonesia are making significant strides in e-governance by focusing on citizen-centric services, digital infrastructure, and secure data systems. Bangladesh is rolling out a National Digital Architecture and a universal payment gateway while digitizing over 800 public services.^{262,263,264} Vietnam is prioritizing end-to-end online service delivery, shared government databases, and digital signatures.²⁶⁵ Indonesia, with a population and geography comparable to Pakistan, is investing in national payment systems, AI readiness, and inclusive infrastructure to support its growing digital economy.^{266,267,268} These regional examples provide practical lessons and clear benchmarks that can help guide and enhance Pakistan's ongoing efforts to modernize its e-governance landscape.

Recent Developments

- **E-Office System Adoption:**

The Prime Minister directed all federal ministries, divisions, and state-owned entities to achieve 100% implementation of the e-Office system, including inter-ministerial correspondence in 2025.^{269,270} To ensure accountability, the Ministry of IT and Telecommunication has requested entities to submit compliance evidence and introduced performance-based recognition for top adopters. The Cabinet has also instructed the MoIT to enforce strict cybersecurity protocols as part of this rollout.

This milestone reflects Pakistan's push toward digitizing government workflows, improving transparency, and embedding efficiency into public administration.²⁷¹

- **E-Filing And Office Automation System (E-FOAS):**

The E-Filing and Office Automation System (e-FOAS), developed by PITB, is a cloud-based platform transforming government offices into paperless environments in Punjab. It digitizes file management, correspondence, and record-keeping, ensuring 24/7 digital accessibility and secure document archiving. e-FOAS streamlines workflows, significantly reducing approval times, cutting administrative costs by eliminating manual systems, and enhancing overall transparency and efficiency in governance. The Punjab government has mandated its implementation across all provincial offices.²⁷²

Through e-FOAS, Pakistan has achieved a notable digital revolution in its public administration, shifting from cumbersome paper-based processes to efficient, transparent, and accessible digital workflows, thereby accelerating government operations.

- **NADRA's PAK-ID App:**

The National Database and Registration Authority (NADRA) remains central to Pakistan's digital infrastructure, providing critical digital identity and authentication services that underpin numerous e-governance initiatives.

In 2025, NADRA launched an upgraded version of its Pak-ID mobile app with a Single Sign-On (SSO) and new features including digital ID storage, facial biometric verification, real-time CNIC tracking, appointment booking, and improved navigation, enabling citizens to access identity services from home.²⁷³

262 Bangladesh's digital transformation roadmap draft: Key takeaways | The Daily Star

263 pressBriefonEgovProject(27.01.2025).pdf

264 Interim govt drafts plan, eyes full digital economy, smart governance by 2030 | The Business Standard

265 Infographics: Viewpoints and goals of National Digital Transformation Program

266 Indonesia Digital Transformation

267 Unleashing the Potential of AI for Indonesia's Digital Government Transformation - Digest by The HEAD Foundation

268 Indonesia prepared to drive ASEAN digital economy leadership - ANTARA News

269 IT Ministry Seeks 100% E-Office Usage in Ministries, Attached Departments and SOEs

270 PM directs e-office implementation in all ministries by 20th - Business Recorder

271 Pakistan's Federal Government Goes Digital with Mandatory E-Office System | Flare

272 PITB Organizes e-FOAS Training for South Punjab Secretariat | PITB

273 NADRA launches upgraded Pak-ID mobile app

It allows users to log in once with their CNIC to securely access multiple online services without creating separate accounts or managing multiple passwords.²⁷⁴

- **National Information Technology Board (NITB) Driven E-Governance:**²⁷⁵

The National Information Technology Board (NITB) continues to be a driving force in modernizing government operations and citizen-centric services through a diverse portfolio of digital projects. These initiatives are expected to mature and expand their reach.

- **One Patient One ID:**

The Ministry of Health, in collaboration with NADRA, is developing the 'One Patient, One ID' system to create unified electronic health records across healthcare providers.²⁷⁶ It links every individual's CNIC to a permanent medical record number, ensuring lifelong tracking of health history. By placing the patient at the center of the system, it enables faster, better-informed healthcare anywhere in the country.^{277,278}

- **E-Governance Training Programs:**

Capacity-building initiatives have also played a key role, such as the "E-Governance for Service Delivery" workshop organized by the Akhtar Hameed Khan National Center for Rural Development (AHKNCRD) in March 2024. These programs are designed to equip government officials with the skills and knowledge necessary to implement e-governance best practices, helping build a digitally competent public sector workforce for 2025 and beyond.²⁷⁹

- **Punjab Urban Land System Enhancement (PULSE) Project:**

The Government of Punjab, with World Bank financing, has launched the PULSE project to digitize urban and rural land records across the province. The initiative replaces old manual recording systems with a modern digital registry linked to geo-mapped land boundaries.²⁸⁰

By eliminating registration delays on agricultural land and resolving mass ownership disputes, the project aims to enhance land ownership records, reduce legal risks, and improve the investment climate for real estate, agriculture and infrastructure development. This marks a key initiative in advancing e governance and land transparency in Pakistan.²⁸¹

Challenges

- **Policy And Implementation Gap:**

While national-level digital strategies have been introduced, there remains a clear disconnect between policy formulation and on-ground execution. This often results in delays, fragmented efforts, and inefficiencies across departments and government tiers.

269 IT Ministry Seeks 100% E-Office Usage in Ministries, Attached Departments and SOEs

270 PM directs e-office implementation in all ministries by 20th - Business Recorder

271 Pakistan's Federal Government Goes Digital with Mandatory E-Office System | Flare

272 PITB Organizes e-FOAS Training for South Punjab Secretariat | PITB

273 NADRA launches upgraded Pak-ID mobile app

274 NADRA

275 E-Pakistan - Ministry of Planning Development & Special Initiatives

276 Medical records to be linked with CNICs under new digital health system

277 Pakistan launches one patient, one ID to transform healthcare access | Biometric Update

278 <https://www.dawn.com/news/1904701>

279 KM_287-20240212144301

280 Punjab Land Record Digitization 2025: A New Era of Transparency and Trust - Green Future Properties | Trusted Real Estate Solutions

281 Punjab digitalises land records system under Pulse project - Pakistan - DAWN.COM

- Inadequate Infrastructure And Financial Constraints:**

Many government entities, particularly at the provincial and local levels, continue to face shortages in basic digital infrastructure, ranging from hardware and connectivity to secure platforms. Limited funding further hampers the expansion and long-term sustainability of digital initiatives.
- Organizational Resistance:**

Outdated institutional structures, hierarchical decision-making, and general resistance to change within public sector bodies due to reasons such as outdated hierarchies continue to slow down digital adoption and innovation.
- Unreliable Connectivity:**

Persistent internet outages and inconsistent speeds, especially in underserved and remote areas, undermine the reliability of digital services and limit access to e-governance platforms.
- Fragmentation And Lack Of Coordination:**

The absence of a unified, integrated e-governance framework has resulted in siloed digital initiatives, with provincial and local governments often operating independently rather than as part of a cohesive national ecosystem.^{282,283}
- Cybersecurity And Data Protection Risks:**

As government systems become more digitized, the risks to data security and citizen privacy are increasing. Pakistan lacks comprehensive data protection legislation and enforcement mechanisms. The ongoing development of centralized digital identity systems makes it even more urgent to establish safeguards to protect sensitive personal information.

Recommendations

- Develop A Unified And Harmonized National E-Governance Framework:**

It is critically important to move beyond fragmented initiatives and establish a single, integrated national e-government model. This comprehensive framework should span across federal, provincial, and local government bodies, taking a cohesive and standardized approach to digital service delivery. Such harmonization will prevent duplication of efforts, optimize resource allocation, and provide citizens with a seamless experience when interacting with various government entities.²⁸⁴

Citizens' e-governance portals should embed real-time feedback tools (e.g. complaint systems, service ratings) across digital services. Existing SOPs should include that the feedback leads to visible improvements and greater public trust.

282 (PDF) An analysis of E-governance in Pakistan from the lens of the Chinese governance model

283 Challenges of emerging e-governance – Pakistan & Gulf Economist. (PDF) E-Government in Pakistan – Implementation and Challenges, Pakistan rises to 136th position in UN e government index, DIGITAL PAKISTAN MONITOR – January 2025 – FNPk

284 (PDF) E-Government in Pakistan – Implementation and Challenges

- **Strengthen System Interoperability**

The government should enable seamless integration across platforms so citizens can access multiple services through a single, secure login, reducing duplication and improving user convenience. Building existing services like NADRA's Pak-ID, which allows users to access multiple services through a single CNIC login. Expanding this model across all government platforms will allow the delivery of seamless, citizen-centric e-services. Scaling interoperability nationwide will minimize duplication, enhance efficiency, and significantly improve the overall user experience.²⁸⁵

- **Investment In Digital Infrastructure And Adequate Resources:**

A foundational requirement is a significant increase in investment towards developing and maintaining a resilient digital infrastructure. This includes not only enhancing nationwide broadband access to ensure connectivity for all citizens but also improving internet stability to mitigate frequent outages that disrupt services and commerce. Furthermore, establishing secure and reliable domestic cloud facilities is vital for data sovereignty, reducing reliance on foreign infrastructure, and ensuring the efficient hosting of e-governance applications and data.^{286,287}

- **Strengthen Institutional Capabilities And Implement Comprehensive Capacity Building Programs:**

A concerted effort must be directed towards enhancing the capabilities of government institutions at all levels. This involves not only providing comprehensive training to public sector employees to equip them with essential digital skills but also enabling a forward-thinking culture of technological adoption and continuous learning within the bureaucracy. Such programs should address skill gaps in areas like data analytics, cybersecurity and digital project management.^{288,289}

- **Enhancement Of Data Protection And Cybersecurity Measures:**

A top priority must be the enactment and rigorous enforcement of a human rights-compliant data protection law. This legislation should provide clear guidelines for ethical collection, secure storage, and responsible usage of personal and sensitive data. Alongside this, implementing cybersecurity measures, including multi-layered access controls, encryption, and regular security audits, is important, especially for centralized digital identity systems to safeguard citizen data from breaches and misuse. Additionally, exploring decentralized data storage models where appropriate can also enhance the overall system's resilience.²⁹⁰

- **Strategic Cultivation Of Public-Private Partnerships:**

Encouraging and facilitating greater collaboration between government bodies and the private sector is essential. Leveraging the private sector's technological expertise, innovative capacity, and financial resources can significantly enhance the speed and quality of digital service delivery, infrastructure development, and the overall efficiency of e-governance initiatives. These partnerships can also bring in agile development methodologies and specialized skills.

288 (PDF) An analysis of E-governance in Pakistan from the lens of the Chinese governance model

289 KM_287-20240212144301

290 DIGITAL PAKISTAN MONITOR – January 2025 – FNPk

Global Case Studies ^{291,292,293,294,295}

United Arab Emirates: UAE PASS – Transforming E-Government Delivery

UAE PASS is the nation's official digital identity and electronic signature platform, enabling secure, single-sign-on access to over 12,000 government and private sector services as of 2024. Credible across both federal and local platforms, including the Ministry of Finance and key semi-government entities. UAE PASS supports legal e-signatures, biometric authentication, and digital vaults, reducing citizen dependence on physical documents and in-person visits

- Digital signature functionality allows formal transactions (e.g. business setup, contracts) to be completed entirely online.
- The related "Zero Government Bureaucracy" policy eliminated over 2,000 redundant procedures, cutting compliance burdens and improving service delivery efficiency, further reinforcing the e-government agenda.

UAE's integrated digital identity system and streamlined document exchange offers a scalable template for Pakistan, which can similarly benefit from single-sign-on systems, reduction of unnecessary procedures, legal e-signatures, and cross-sectoral interoperability.

Saudi Arabia: Absher – Digitizing Public Services At Scale

Launched in 2010 by the Ministry of Interior, Absher has evolved into Saudi Arabia's leading e-governance platform, offering over 280 digital services to more than 28 million users by 2024. Initially created to digitize traffic and passport services, Absher has since become a one-stop app for citizen-government interactions, covering civil affairs, driving licenses, visa issuance, Hajj permits and court appointments.

- Absher consolidates hundreds of services from multiple ministries and public departments into a single user interface, reducing the need for physical visits and paper documentation.
- Absher supports electronic authorizations and document issuance, allowing citizens and expatriates to manage legal affairs remotely.

Saudi Arabia's Absher platform demonstrates how consolidating citizen services into a unified, mobile-first interface can dramatically improve accessibility, trust, and efficiency in government operations. Pakistan can replicate this model by investing in a single national platform that integrates essential public services, from civil registration to licensing, backed by strong digital identity authentication, real-time service tracking, and multilingual support to reach underserved populations. Absher's success underlines the importance of convenience, legal enablement, and centralized access in building a citizen-centric digital governance ecosystem.

291 <https://seedgroup.com/2025/01/expert-zero-bureaucracy-and-digital-government-initiatives-transform-compliance-and-setup-for-businesses-in-the-uae/>

292 UAE Pass Explained: Access to All Government Services

293 UAE's Digital Government Strategy (2021–2025) | Digital Watch Observatory

294 Ministry of Finance Enables UAE Pass for All Services – Ministry of Finance – United Arab Emirates

295 The UAE Digital Government Strategy 2025 | The Official Portal of the UAE Government

DIGITAL FINANCIAL SERVICES AND FINTECH

Pakistan's digital financial services narrative has shifted from an emerging stage to a high growth stage, fueled by progressive regulatory frameworks, infrastructural maturation, and an increase in consumer adoption. SBP policies and the successful launch of initiatives like the Raast instant payment system have shifted the market dynamics and driven a significant increase in financial inclusion and digital transaction volumes.²⁹⁶

Despite this progress, structural challenges in the financial services ecosystem remain. The challenges include the persistent digital divide, a fragmented regulatory landscape, and the dominance of cash in the informal economy. Around 80% of all transactions are still in cash, and the informal economy accounts for an approximate 40% of GDP, limiting transparency and scale.^{297,298,299} Investors need to shift focus from asking if to invest, to how best to navigate and unlock value in this evolving ecosystem.



Globally, the fintech market is valued at USD 320 billion³⁰⁰ and is projected to grow at a CAGR of 16% (2025-2032).³⁰¹ Digital payments account for the largest share of this market, comprising approximately 46%. Regional countries like Malaysia surpassed a market size of USD 46.9 billion in 2024 and is rapidly growing with a CAGR of 15% (2026 to 2032). Emerging technologies such as artificial intelligence (AI), blockchain, and big data are transforming Malaysia's fintech landscape, with 73% of consumers using digital banking services as of 2023.³⁰² Vietnam's fintech market size stood at USD 17 billion in 2024 with digital payments and personal finance being the major segments.³⁰³ Nigeria's fintech industry had an Year-on-Year growth of 70% in 2024, driven by companies operating in verticals such as cross-border transactions, digital lending, BNPL, and merchant solutions.³⁰⁴

In the Pakistani context, the fintech sector currently valued at USD 560 million³⁰⁵ trailing behind several regional peers in both scale and adoption. However, key segments showing strong growth include digital payments, robo-advisory services, crowdfunding platforms, and neo-banking, reflecting rising demand for accessible, tech-driven financial solutions. According to the State Bank of Pakistan's Q3 2025 report, mobile app-based platforms including mobile banking apps, branchless banking (BB) wallets and e-money wallets processed 1.7 billion transactions worth PKR 27 trillion in the quarter, making them a dominant driver of digital payments in the country.³⁰⁶

296 Pakistan's digital payments surge 35% in FY24, reports SBP - Profit by Pakistan Today

297 Digital payments constitute 80% of Pakistan's total retail transactions in 1QFY24

298 Pakistan's digital leap: trillion-dollar opportunity

299 Going cashless - Opinion - Business Recorder

300 Fintech Market Size, Share, Value & Growth Research Report 2030

301 FinTech Market Overview with Size, Share, Value | Growth [2032]

302 Malaysia Fintech Market Size, Share, Scope, Trends & Forecast

303 Vietnam Fintech Market to Grow at 14.2% During 2025-2033

304 Nigeria's Fintech Sector Surges 70% Despite Challenges - Fintech News Africa

305 Financial-Technology-Factsheet-2024.pdf

306 Digital payments thriving in Pakistan: Q3 sees 2bn transactions: SBP - Business Recorder

Recent developments

- **New EMI Licenses And Fintech Partnerships:**

SBP has granted in-principle approvals to new EMIs like PaySa. This license now includes POS and QR acquiring.³⁰⁷

JazzCash teamed up with K-Trade to enable stock trading via mobile.³⁰⁸ This is to increase the population in stock investment which currently stands at less than 1% of the total population.³⁰⁹ The platform also promotes financial literacy by providing educational resources in the app.

Digitt+ launched agri-payments with Concave Agri, a much-needed initiative that financially empowers farmers.³¹⁰ It aims to facilitate the farmers with digital payments, and accessibility to agricultural inputs like seeds and fertilizers at government-set prices. This shift toward digital transactions enables farmers to establish verifiable financial records, improving their access to credit and financing while enhancing transparency and efficiency throughout the agricultural supply chain.

- **Google Wallet Launch:**

Google Wallet officially launched in Pakistan (in March 2025), supporting NFC-based tap-to-pay with major banks like HBL, UBL, Meezan, JazzCash, and Faysal. Users in major urban centers report seamless contactless payments, reflecting growing maturity in the country's digital payments infrastructure.³¹¹ The full version with contactless payment features was introduced at a later stage, but its launch was delayed due to multiple challenges. These included regulatory hurdles, lengthy paperwork, and the need for approvals from financial authorities.³¹²

Nonetheless, Google's market entry signals that Pakistan's fintech ecosystem meets global security, regulatory, and technological standards: a green light for digital finance scalability and deeper fintech investment.

- **Digital Banks:** ³¹³

In 2022, SBP issued no objection certificates to a total of five entities for establishing digital banks after a rigorous shortlisting process: Raqami Bank, Hugo Bank, Buraq Bank, Easypaisa and Mashreq Pakistan, signaling strong momentum in expanding digital banking.³¹⁴ Easypaisa has now been granted a commercial digital bank license and is fully operational. Mashreq Bank Pakistan and Raqami Digital bank are currently in the pilot phase, while HugoBank and KT Bank have an In-Principle Approval (IPA) from the State Bank of Pakistan to commence its journey towards operational readiness.³¹⁵

Pakistan's digital banking sector gained momentum with several new entrants under SBP's restricted digital bank licensing framework this year. Raqami Islamic Digital Bank began pilot operations as a Shariah-compliant digital bank, supported by Euronet Pakistan and Codebase Technologies for secure payments and platform integration.³¹⁶

307 SBP Gives Approval to PaySa to Establish E-Money Operations - Digital Pakistan

308 JazzCash Partners with K-Trade for Profitable Stock Exchange - Digital Pakistan

309 Revitalising Pakistan's Financial Landscape: A Call for Comprehensive Reforms in the Stock Market

310 Digitt+ Partners with Concave Agri for Digital Payments - Digital Pakistan

311 Google Wallet launches in Pakistan, expanding digital payment options

312 Google Wallet's Partial Rollout in Pakistan: What's Still Missing?

313 <https://assets.kpmg.com/content/dam/kpmg/pk/pdf/2025/04/Pakistan-Banking-Perspective-2025.pdf>

314 <https://www.dawn.com/news/1902528>

315 Digital Banks - opportunities and challenges - Newspaper - DAWN.COM

316 <https://www.fintechfutures.com/digital-banking/raqami-islamic-digital-bank-in-pakistan-partners-codebase-technologies-for-digibanc-platform>

Challenges

- **Low Digital And Financial Literacy:**
Only 26% of adults in Pakistan are financially literate which is significantly below regional benchmarks, such as Sri Lanka's average of 35%.³¹⁷
- **Heavy Economic Dependency And Limited Fiscal Space:**
Pakistan's reliance on external aid: 25 IMF bailouts since 1958, including a USD 7 billion program in 2024, signals deep structural weaknesses. With interest payments consuming 68% of tax revenue and a debt-to-GDP ratio exceeding 70%, public sector investment in fintech infrastructure remains inhibited.³¹⁸
- **Underdeveloped Digital Infrastructure:**
Despite the launch of Google Wallet, Pakistan's digital payment infrastructure remains inadequate. NFC penetration is estimated at just 35% among the banked population, limiting widespread adoption of contactless payment technologies.³¹⁹
- **Hidden Charges And High Markups:**
Formal nano-loan products from different platforms have become widespread in Pakistan, offering quick access to small sums of credit. However, they often come at a steep cost charging weekly fees of 4 to 5%, which translates to extremely high annualized percentage rates (APRs) ranging from 208% to as much as 260% for an average 8-week loan. For many low-income borrowers, this means paying back significantly more than they receive, making these loans financially burdensome over time.³²⁰ On the other end of the spectrum, unregulated nano-loan apps have added to the problem, luring users with quick disbursements but hiding critical information about fees, using unauthorized access to personal data, and applying compounding interest.
- **High Repayment Burdens Undermine Access To Finance:**
Access to finance remains limited as many low-income borrowers face disproportionately high repayment burdens. With formal nano-loans charging results in annualized rates often exceed 200%, leading borrowers to repay far more than they receive. This financial strain discourages the use of formal credit and leaves many underserved populations reliant on exploitative or informal lending options.
- **Fragility Of The EMI Ecosystem:**
Despite an initial wave of enthusiasm following SBP's regulatory sandbox and the launch of several Electronic Money Institutions (EMIs), Pakistan's EMI landscape has faced substantial setbacks. By late 2023, nearly half of all EMIs that received licenses or in-principle approvals had either shut down or voluntarily withdrawn from the market.

These exits reflect broader structural constraints such as thin margins, limited interoperability, and a macroeconomic environment that has challenged investor confidence and operational sustainability. This has hindered EMIs from achieving sustainable scale in Pakistan's price-sensitive and cash-dominated market. Additionally, many EMIs struggled to manage high compliance costs and operational overheads, further straining their financial viability.^{321,322}

317 Navigating the Fintech Revolution in Pakistan: Challenges and Opportunities - Technology news and insights in the Middle East, South Asia, and Africa

318 Pakistan Introduces Google Wallet, Establishes Crypto Council | Crowdfund Insider

319 Pakistan Introduces Google Wallet, Establishes Crypto Council | Crowdfund Insider

320 <https://www.brecorder.com/news/40361282>

321 <https://profit.pakistantoday.com.pk/2023/11/18/what-is-happening-to-emis/>

322 <https://profit.pakistantoday.com.pk/2024/11/25/when-it-comes-to-emis-many-have-tried-few-have-succeeded-heres-why/>

Recommendations

- **Digitize High-Value C2C Transactions:**

Regulate property and large consumer transactions through digital payments with tax incentives for compliance.

- **Mandate Digital-Only P2G Payments:**

Phase out over-the-counter payments for government services and enforce account- or wallet-based payment options.

- **Strengthening RAAST For Nationwide Digital Adoption:**

Make RAAST QR mandatory for all online checkout and cash-on-delivery e-commerce platforms.

Design and execute a communications campaign to build awareness and trust in RAAST.

Reward acquiring banks and fintech companies for onboarding RAAST merchants in rural and low digital-penetration regions.

Expand RAAST functionality to support international business transactions and remittances.

Standardize digital RAAST QR-based payments across all government collection points.

- **Phase Out High-Denomination Currency Notes:**

Withdraw PKR 5,000 notes and redesign cash to encourage conversion to digital and reduce informality.

- **Cap Cash Transactions At E-POS Enabled Retailers:**

Impose transaction ceilings on cash payments at digitally integrated Tier 1 and Tier 2 retail stores.

- **Prioritize Financial Literacy Over Platform Proliferation:**

Working towards a financially literate population is more impactful than launching new fintech apps. Without basic understanding of finance, tools are underutilized or misused, increasing vulnerability to fraud and poor financial decisions. Government programs like “Pakistan’s National Financial Literacy Program for Youth” are an excellent example of such initiatives.

- **Strengthening Inclusive Finance For Women And Underserved Groups:**

Build on the Benazir Social Protection Account and the Banking on Equality Policy to improve women’s access to digital finance, address mobile phone ownership gaps, and close the gender financial divide.³²³

Replicate models that combine microfinance with financial education, like Akhuwat, to support underserved and vulnerable segments like women, youth, persons with disabilities, SMEs. This aligns with the 2030 UN Sustainable development goals of achieving poverty reduction, gender equality and economic empowerment.

³²³ Benazir Social Protection Account 2025 Launched by PM Sharif

- **Cap Interest Rates And Increase Transparency:**

Most borrowers do not read the fine print as they are just focused on getting quick cash. However, when that cash comes with hidden fees or sky-high markups, it becomes a debt trap. That is why lenders must be required to clearly show the total cost of borrowing upfront, including all fees and interest, in a straightforward language that the average consumer can clearly understand. The State Bank should also consider capping the Annual Percentage Rate (APR) on nano loans to protect low income, first-time borrowers from falling into cycles of unaffordable debt.

- **Alternative MSME Credit Models:**

For small shopkeepers, tailors, or corner store owners, borrowing PKR 3,000 repeatedly just to stay afloat is not considered progress. Rather than forcing them into the cycle of high-cost, short-term loans, financial institutions should provide smarter credit solutions. This could include revolving credit lines or access to BNPL facilities designed around how such businesses manage inventory and cash flow.

By using their digital transaction histories, such as mobile payments and supplier orders, small businesses can be supported to grow sustainably rather than merely survive.

- **Broaden Digital Licensing And Encourage New Entrants:**

The current number of digital banking licenses is too limited to drive mass adoption. The government and regulators should broaden the scope of licensing to attract more digital-first financial institutions, fintech startups, and embedded finance players. Introducing newer players and innovation will help expand access, lower costs, and accelerate digitization in underserved segments.

- **Create a Dedicated Fund For SME And Startup Financing:**

Similar to the Universal Service Fund (USF) in telecom, the banking sector should be required to contribute to a pooled financing mechanism reserved for SME credit, startup funding, and venture capital support. This fund could be administered in partnership with private sector accelerators and development finance institutions, helping bridge the financing gap faced by high-potential but undercapitalized ventures across Pakistan.

Global Case Studies ^{324,325,326,327,328,329,330}

Bangladesh: bKash - Redefining Financial Inclusion

“bKash” revolutionized Bangladesh’s fintech landscape, expanding to over 70 million users, with a nationwide network of 330,000 agents by 2023. It became the country’s first fintech unicorn (valued at ~USD 2 billion in 2021), and offers services such as mobile wallets, bill payments, digital savings, and nano-loans. Its pioneering “human ATM” model plays a pivotal role in boosting financial inclusion, particularly for women and rural communities.

- Human Centered Agent Networks: These agents act as financial educators and trust bridges in underserved areas and are called human ATMs. They play a key role in rural adoption and women’s onboarding.
- Financial products specifically designed for the underserved. Financial products like nano loans, digital savings, insurance and alternate credit products drove bKash’s success in targeting the pain points faced by unserved communities and built its solid foundation in the low-trust cash heavy environment.

The bKash model offers Pakistan a concrete blueprint for scale, trust-building, and last-mile inclusion that is currently underdeveloped in the local ecosystem.

Kenya’s M-PESA: A Step Towards a Comprehensive Digital Finance Ecosystem

M-PESA has completely reshaped Kenya’s financial landscape, growing to nearly 34 million users and supported by a vast network of 300,000 agents by the end of 2024. What began in 2007 as a simple mobile money transfer service has since evolved into a full-fledged financial ecosystem. Today, M-PESA offers everything from savings products like M-Shwari, to instant credit through Fuliza overdrafts, as well as insurance, investment tools, and payments for merchants. In 2024 alone, mobile money agents in Kenya processed transactions worth over half the country’s GDP. This transformation was built on trust, convenience, and a growing set of services that met people where they were, both geographically and financially.

For Pakistan, the M-PESA story offers powerful lessons: start by building a reliable digital payments foundation, invest in agent networks that act as community anchors (especially in rural areas), and introduce savings and credit options.

Philippines’s GCash :Seamless Mobile Wallet Integration

GCash has grown into one of the Philippines’ most influential fintech platforms, serving over 90 million Filipinos. Originally launched in 2004 as an SMS-based remittance tool, it has since evolved into a full spectrum “super-app,” offering services that include savings, loans, insurance, and investments. Its Fuse lending arm extended more than USD 2.7 billion in loans to 5.4 million borrowers, particularly targeting women and lower-income users in 2023. GCash has also expanded its international footprint, enabling cross-border payments across 45+ markets via partnerships with Alipay+ and others. Further innovations include NFC tap-to-pay, AI-powered credit scoring (GScore), and integrated financial tools, all adding up to a digital ecosystem that blends convenience, trust, and financial inclusion.

Pakistan should also adopt an integrated fintech platform model like GCash to drive financial inclusion, leveraging AI-driven credit tools and strong consumer protections to serve unbanked and low-income users.

324 How Bangladesh’s first and only unicorn used “human ATMs” to promote financial inclusion - Rest of World

325 <https://www.safaricom.co.ke/media-center-landing/press-releases/safaricom-m-pesa-hits-34-million-customers-in-kenya>

326 <https://xelius.org/news/2025-03/exploring-kenyas-fintech-landscape>

327 <https://fintechmagazine.com/articles/gcash-the-rise-of-a-financial-super-app>

328 <https://www.mynt.xyz/newsroom/philippine-fintech-flag-raised-high-on-global-stage-as-gcash-lands-on-two-fortune-lists-in-2024>

329 <https://newsbytes.ph/2024/10/16/gcash-expands-cross-border-payment-in-more-countries-via-alipay/>

330 <https://gadgets magazine.com.ph/technology/fintech/gcash-futurecast-2024>

AGRI TECH

Agriculture remains a vital pillar of Pakistan's economy, contributing 24% to GDP, and employing 37% of the labor force, which supports nearly 70% of the country's exports.³³¹

With almost half of the national land used for farming (47%), which is higher than the global average of 38%, the sector plays a significant role in ensuring food security and supporting rural livelihoods. However, its growth slowed significantly to just 0.56% in FY2025, the lowest in nine years, mainly due to a decline in major crop production caused by reduced cultivation and adverse weather conditions.³³²

While global projections suggest that agricultural technology and improved connectivity could add USD 500 billion to the global GDP by 2030. Pakistan has been slow to adopt these innovations compared to countries such as Thailand, Australia, and the Netherlands. Unlocking this potential will require overcoming structural barriers, enhancing digital literacy among farmers, ensuring consistent policy support, and building a strong AgriTech ecosystem that can reach and benefit smallholder farmers across the country.^{333,334}

Recent Developments

- **Digital loan And Electronic Warehouse Receipt System:**

The federal government has launched a digital loan scheme aimed at empowering smallholder farmers by offering unsecured loans of up to PKR 1 million through a fully digital process. This initiative enables farmers to access timely financial support for purchasing essential inputs such as seeds, fertilizers, and fuel, without the delays and inefficiencies of traditional banking systems. By eliminating paperwork and reducing the risk of corruption, the digital disbursement system promotes financial inclusion and ensures that funds are delivered directly to farmers, particularly those in underserved rural areas.³³⁵

In addition to digital loans, the government is introducing an Electronic Warehouse Receipt System, which allows farmers to store their harvested grain in certified warehouses and receive digital receipts as proof of storage. These receipts can be used as collateral to access up to 70% of the commodity's market value through digital financing. This system not only secures the produce but also enhances transparency and efficiency, helping farmers reduce post-harvest losses and sell their crops when market prices are most favorable.^{336,337}

- **Karandaaz Digital Financing for Agriculture Challenge (DFAC):**

To address the financial challenges faced by smallholder farmers in Pakistan, Karandaaz Pakistan has launched the second round of its Digital Financing for Agriculture Challenge, focusing on innovative digital solutions that enhance access to affordable and sustainable formal credit. With only 22% of farmers currently accessing institutional loans, the majority rely on informal credit sources that are often costly and exploitative. This initiative emphasizes the development of digital platforms that can provide collateral-free financing, enable electronic warehouse receipt systems, digitize traditional intermediary models like the Aarathi system, and streamline input financing.

331 Agriculture Statistics | Pakistan Bureau of Statistics

332 Highlights.pdf

333 Pakistan at a Glance | FAO in Pakistan | Food and Agriculture Organization of the United Nations

334 Pakistan agri sector misses growth target in FY25 - Business & Finance - Business Recorder

335 Digital Loans for Farmers in Pakistan - Govt Agri Scheme

336 Digital Loans for Farmers in Pakistan - Govt Agri Scheme

337 Pakistan's Farmers Can Now Apply for PKR IM Loans Online - Here's Everything You Need

By leveraging technology, these solutions aim to reduce barriers to credit, improve transparency, and expand financial inclusion, ultimately helping farmers optimize their operations, reduce losses, and achieve long-term financial resilience.³³⁸

- **Jazz: Bakhabar Kissan:**

Jazz Pakistan, in collaboration with the GSMA Innovation Fund, has launched a transformative AgriTech initiative designed to empower smallholder farmers. The program seeks to enhance agricultural productivity, expand financial inclusion, and bolster climate resilience. Through strategic partnerships with Bakhabar Kissan and local agribusinesses, the initiative delivers an integrated digital ecosystem. Core services include latest market rates, weather forecasts, mobile-based agricultural advisory and streamlined logistics, collectively fostering a more efficient and inclusive agricultural value chain.³³⁹

- **Neem: Bakhabar Kissan:**

Bakhabar Kissan has partnered with Neem to integrate embedded finance into its platform, enabling over 20 million farmers to make digital payments, access credit, and manage transactions through dedicated wallets. The collaboration reduces reliance on cash, enhances transparency, and ensures loans are used for agricultural inputs. A pilot wallet system is underway, marking a major step toward financial inclusion and a more sustainable, tech-enabled agriculture ecosystem in Pakistan.³⁴⁰

- **Habib Bank Limited – Zarai Services:**

HBL Zarai Services, launched on February 26, 2024, is Pakistan's first agriculture-focused extension services subsidiary, established by HBL Bank in partnership with the Aga Khan Development Network (AKDN). Through its "Zarai Deras", integrated agriculture hubs, it delivers agronomic advisory, mechanization, quality inputs, crop procurement, and access to agri-finance and ATM services, driving rural empowerment and sustainable agricultural transformation.³⁴¹

- **GSMA, Syngenta And Others:**

In 2024, groups like GSMA have been stepping up efforts to improve rural connectivity and digital literacy in Pakistan, knowing that without basic infrastructure and education, even the most advanced AgriTech tools will not reach the people who need them most.³⁴² On the other end, Syngenta's leadership in Pakistan has been vocal about the widespread issue of counterfeit seeds, stressing how the use of certified seeds could dramatically raise yields if paired with stronger regulatory enforcement.³⁴³

At the grassroots level, AgriTech startups like Tractorspk, AgriSmart, Ricult, and Farmdar are beginning to reshape the farming experience. They are giving farmers access to everything from precision tools and digital marketplaces to cold storage, all of which were previously out of reach.

339 Prepaid Bakhabar Kissan - Jazz

340 <https://neem.io/blog/neem-and-bakhabar-kissan-partnership>

341 <http://hblzarai.com/>

342 <https://agrieconomist.com/agri-tech-revolution-in-pakistans-agriculture>

343 <https://pakobserver.net/counterfeit-seeds-hurt-farmers-undermine-food-security/>

Challenges ^{344,345}

- **High Cost Agri-Tech Tools:**
Around 70% of small farmers cannot afford modern tools like precision irrigation systems, drones, or solar-powered equipment without financial assistance, limiting widespread adoption.
- **Low Digital Literacy:**
Only 25% of rural farmers use smartphones for farming activities, and nearly 78% of farmers over the age of 40 struggle to operate smartphones, reflecting a major digital literacy barrier. Some farmers remain uncertain about the effectiveness of these technologies in their specific local conditions and question whether the potential benefits justify the high initial costs, resulting in reluctance to adopt them.³⁴⁶
- **Language Issues Power Supply Disruptions:**
Many digital platforms are only available in Urdu, excluding speakers of regional languages such as Punjabi, Seraiki, and Sindhi. This was a key reason for the low adoption of the CropCare app, which faced usability and relevance issues.
- **Policy Gaps And Fake Inputs:**
Policy uncertainty continues to weigh heavily on small farmers in Pakistan. Frequent and unpredictable price hikes in essential inputs like fertilizer, often driven by heavy taxation, make it nearly impossible for farmers to plan ahead or invest confidently in their crops.³⁴⁷ In parallel, the ongoing problem of counterfeit seeds, despite having regulations on paper, remains largely unaddressed. For farmers relying on each season's yield to make ends meet, planting fake or low-quality seeds does not just mean poor output means debt, wasted effort, and lost hope. These gaps in policy enforcement and regulatory consistency are not just technical issues; they have real, human consequences in the fields.
- **Power Outages Disrupt Digital Farming:**
Frequent power outages disrupt the operation of IoT-based tools and other digital farming technologies that rely on continuous electricity.

Recommendations

- **Enhance Accessible And Flexible Digital Financing:**
Significantly expand the reach and flexibility of the new federal digital loan initiative (up to PKR 1 million). This involves partnering with microfinance institutions and FinTech companies to offer tailored, collateral-free loans specifically for AgriTech, potentially including pay-as-you-go or rental based schemes for expensive equipment.

344 Agri-Tech Revolution in Pakistan's Agriculture | The Agricultural Economist

345 Bridging the Digital Divide in Pakistani Agriculture | The Agricultural Economist

346 Bridging the Digital Divide in Pakistani Agriculture | The Agricultural Economist

347 <https://www.dawn.com/news/1911908>

Focus on transformation ZTBL into a true enabler of the sector. Given its issues with governance and financing, the government should expedite its privatization to help position ZTBL as a catalyst for improving credit facilities for rural areas.³⁴⁸

Implement transparent and digitally disbursed subsidies or matching grants for high-impact AgriTech tools (e.g. precision irrigation, drones, specialized machinery) that demonstrate clear returns on investment for smallholders.

Prioritize and promote innovative insurance schemes. A lot of risks are associated with this sector e.g. climate, floods, pests etc. Thus, further coverage and policies favoring farmers should be developed to increase the insurance landscape in AgriTech.³⁴⁹

- **Strengthen Farmer-Centric Digital Literacy And On-Ground Support:**

Develop and roll out comprehensive digital literacy modules. These programs should prioritize hands on training for basic smartphone usage and agricultural app navigation, with content adapted to local dialects and farming practices.

Train and deploy tech-savvy individuals from farming communities as "Digital Kisaan Ambassadors." These local experts can provide peer-to-peer training, technical support, and function as a crucial link between farmers and AgriTech providers, fostering trust and practical adoption.

- **Infrastructure And Policy Recommendations:**

Prioritize significant investment in extending 3G/4G connectivity to unserved and underserved rural agricultural areas. This ensures the reliable internet access necessary for cloud-based AgriTech solutions and real-time data exchange.

Beyond solar tube wells, actively promote and incentivize off-grid solar solutions for various farm applications, including solar-powered cold storage and backup systems for IoT devices. This mitigates the impact of frequent power outages and enhances operational continuity for AgriTech.

Develop lab infrastructure for growth of AgriTech in Pakistan. New laboratories should be set up and upgrading the existing laboratories will contribute immensely in AgriTech such as preventing an outbreak of diseases, improving animal vaccination facilities, better resilience to changes, better yields and less losses.³⁵⁰

Develop and commit to a long-term national AgriTech policy with stable funding and clear incentives for both farmers and the private sector. Avoiding inconsistent signals, such as recent cuts to agricultural research funding, is crucial for building sustained confidence.


Leverage partnership with ASEAN by aligning its agricultural policies and frameworks with ASEAN standards, enabling greater access to regional markets and enhancing agricultural exports. In parallel, the government's ongoing development of Special Economic Zones (SEZs) such as Rashakai Economic Zone, Bostan Industrial Zone, and the ICT Model Industrial Zone provides a strategic platform to boost AgriTech. Aligning SEZ incentives and initiatives with ASEAN compatible agricultural practices will not only strengthen Pakistan's agricultural infrastructure but also accelerate innovation and investment in AgriTech ventures nationwide.³⁵¹

348 Pakistan moves closer to privatising Zarai Taraqiati Bank, bids opened for financial adviser - Profit by Pakistan Today

349 MG Desk

350 Food and Agriculture Sector of Pakistan - Defence Journal

351 Pivot_Magazine_Nov_2024.pdf, Ministry of Planning, Development & Special Initiatives



Assess Public Private Partnerships or outsource select DPP functions. DPP has been facing some critical issues such as manual processes, labor shortages, and old machinery thus restructuring DPP by outsourcing or a public private partnership seems to be a viable solution. This has already started in the restructuring process as two laboratories have been outsourced and may lead to more outsourcing in the future. Also, Public Private Partnerships will improve efficiency and governance of DPP's due to collaboration between the Private sector and government which will lead to improvements in Plant Protection services across the country.³⁵²

Revitalize agricultural extension departments by equipping staff with digital tools and training in AgriTech. Transform their role into facilitators of technology adoption, providing crucial on-ground support and bridging the knowledge gap between innovative solutions and farmer needs.

Support the development and scaling of equipment-sharing platforms, an “Uber for tractors” model that enables farmers to rent and access shared machinery smartphone apps or local service centers.³⁵³ Similar models such as TROTRO Tractor in Ghana have demonstrated success in connecting smallholder farmers with tractor owners through mobile-based bookings, boosting productivity and reducing operational costs significantly. Pilot projects in Punjab and Sindh can be supported through subsidized financing, tax relief, or partnerships with Digital Financing for Agriculture Challenge (DFAC) and AgriTech startups. This model can unlock equipment access for smallholder farmers, drive mechanization, and strengthen local rural entrepreneurship, without requiring high upfront investments to own expensive equipment.

³⁵² Govt unveils plan to modernise plant protection department - Pakistan - DAWN.COM
³⁵³ Informal Farm Machinery Rental Market in Pakistan - Amar Razaq

Global Case Studies ^{354,355,356}

Facilitating Agri Tech Development, Thailand

Thai Government is actively driving digital transformation in its agricultural sector, yielding significant benefits. These initiatives are generating substantial economic value for farmers by reducing production costs and increasing income through the adoption of modern technologies like drones for precise farming. Furthermore, projects like One Tambon One Digital (OTOD) Digital Durian, a community drone project, are boosting export competitiveness by enabling digital traceability and quality assurance for high value crops.

OTOD Smart Living aims to equip over 2,700 individuals with vital digital skills, and Depa's drone training centers that have already certified over 1,500 agricultural drone pilots and 100 repair technicians, collectively empowering farmers with better information and decision-making capabilities. Similar to the Thai government initiative, Pakistan can scale digital skills programs through certifying farmers and technicians in the use of modern technologies, such as drones that are widely used and improve farming and yielding high value crops.

Vietnam's Agritech Boom: Smarter Farming, Stronger Exports

Vietnam is quickly emerging as a regional frontrunner in digital agriculture, placing AgriTech at the heart of its economic growth strategy. In 2025, startups like Enfarm and Techcoop are transforming the way farming is done using AI and IoT tools to help farmers grow more with less. Techcoop alone raised USD 70 million in Series A funding, with a sharp focus on digital payments and enabling smallholders to access high-value export markets like the US, Japan, and Europe.

These efforts align with Vietnam's bold target of USD 100 billion in agri-exports by 2030. While smallholder data gaps and infrastructure limitations persist, the government is stepping in with certification programs and accelerators that support young startups and build farmer trust.

For Pakistan, the takeaways are powerful: how to scale tech beyond pilot stages, draw in smart capital, and build export-ready supply chains. Vietnam's example shows what's possible when public and private actors move in sync to empower farmers with the tools, funding, and market access they need to thrive.

354 Thailand: Digital Innovation Empowering Farmers and Agriculture – OpenGov Asia

355 Bangkok Post – New farm technologies promoted

356 <https://stagingvia.incorp.com.vn/strategic-moves-in-agritech-vietnam/>

The global education technology (EdTech) sector is undergoing rapid transformation, with the market valued at USD 155 billion in 2024 and projected to surge to USD 546 billion by 2032, reflecting a strong CAGR of 17%. As educational institutions and learners increasingly prioritize integrated, technology-driven learning ecosystems, digital platforms are gaining ground.

In Pakistan, the online education market reached USD 328 million in 2024 and is poised for exponential growth, expected to hit USD 2.3 billion by 2033 at a CAGR of 24%. This growth is driven by expanding internet penetration, an increasingly tech-savvy youth population, and rising demand for flexible, skill-oriented learning solutions. It should be noted that this estimate primarily reflects the formal EdTech sector and likely excludes Pakistan's sizeable informal digital education economy.^{357,358,359}

Despite this progress, Pakistan remains significantly behind regional peers like China, where the EdTech market generated USD 107 billion in revenues in 2024.³⁶⁰ In 2024, Bangladesh's EdTech sector showed strong momentum, with the market reaching USD 359 million and projected to grow to USD 2.56 billion by 2033, driven by an ambitious push under the "Digital Bangladesh" and "Smart Bangladesh" visions.³⁶¹ The government is actively rolling out digital classrooms, distributing tablets and laptops, and working with NGOs to widen learning access, particularly in underserved areas. Indonesia's Kartu Prakerja program (2024–25) is reshaping how inclusion and education intersect by requiring participants to open bank or e-wallet accounts.³⁶² Launched in April 2025 under Malaysia's Education Blueprint 2025–2035, the SmartClass initiative is redesigning classrooms by embedding AI-powered tools like adaptive learning tutors, predictive analytics, and teacher-assist bots into everyday teaching.³⁶³

Pakistan's educational landscape faces major structural gaps, with an estimated 25.3 million children aged 5–16 out of school, representing 44% of the age group.^{364,365} Deep-rooted disparities persist based on gender, geography, and income levels. Bridging these gaps requires targeted EdTech solutions that can enhance access and equity while complementing formal education delivery.³⁶⁶ In contrast, much of Pakistan's progress is being driven by private startups without strong policy backing. For EdTech to truly work here, Pakistan needs to move beyond isolated efforts and build a more inclusive, government-supported ecosystem that ensures every learner can benefit.

Recent Developments

- **Online Textbooks:**

The Federal Directorate of Education (FDE) has introduced newly developed textbooks for Grades 1 to 5, set to roll out in Islamabad's schools from the 2025 academic year. These innovative books feature interactive content, student-centered activities, and a strong focus on 21st-century skills to enhance classroom learning. To ensure wider access, textbooks are also available online for students and teachers nationwide. This initiative reflects the FDE's ongoing commitment to providing inclusive, equitable, and modern education.³⁶⁷

357 EdTech and Smart Classroom Market Size & Analysis [2032]

358 Pakistan Online Education Market 2025 : Industry Size to Reach

359 Pakistan Online Education Market Size, Share, Outlook 2033

360 China Edtech Market Summary, Competitive Analysis and Forecast to 2029

361 <https://www.imarcgroup.com/bangladesh-online-education-market>

362 <https://medium.com/%40alfahrisrg/when-innovation-meets-policy-how-edtech-partnerships-can-close-indonesias-education-divide-6beca5c0b4e4>

363 <https://www.newsbleasia.com/ai-in-the-classroom-can-malysias-new-edtech-reform-narrow-rural-urban-gaps>

364 UNICEF Annual Report 300625.pdf

365 Report on Pakistan's education crisis: More than 36% of children out of school

366 Education | UNICEF Pakistan

367 PID

- **Smart Classrooms:**

The Ministry of Federal Education and Professional Training, in collaboration with UNESCO Pakistan, is working to enhance digital education for girls in Azad Jammu and Kashmir and Gilgit-Baltistan through the introduction of smart classrooms. Aimed at improving access for marginalized communities, these classrooms incorporate interactive tools, digital content, and personalized learning interfaces to create an engaging and dynamic educational experience. By integrating these technologies, the initiative seeks to foster creativity, critical thinking, and problem-solving skills among young girls in these underserved regions.³⁶⁸

- **E-Taleem platform:**

The e-Taleem platform is a modern digital learning solution aimed at reshaping education in Pakistan by fostering critical thinking, creativity, collaboration, communication, and digital literacy. Launched through a collaboration between Classera, PTCL, HP Classeasy, and the Ministry of Federal Education and Professional Training, the platform currently serves over 200,000 users. It offers an interactive, tech-driven alternative to traditional study methods, featuring innovative content delivery, real-time performance tracking, and personalized learning pathways to equip students with future-ready skills.³⁶⁹

Challenges

- **The Digital Divide:**

The most pressing issue is the digital divide, with internet penetration at just 45.7% as of 2025 and stark disparities between urban and rural areas. Students in cities often enjoy access to high-speed internet and digital devices, while those in rural regions struggle with unreliable and costly connectivity.³⁷⁰

- **Financial Barriers To Digital Learning:**

The high cost of data packages and digital devices further limits access for low-income families. Additionally, most public educational institutions lack the infrastructure such as computers, projectors, and stable internet connections, needed to support large-scale online learning.³⁷¹

- **Untrained Teachers And Low Student Engagement:**

Many teachers across Pakistan have not received the training needed to confidently teach in digital environments. Without the right support, they often struggle to make online lessons engaging or interactive. As a result, students lose interest, and the potential of virtual learning feels more frustrating than empowering for both sides of the screen.³⁷² While provinces like Punjab and Sindh have introduced digital “Continuous Professional Development” programs and blended teacher training pilots, these initiatives remain limited in scale and fragmented, falling short of addressing the national gap in teachers’ digital readiness.

369 ‘Steps taken to bring educational sector at par with global standards’ - Pakistan - Business Recorder

370 Online Education in Pakistan: Challenges and Opportunities

371 Online Education in Pakistan: Challenges and Opportunities

372 Online Education in Pakistan: Challenges and Opportunities

- **Policy Gaps and Weak Implementation Strategies:**

The National Policy Framework 2024, while recognizing the importance of EdTech, falls short in outlining actionable strategies for infrastructure development, especially in remote areas. Without a clear plan to expand reliable internet access and make digital devices affordable, many students remain excluded from digital learning opportunities.

- **Cultural Barriers and Systemic Flaws:**

Girls in conservative rural areas face additional cultural and social barriers that limit their participation in online education. Moreover, frequent technical disruptions, inadequate learning management systems, and a continued reliance on rote learning further hinder effective implementation. Without addressing these foundational issues; connectivity, affordability, teacher training, and inclusive policy design, EdTech initiatives risk deepening existing inequalities rather than bridging them.³⁷³

Recommendations

- **Building Capacity for Digital Learning:**

Provide extensive training for teachers in digital literacy and online teaching methodologies to enhance the quality of digital instruction. Make digital literacy a mandatory component in teacher certification and continuous professional development (CPD) frameworks.

- **Community-Based Hybrid Learning Hubs:**

Set up hybrid micro-learning hubs with local facilitators in communities to increase access in rural areas.

- **Public-Private Partnership (PPP) Frameworks:**

Promote Public-Private Partnership (PPP) frameworks where Telcos, EdTech providers, and government align on KPIs such as gender parity, digital inclusion in rural areas, and measurable learning outcomes. For example, Bangladesh's "Sheikh Russel Digital Labs" initiative demonstrates how government and private sector collaboration can expand digital education access and bridge the digital divide in schools across the country. Adopting similar best practices can help ensure Pakistan's EdTech initiatives are inclusive, and results driven.³⁷⁴

- **AI-Powered Personalized Learning:**

Use AI diagnostics to personalize content and close foundational learning gaps across regions.

- **National Skills Intelligence Dashboard:**

Build a national skills dashboard tracking learner growth, skill demand, and regional disparities.

To strengthen digital learning outcomes, also introduce adaptive learning dashboards that help principals and district officials track student engagement, topic mastery, and early dropout signals for timely intervention. Alongside this, a unified, mobile-based Student Digital ID system can ensure each learner's progress and credentials are securely tracked across platforms and regions, especially vital for students who frequently move or face disruptions.

373 Beyond the classroom—peeking into the EdTech maze | Pakistan Today

374 Sheikh Russel Digital Lab



- **Localized Adaptive Assessments:**

Develop Pakistan-focused adaptive assessment tools for early grades to measure conceptual understanding.

- **Micro-Credentials For Future Skills:**

Introduce micro-learning and micro-credentials for future ready skills.

- **Mobile Learning Games In Local Languages:**

Develop mobile-first learning games in local languages to reach underserved youth and out-of-school learners.

- **Ensuring Inclusive And Equitable Learning:**

Implement policies to ensure all students, regardless of socioeconomic status, have access to digital learning tools. Offer subsidized devices or loans to low-income families. Localize curriculum in regional languages (e.g., Sindhi, Balochi, Pashto) with visual aids and offline-first access.

Mandate EdTech performance audits for public education interventions. Ensure all new initiatives (devices, labs, training) include gender-disaggregated KPIs. Incentivize female-led digital learning centers, particularly in Gilgit-Baltistan, Balochistan, and Southern Punjab.

Online platforms should include features such as peer collaboration tools, counseling services, and interactive discussion forums to maintain engagement.³⁷⁵

Global Case Studies ^{376,377,378}

AI-Powered Digital Textbooks, South Korea

South Korea has made significant strides in integrating AI-powered digital textbooks into its public education system. Data from the Ministry of Education shows that approximately 30% of elementary schools have adopted these textbooks within their first year of introduction, specifically for third- and fourth-grade subjects like English, mathematics, and computer informatics. For instance, 29.1% of schools are using AI textbooks for third-grade English and 28.6% for math, while fourth-grade adoption rates are slightly higher. In middle schools, around 27% have implemented AI textbooks for first-year English and math, with similar figures observed in high schools. Overall, out of 11,932 schools nationwide, 3,870 (32.4%) have incorporated these textbooks in at least one of the three subjects.

The initiative, launched in the 2025 academic year, is part of a phased plan to expand AI-enhanced textbooks across all grades and core subjects by 2028, excluding art, music, physical education, and ethics.

South Korea's gradual rollout of AI-powered digital textbooks offers Pakistan a practical roadmap, start small with core subjects in early grades, learn from the process, and then scale. It's not about flashy launches, but steady, thoughtful integration that builds trust and impact over time.

Rwanda's National ICT Integration In Education

Rwanda's Education Accelerator Project, launched with the World Economic Forum in late 2024, is a national call to reimagine learning for the future. Rooted in Rwanda's Vision 2050 and its Education Strategic Plan (2024–2029), the project brings together government officials, teachers, tech leaders, and development partners with a shared goal: to prepare young people for the fast-changing world of work. By placing public-private collaboration at the center, Rwanda isn't just experimenting with EdTech as it's embedding it into long-term human capital growth.

For Pakistan, this offers a valuable lesson: real education reform needs more than apps and devices. It needs a clear national vision, coordinated action across sectors, and the voices of educators and learners leading the way.

376 Elementary Schools Lead Adoption of AI Digital Textbooks in South Korea | Be Korea-savvy

377 Around 30% of South Korean elementary schools use AI textbooks | The Straits Times

378 <https://www.mineduc.gov.rw/news-detail/education-accelerator-project-launching-workshop>

HEALTHTECH

In recent years, the world has witnessed a remarkable shift in how healthcare is delivered. In 2024, the digital health industry was already valued at over USD 312 billion. The market is expected to grow from USD 387.8 billion in 2025 to USD 2.19 trillion in 2034 at a CAGR of 21.2% from 2025 to 2034.³⁷⁹ The driver of this growth is not just technology; it is a global need. From remote villages to busy cities, more people are living with chronic illnesses like heart disease which alone causes around 17.9 million deaths every year. This has made real-time monitoring tools like ECG patches and blood pressure apps, not just innovations, but lifelines.^{380,381}

Lancet Study of accessibility and quality of healthcare

Pakistan Ranking

154 / 195

Life Expectancy

67 Years

People per one doctor

750,000

Smartphones are now essential tools in healthcare. With smartphone use expected to reach 92% globally by 2030,³⁸² mobile apps and wearable devices are helping people manage their health from the palm of their hands. Countries like the U.S., Germany, China, and Saudi Arabia are leading the way, investing heavily in telehealth platforms, AI diagnostics, and connected medical devices. During the COVID-19 pandemic, these tools became necessities, and they have not slowed down since.

However, the transformation has its challenges: data privacy, high costs, and poor internet access in rural areas still hold some communities back. And while digital healthcare opens doors for many, it can leave the elderly or digitally untrained behind. Still, the momentum is undeniable. A comparison with Pakistan's regional peers such as Bangladesh and Turkey reveals key insights into the evolving health-tech ecosystems.

Backed by World Bank funding and a mobile-savvy population, Bangladesh is becoming a preferred market for e-health investment. Apps such as Maya offer on-demand consultations that reach women and rural users, mirroring Pakistan's Sehat Kahani model. Under the "Smart Bangladesh" agenda, low-cost telemedicine and community health workers are plugging gaps in overstretched clinics, proof that pragmatic digital tools, not expensive infrastructure, can rapidly widen access to care.³⁸³ Turkey presents a different insight, with a digital health market driven by government platforms such as e-Nabiz, now frequently used by citizens for appointments, lab results and remote consults.^{384,385} Turkey's public investment in wearables, AI diagnostics and tele-monitoring aims to push care into remote areas: an approach that echoes Pakistan's Sehat Kahani model and shows how technology can stretch limited clinical capacity nationwide. The core vision in both countries is similar: to bring quality care to every corner, using technology as the connector.

379 <https://www.gminsights.com/industry-analysis/digital-health-market>

380 Lancet study places Pakistan on 154th position in healthcare

381 Healthcare sees gains despite underfunding

382 <https://www.gminsights.com/industry-analysis/digital-health-market>

383 <https://defence.pk/threads/bangladesh-next-global-big-tech-destination-for-e-health-world-bank.722842/>

384 Turkey Digital Health Market Size, Share & Trends Analysis Report By Technology (Tele-Healthcare, Healthcare Analytics), By Component (Services, Software), By

Application (Diabetes), By End-use, And Segment Forecasts, 2024 - 2030

385 <https://www.imarcgroup.com/turkey-digital-health-market/>

In 2025, Pakistan has seen a wave of progress in digital health, thanks to a series of federal government policies focused on making healthcare more accessible and modern. One major step forward has been the nationwide rollout of EZ Shifa's telemedicine kiosks called "Digital Clinics" which are helping bridge the gap in primary care for underserved communities.³⁸⁶

Another milestone is the government's "One Patient One ID" policy, which now links every citizen's CNIC to a centralized medical record system. This move has made it easier to access unified health data and deliver services like telehealth consultations and home medicine delivery under one streamlined system.³⁸⁷

Building on these efforts, the Federal Health Minister launched a nationwide telemedicine program to bring primary healthcare right into people's homes through phone and online consultations. The program includes teams of 30 certified doctors and dedicated call centers to handle consultations.³⁸⁸ Through this platform, people can now receive medical advice remotely, and get their medicines delivered at home. All patient data is linked to their CNICs, ensuring that care is consistent and follow-ups are smooth no matter where they are treated. At the grassroots level, the government is also supporting the ITU-backed Smart Villages project, which has introduced e-health clinics run by Sehat Kahani in places like Swabi and Gokina. These clinics have already provided thousands of telemedicine consults and are creating meaningful opportunities for women to work as remote healthcare professionals.³⁸⁹

Altogether, these government policies have sparked stronger public-private partnerships, encouraged better data-sharing systems, and attracted growing investment in next-generation health tools, especially AI-powered diagnostics and smart medical devices. This momentum is reflected in the 2 percent year-over-year increase in digital health funding, which reached around USD 6.3 billion in Q1 of 2025, backed by major deals and expanding European interest.³⁹⁰

Recent Developments

- **Sehat Kahani:**
Sehat Kahani began offering in-home doctor and nurse visits for chronic and palliative care patients to reduce hospital visits. This service focuses on improving patient comfort while preventing hospital-acquired infections in high-risk populations.³⁹¹ Telecom operators, Zong 4G and Telenor are also expanding Sehat Kahani's reach through network integration and subsidized access in remote areas.³⁹²
- **District Health Information Software (DHIS-2) Rollout:**
In late 2024, Khyber Pakhtunkhwa's health department began province-wide training on DHIS-2, a global health information system to digitize disease reporting.³⁹³ At the federal level, the Health Ministry is exploring a national scale-up of EZ Shifa's digital clinics to ease hospital loads and improve rural access.³⁹⁴

386 <https://profit.pakistantoday.com.pk/2025/05/26/ez-shifas-telemedicine-initiative-set-for-nationwide-rollout/>

387 <https://www.nation.com.pk/17-Apr-2025/health-minister-launches-one-patient-one-id-initiative-with-nadra>

388 <https://www.nation.com.pk/16-May-2025/health-minister-announces-launch-of-nationwide-telemedicine-project>

389 <https://www.itu.int/hub/2025/04/pakistans-smart-villages-transform-lives/>

390 galengrowth.com

391 <https://tech.pk/sehat-kahani-launches-new-home-healthcare-quality-services/>

392 <https://www.brecorder.com/news/40252072>

393 <https://www.dawn.com/news/1877034/digitisation-of-health-system-to-improve-patient-care-dg>

394 https://pid.gov.pk/site/press_detail/29211

- **Apka Muaalij:**

Originally launched in 2020 and rebranded in 2024 as “Apka Muaalij,” the platform connects users with a network of over 10,000 PMDC-verified doctors nationwide. The app allows users to book appointments quickly through its website or mobile app. It offers 30-minute consultations, easy prescription downloads, and smooth payment processing.³⁹⁵

- **Hifazat:**

The United Nations Population Fund (UNFPA) Pakistan, in collaboration with the School of Leadership Foundation, launched the Hifazat app in 2024 to support youth health and well-being. It is designed to provide reliable information on reproductive health, puberty, mental health, and is Pakistan’s first youth centered “Sexual and Reproductive Health and Rights” focused mobile app. The app targets young users, especially in rural areas. It provides location-based services connecting users to nearby clinics and ensures easier access to essential healthcare.^{396,397}

- **Mashwara:**

Launched in late 2024 as a beta, Mashwara is expanding rapidly in 2025 as a full-spectrum digital health platform. The platform offers telemedicine consultations, allowing users to connect with doctors from home, and a healthcare provider search feature to find and book appointments with nearby professionals. The platform also includes Electronic Health Records (EHR) for secure storage and easy sharing of medical history. It is also equipped with an AI-powered chatbot for instant health advice and symptom checking, and a nearby services tool to locate hospitals, pharmacies, and labs using real time location data.³⁹⁸

Challenges

- **Low Digital Literacy And Trust Issues:**

For many patients in Pakistan, especially in semi-urban and rural areas, digital healthcare still feels unfamiliar and distant. Online consultations may offer convenience, but they often lack the warmth and reassurance that comes from sitting across from a doctor in person. They find it harder to trust the process or speak freely during online consultations making digital care feel more like a transaction than real treatment.

- **Unsustainable Healthcare Models:**

Pakistan’s telehealth sector may be booming, but its business models are still shaky. With public health spending sitting at just around USD 38 per capita,³⁹⁹ there is little room for long-term growth without relying heavily on donor funding or limited startup capital.⁴⁰⁰ This makes it tough for even successful platforms to scale sustainably. On top of that, patient fees remain a tricky issue as some communities cannot afford to pay, others actually reject free services, seeing them as lower in quality or not worth trusting.

- **Fragmented Health Databases:**

Hospitals, clinics, and health startups all understand the power of sharing patient data: it could save lives, reduce costs, and improve care, but the reality is far messier. Systems are not seamless, records are scattered, and there is no common language or standard in place. The result of the current system are silos of information that leave patients with fragmented databases.⁴⁰¹

395 <https://propakistani.pk/2025/06/24/apka-muaalij-launches-its-most-advanced-app-healthcare-at-your-fingertips/>

396 <https://www.thenews.com.pk/print/1258951-app-launched-to-empower-youth>

397 Hifazat Application – SoLF

398 <https://mashwara.ai/how-mashwara-can-benefit-you-a-deep-dive-into-key-features/>

399 Enhancing telehealth services development in Pakistani healthcare sectors through examining various medical service quality characteristics – PMC

400 https://jpma.org.pk/index.php/public_html/article/view/22685

401 <https://pmc.ncbi.nlm.nih.gov/articles/PMC10514666/>

- **Poor Infrastructure And Tech Gaps:**

In many rural parts of Pakistan, a significant number of healthcare facilities are struggling with critical infrastructure gaps, with 30% of Basic Health Units (BHUs) being non-functional and nearly 60% of public hospitals lacking essential medical equipment.⁴⁰² This makes it incredibly difficult to run anything digital, whether it is a telehealth consultation or even maintaining electronic health records. People living in these areas are often left out of the health-tech revolution altogether.⁴⁰³ Telehealth and AI show huge potential to bridge access gaps, but infrastructure inequities, digital illiteracy, and uncertain liability/legal frameworks continue to slow adoption.⁴⁰⁴

Recommendations

- **Establish a National Health Data Exchange Platform:**

Create a centralized digital platform to integrate fragmented health databases across public and private providers.

Ensure real-time access to anonymized health data for clinical, policy, and research purposes.

- **Promote Community Health Workers as Digital Health Ambassadors:**

Train and equip Lady Health Workers (LHWs) and other frontline staff with mobile tools to deliver basic digital services, such as online consultations, health education, and patient registration in rural settings.

Partner with influential community figures to promote the use of digital health tools, dispel myths about data privacy, and reduce resistance to new technologies, particularly in conservative rural areas.

- **Establish Community-Based Telehealth Centers:**

Set up small-scale telehealth centers at the area level, staffed by trained health workers and connected to urban medical specialists via reliable internet. These centers can serve as local hubs for diagnostics, virtual consultations, maternal health support, and chronic disease management, bridging the ruralurban healthcare gap and reducing the burden on overpopulated hospitals.

- **Establish A Unified, Enforceable National Digital Health Law:**

Pakistan's health-tech journey is moving fast but the road is far from smooth. Even with promising steps like the Personal Data Protection Bill (2023), which set up a national data protection authority (NCPDP), the bigger picture remains messy. Rules differ across provinces, safeguards are patchy, and citizens still worry about how their private health information is being handled. Without trust, digital progress can only go so far.⁴⁰⁵

- **Launch Nationwide Digital Health Literacy Programs:**

Digital illiteracy among healthcare professionals and patients is a major barrier. The government, in collaboration with health-tech startups and NGOs, should initiate training programs, particularly in rural areas, which focus on basic digital skills, patient data privacy, and use of telemedicine tools.

402 Poor Health Infrastructure in Pakistan Rural Healthcare Challenges in Pakistan | The Agricultural Economist

403 https://www.researchgate.net/publication/371469761_Healthcare_in_Pakistan_Navigating_Challenges_and_Building_a_Brighter_Future

404 <https://articles.pakistanlawyer.com/2024/09/02/legal-challenges-in-regulating-emerging-health-technologies-in-pakistan/>, <https://pmc.ncbi.nlm.nih.gov/articles/PMC10930096/>

405 <https://teletimesinternational.com/2025/data-governance-in-pakistan/>

- **Invest in Rural Infrastructure and Connectivity:**

With over 60% of rural facilities lacking adequate infrastructure, there must be targeted investment in digital infrastructure, including reliable electricity, internet, and telehealth-compatible hardware. Public private partnerships (PPPs) can help scale solar-powered hubs or mobile health vans with satellite connectivity.

- **Develop Interoperability Standards for EHR And AI:**

To address fragmented systems, the Ministry of National Health Services should standardize Electronic Health Records (EHRs) and define AI integration protocols across provinces, ensuring cross-platform data sharing and analytics. These standards must align with the best international practices (e.g., HL7 FHIR) and be enforced via health regulations.⁴⁰⁶

- **Incentivize Startups Through Tax Breaks And Sandbox Models:**

To encourage local health-tech innovation, the government can provide tax incentives, low-interest loans, and regulatory sandboxes for startups innovating in AI diagnostics, teleconsultation, or remote monitoring. This lowers entry barriers while testing innovations under regulatory supervision.

- **Implement Population Health Analytics Using Big Data:**

Integrate data from hospitals, labs, pharmacies, and public health surveys to identify root causes of diseases across geographies. This would enable policymakers to:

Detect geographic disease hotspots and underlying external drivers such as water quality, pollution, dietary habits, and climate variations.

Design targeted interventions, optimize allocation of vaccines and staff, and build stronger early warning systems for epidemics and chronic disease.

The use of big data and advanced analytics would shift the system from reactive healthcare model to preventive and proactive care system, lowering costs and improving long-term health outcome.

406 <https://pmc.ncbi.nlm.nih.gov/articles/PMC10514666/>

Global Case Studies ^{407,408}

Seha Virtual Hospital: Saudi Arabia

Saudi Arabia's launch of the Seha Virtual Hospital is the largest of its kind in the world and it marks a defining moment in global digital health.

Working hand-in-hand with physical hospitals and delivering specialist services remotely, it is reimagining what accessible healthcare can look like. Whether it is a cardiologist in Riyadh guiding treatment for a stroke patient hundreds of miles away or a psychiatrist offering virtual support to someone in a remote village, Seha is dissolving the traditional barriers of geography and access.

For Pakistan, this model holds deep relevance. Imagine a child in rural Balochistan being connected to a top pediatric neurologist in Lahore, or a cardiac patient in interior Sindh receiving timely intervention via a virtual clinic. Seha shows us that centralized, tech-enabled care isn't just a futuristic ideal, it's a workable solution for countries like ours that struggle with uneven health infrastructure and limited specialist availability. It's not just about building hospitals; it's about building digital bridges where people need them most

MySmartMedic: Nigeria

Nigeria took a major leap in digital healthcare by launching MySmartMedic, an AI-powered telemedicine platform developed by UNICOM Group. Designed with rural communities in mind, the platform combines smart symptom analysis, instant video and chat consultations, e-prescriptions, and even doorstep drug delivery: all in one seamless experience.

What makes it particularly impactful is its AI-driven triage system, which helps prioritize patients efficiently, ensuring limited medical resources are used where they're needed most. In its pilot rollout in Galadimawa village near Abuja, local leaders praised how the service brought much-needed medical care to people's doorsteps cutting down travel, cost, and wait times.

For a country like Pakistan, where rural areas still struggle with access to quality healthcare, MySmartMedic offers an inspiring model: one that blends smart technology with local realities, paving the way for AI-led triage, end-to-end virtual care, and scalable rural health solutions.

407 <https://healthmanagement.org/c/it/PressRelease/saudi-arabia-embraces-shift-to-digital-health-solutions?>
<https://www.digitalhealthnews.com/world-s-largest-virtual-hospital-offers-ai-driven-healthcare-services>

408 AI-driven telemedicine healthcare platform launched - Vanguard News

CLOUD

Cloud computing delivers services like storage, networking, and software over the internet, allowing flexible, on demand access without active user management. The global market reached USD 676 billion in 2024 and is projected to grow to USD 2,300 billion by 2032.⁴⁰⁹ In Asia Pacific, spending is expected to hit USD 250 billion by 2025, growing at 14.2% annually through 2028 due to generative AI adoption and IT modernization.⁴¹⁰

Pakistan's 'Cloud Solutions' market is projected to reach approximately USD 800 million by the end of 2025,⁴¹¹ with expectations of reaching the market of USD 3.18 billion by 2030, growing steadily at a 23% CAGR.⁴¹² The 'Cloud Solutions' market broadly encompasses the entire cloud ecosystem, including not only service layers such as SaaS, PaaS, and IaaS, but also the underlying hardware, infrastructure, platforms, and support services that enable cloud delivery and operations. Within this space, Infrastructure-as-a-Service (IaaS) is gaining traction and is expected to contribute USD 263 million by the end of 2025, growing at 17% annually to surpass USD 579 million by 2030.⁴¹³ Meanwhile, Platform-as-a-Service (PaaS) is showing even more aggressive momentum, forecasted at USD 370 million by the end of 2025 and projected to rise to USD 1.34 billion by 2030, expanding to 29.43% CAGR.⁴¹⁴ These figures reflect not just market potential, but a clear shift in how organizations in Pakistan are beginning to trust and rely on cloud-based technologies for the future.

However, despite the 2022 Cloud First Policy, Pakistan still lags as the adoption remains slow and fragmented. Unlike its regional peers like Vietnam and Indonesia, Pakistan is still missing from the Asia Cloud Computing Association's Cloud Readiness Index, reflecting weak institutional and regulatory development.^{415,416}

In June 2025, Vietnam took a bold step by approving a national action plan aimed at making cloud computing a core part of its digital future by 2030. The plan sets ambitious but clear targets: cloud platforms will be used by all government agencies, 70% of private businesses, and more than 50% of citizens.⁴¹⁷ To make this happen, the country is backing its own "Make in Vietnam" cloud providers, giving them a strong push to grow and compete.⁴¹⁸

Similarly, Indonesia has demonstrated progress by advancing its cloud infrastructure through steady expansion and targeted partnerships with global cloud providers. Indonesia's cloud market was on a rise from 2024 to 2025, with sectors like finance, retail, healthcare, and government turning to cloud-based solutions to improve efficiency and scalability. Even small and medium-sized enterprises (SMEs) began embracing flexible cloud services to meet their growing digital needs. A major milestone came in May 2025, when Microsoft officially launched its "Indonesia Central" Azure cloud region.⁴¹⁹ This new region includes three availability zones, designed specifically to meet local requirements for data residency, security, and sustainability. This is a move that not only strengthens Indonesia's cloud infrastructure but also signals growing trust in the country's digital ecosystem.

409 Cloud Computing Market Size, Share, Value & Growth [2032]

410 Asia Pacific cloud market to reach \$250B by 2025, IDC says | Back End News

411 NASTP and Khazana Cloud Establish Pakistan's First Hyperscaler Cloud Solution

412 <https://www.statista.com/outlook/tmo/public-cloud/pakistan>

413 <https://www.statista.com/outlook/tmo/public-cloud/infrastructure-as-a-service/pakistan>

414 <https://www.statista.com/outlook/tmo/public-cloud/platform-as-a-service/pakistan>

415 Asia/Pacific Public Cloud Services to Reach US\$250 Billion by 2025, According to IDC

416 Is the Cloud First Policy a step towards digitising the country? - Profit by Pakistan Today

417 <https://vietnamnews.vn/economy/1719523/viet-nam-targets-universal-cloud-computing-adoption-by-2030.html>

418 <https://www.ft.com/content/3b609f11-7810-4954-82ec-f3bfaed07294>

419 <https://news.microsoft.com/id-id/2025/05/27/microsoft-opens-indonesia-central/>

For Pakistan, it is time to move beyond plans by investing in reliable infrastructure, closing the gap between provinces, and helping small businesses and rural areas get on board. Regulatory steps are underway: SBP allowed limited cloud use for banks in 2023, and SECP issued cloud guidelines in 2023. Some public entities like NADRA and FBR have started partial cloud transitions. However, concerns over security, interoperability, and insufficient local hosting capacity continue to slow progress. With the right support, Pakistan's cloud story can go from slow steps to real momentum.

Recent Developments

- **Telecom Giants Driven Cloud Expansion:**
Telecom companies PTCL, Zong (Z SAIS Cloud), and Jazz's cloud platform, Garaj, are stepping up in a big way, rapidly expanding their cloud services across Pakistan. From Infrastructure-as-a-Service (IaaS) to Software-as-a-Service (SaaS) and even AI-powered solutions, they are building more than just networks as they are shaping the future of digital business.⁴²⁰ By tapping into their strong fiber and connectivity infrastructure, these companies are making it easier for enterprises and SMEs to access secure, scalable cloud platforms without starting from scratch.
- **Pakistan's First Hyperscale Data Centre:**
In a major boost to Pakistan's digital backbone, NASTP, in collaboration with Khazana Cloud and Huawei, launched the country's first-ever hyperscale Tier-3 data center, spread across key cities like Rawalpindi, Lahore, Karachi, and Kamra. This is not just a tech upgrade as it is a leap toward digital self-reliance. Offering IaaS, PaaS, and SaaS, the center is built to power everything from AI-driven solutions to secure data storage, with ultra-low latency designed for high-stakes, time-sensitive applications.⁴²¹ It is a clear signal that Pakistan is ready to handle large-scale cloud demands with confidence.
- **First Tier-3 University Data Centre:**
In February 2025, NED University made a major leap for Pakistan's digital future by launching the country's first Tier-3 certified data center. Built in collaboration with HEC, Huawei, and the World Bank, this facility is more than just a technical milestone.⁴²² It is a much-needed boost for data security and local digital infrastructure. With a 4 MW capacity, the center is designed to support both public and private sectors, especially in underrepresented regions like Sindh and Balochistan. It marks a crucial step toward enabling local data storage, secure processing, and broader access to reliable cloud-based services.

Challenges

- **Skills Shortage And Outdated Curriculum:**
Pakistan faces a critical shortage of cloud-skilled professionals. Despite producing 25,000 computer science graduates annually, only 10% are ready for cloud-related roles due to outdated curricula and insufficient practical training.^{423,424}

420 <https://www.dawn.com/news/1893531/cloud-industry-grows-with-telecom-expansion>

421 <https://www.datacenterdynamics.com/en/news/khazana-cloud-and-nastp-plan-pakistans-first-hyperscale-data-center/>

422 <https://www.dawn.com/news/1893036/ahsan-inaugurates-cutting-edge-data-centre-at-ned-university> DWP Technologies completes data centre for HEC - Pakistan - Business Recorder

423 Pakistani IT professionals: Challenges and skills needed to compete in international market

424 Only 10% IT graduates employable: SBP

- **Cost Barriers To Cloud Adoption:**

For many small businesses the upfront setup, ongoing subscriptions, and training costs can add up quickly, making it hard for SMEs with limited budgets to justify the switch. Even though the pay-as-you go model sounds appealing, the uncertainty around return-on-investment makes the decision even harder. The financial risks often outweigh the perceived benefits, keeping adoption rates low despite growing awareness.⁴²⁵

- **Unreliable Connectivity And Bandwidth Gaps:**

Cloud adoption in Pakistan continues to face serious roadblocks due to poor internet infrastructure. Frequent outages, limited bandwidth, and unstable connections make it difficult for businesses to rely on cloud services for everyday operations. Adding to the challenge, the country depends on just seven submarine cables for international connectivity, creating a fragile setup where even a single disruption can impact cloud-based work across sectors. For many companies, this unreliable foundation makes cloud feel more like a risk than a solution.⁴²⁶

- **Low SME Adoption Despite High Awareness:**

Over 85% of SMEs in Sindh recognize the potential of cloud computing, yet adoption remains around 30%, mainly due to limited technical capacity, security concerns, and a lack of understanding of cloud advantages.^{427,428}

- **Weak Legal And Regulatory Framework:**

The absence of an effective legal framework leaves personal and business data vulnerable. While the proposed Personal Data Protection Bill 2023 aims to address this, delays and limited regulatory independence hinder progress.

- **Political And Industry Resistance:**

Political delays, restricted telecom competition, and resistance from some industry stakeholders continue to slow cloud policy implementation and infrastructure development.⁴²⁹

Recommendations

- **Develop Cloud-Skilled Human Capital:**

To bridge Pakistan's cloud skills gap, universities should incorporate practical training in cloud, DevOps, and containerization, aligned with industry needs. Building on programs like Tech lift and PIAIC, subsidized, certification-linked courses and internships should be expanded. Collaborations with global cloud providers can make certifications more affordable, while competitive local career paths and remote work options are key to retaining skilled talent and curbing brain drain.

426 <https://www.thenews.com.pk/print/1277618-pakistani-it-professionals-challenges-and-skills-needed-to-compete-in-international-market>

427 (PDF) Government Policies and their Impact on Cloud Adoption by SMEs in Sindh

428 (PDF) Cloud Computing Adoption by SMEs in Sindh: Opportunities and Challenges

429 Josh and Mak International

- **Support Cloud Adoption Among SMEs:**

A national cloud scheme offering bundled services and vouchers can accelerate SME adoption, especially in regions like Sindh where awareness and connectivity remain major hurdles. As Karachi's IT sector expands, P@SHA emphasizes the need for stronger telecom-backed cloud infrastructure and SME engagement. Collaborating with P@SHA and chambers of commerce to deliver focused awareness drives, mentorship, and migration support can turn policy into real-world impact.⁴³⁰

Launch targeted awareness campaigns and advisory programs to demonstrate the cost-efficiency and scalability benefits of cloud computing.

- **Expand Local Cloud Infrastructure:**

Provide regulatory clarity and incentives, such as duty exemptions on hardware and utility subsidies, to attract cloud service providers and enhance national hosting capacity.

Accelerate the approval and implementation of the Personal Data Protection Bill 2023, ensuring alignment with global best practices (e.g., GDPR). Establish an independent data protection authority to oversee compliance and build trust in cloud services.

Prioritize cloud solutions in all new IT initiatives, ensuring compliance with local regulations and data residency requirements.

Provide a standardized risk assessment framework to address cloud adoption risks, focusing on data privacy, security, and regulatory compliance.

Promote hybrid cloud adoption and interoperable digital platforms to balance flexibility, security, and cost efficiency.

- **Promote Regional And Global Collaboration:**

Pakistan can position itself as a South Asian cloud hub by leveraging CPEC partnerships, regional alliances, and existing telecom and capacity-building infrastructure. Strategic agreements with the U.S., China, EU, and Gulf states for joint cloud projects, investment, and skill transfer are key. Establishing tech zones under STZA and SIFC will support regional innovation. Coordinated cloud standards, shared infrastructure, and collaborative R&D and certification initiatives will drive economic growth, innovation, and global integration.⁴³¹

- **Align Cloud With Business Strategy:**

Build a cloud strategy that connects directly with your overall business goals. When cloud adoption supports your vision whether that is growth, agility, or customer service, it becomes a powerful tool for transformation.⁴³²

- **Upskill Teams With Certified Training:**

Technology is only as effective as the people behind it. For Pakistan, the focus should be on expanding access to certified cloud training through platforms like AWS, Microsoft Azure, and Google Cloud. Building local expertise will enable IT teams to manage cloud systems confidently and securely from the start. Globally, many SMBs have saved substantial operational costs by using AI tools and serverless infrastructure. With the right support, Pakistani businesses can unlock similar value boosting growth while staying secure.

430 Cloud industry grows with telecom expansion - Business - DAWN.COM

431 [Econ] Boosting Pakistan's Exports : r/Geosim

432 <https://techmag.com.pk/cloud-computing-trends-in-pakistan/>

Global Case Studies ^{433,434,435}

Singapore's Global Leadership In Cloud Readiness And Digital Government

Singapore has high scores in infrastructure, security, and digital talent. As of 2023, 70% of government systems had migrated to commercial cloud platforms under the Digital Government Blueprint, enabling 95% of government transactions to be completed digitally. The Government on the Commercial Cloud (GCC) platform now supports over 600 digital services, simplifying adoption for agencies. Additionally, Amazon Web Services (AWS) announced a USD 9 billion investment in Singapore's cloud infrastructure by 2028. AWS is also working with the Singaporean government to promote the use of AI and generative technologies.

A unified public cloud platform can be built to streamline government services and make digital access easier for citizens. But to make that work, Pakistan also needs to invest in long-term talent and not just short-term bootcamps. Partnering with global players like AWS can help bring in the tech and AI expertise we need. Most importantly, clear migration policies with real incentives will be key to getting public agencies on board and moving confidently to the cloud.

China's Cloud Computing Market

China's cloud computing market is projected to surpass USD 80 billion by 2030, growing at a CAGR of 25% and capturing 15% of the global share. This rapid growth is fueled by strong government backing under the "New Infrastructure" initiative, which emphasizes investments in 5G, AI, and next-generation data centers. Domestic leaders, Alibaba Cloud, Tencent Cloud, and Huawei Cloud, collectively dominate the market with over 70% share and operate more than 500 data centers nationwide. Cloud services like SaaS, currently valued at USD 5 billion, and IaaS are widely adopted, particularly among SMEs, which show a 40% adoption rate. Strict data sovereignty laws mandate local data storage, limiting foreign competition and reinforcing the dominance of Chinese firms. These policies, along with cybersecurity regulations such as the Cybersecurity Law and the Personal Information Protection Law (PIPL), have also spurred growth in the USD 2.5 billion cloud security market. Altogether, China's strategic investments, regulatory clarity, and domestic ecosystem continue to drive rapid cloud adoption and digital innovation.

Pakistan can take a page from China's playbook by finalizing and enforcing the Data Protection Bill to give businesses and investors much-needed clarity. Supporting local cloud providers through incentives, foreign investment, and integration with STZA zones can help grow a stronger domestic ecosystem. At the same time, launching targeted SME voucher programs much like China's SaaS push which can drive adoption from the ground up. Sector-specific digitalization plans in areas like health, retail, and manufacturing will further incentivize meaningful cloud use where it matters most.

433 <https://govinsider.asia/intl-en/article/key-lessons-from-the-singapore-governments-ambitious-whole-of-government-cloud-migration-strategy>

434 Digital Government | Ministry of Digital Development and Information Amazon to spend nearly \$9 bln to expand cloud infra in Singapore | Reuters

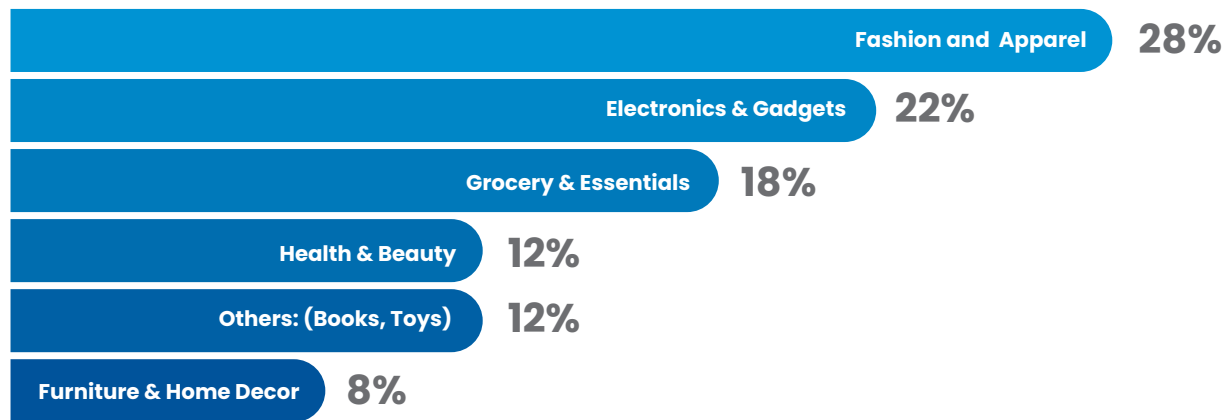
435 <https://www.btoobers.com/cloud-computing-market-in-china/>

E-COMMERCE

The E-Commerce sector landscape in Pakistan has been expanding significantly since 2022. By 2024, sales reached USD 7.7 billion, and the market is expected to grow at a CAGR of 17%, reaching USD 12 billion by 2027. The retail e-commerce volume reached USD 5.4 billion.⁴³⁶ Despite its growth, Pakistan contributed only 0.01% to total global e-commerce volume in 2024. The country ranks as the 5th most populous in the world but stands 46th in e-commerce development. E-commerce accounts for just 0.1% of overall retail spending in Pakistan.⁴³⁷

The sector is dominated by B2C platforms: groceries, fashion, electronics, and home-essentials driven by smartphone proliferation (over 80% of users primarily use mobile for e-commerce purchases) and enhanced 4G/5G connectivity.⁴³⁸ Social-commerce via live-selling on Facebook, Instagram, TikTok and WhatsApp will account for a projected 35% of online retail by 2026.⁴³⁹

The sector share within E-commerce is split as follows:⁴⁴⁰



On the consumer side, cash remains the dominant payment method, accounting for more than 75% of online retail transactions. This reliance stems from cultural preferences and limited confidence in the security of online payments. The second most-used payment methods include debit cards (9%), credit cards (8%), and digital wallets (4%). However, adoption of formal banking channels remains limited; only about 21% of Pakistan's population has access to formal banking services, highlighting the significant gap in financial inclusion. This low penetration of formal banking is a key factor behind the continued dominance of cash in online transactions.⁴⁴¹

In the FY 2025–26 budget, Pakistan formally defined “e-commerce” and added tax clauses applicable to digital trade.⁴⁴² This move reflects the government's intent to digitize and formalize the sector, FBR expects to bolster revenues, but e-commerce associations warn these measures could squeeze SMEs, increase compliance burdens, and drive-up end-customer prices. While higher taxes may deter discount-led competition, government bodies are reportedly considering phased implementation and exemptions for micro and women-led home businesses earning below PKR 5 million per year.^{443,444}

⁴³⁶ E-commerce Projections for Pakistan (2024-2027) | PCMI

⁴³⁷ E-commerce Projections for Pakistan (2024-2027) | PCMI

⁴³⁸ E-commerce Projections for Pakistan (2024-2027) | PCMI

⁴³⁹ Pakistan E-Commerce in 2026: Pakistan's E-Commerce Growth and Market Share | Digital Marketing Services in Lahore


⁴⁴⁰ Pakistan E-Commerce in 2026: Pakistan's E-Commerce Growth and Market Share | Digital Marketing Services in Lahore

⁴⁴¹ <https://development.asia/insight/cash-digital-advancing-financial-inclusion-pakistan>

⁴⁴² <https://www.brecorder.com/news/40367014>

⁴⁴³ <https://www.pwc.com/pk/en/tax-memorandum/AFFs%20Tax%20Memorandum%20on%20Finance%20Bill%202025.pdf>

⁴⁴⁴ One-time sellers, home-based business exempt from online registration: FBR - Pakistan - DAWN.COM



Globally, the total e-commerce market amounted to USD 27 trillion, and the retail e-commerce market stood at USD 4.32 trillion by the end of 2024.⁴⁴⁵ The global cross-border e-commerce segment alone is projected to reach USD 4.8 trillion by 2032, reflecting increasing consumer willingness to shop internationally.⁴⁴⁶ The Asia-Pacific region leads the total e-commerce market. Among the most active online buyer markets are China and Thailand where digital retail is deeply embedded in daily consumer behavior. In terms of payment preferences, 88% of global shoppers use credit or debit cards, followed by 72% using digital wallets. Particularly, cash on delivery remains relevant at 54%, particularly in emerging markets, while 50% of shoppers now use Buy Now, Pay Later (BNPL) options, an approach that continues to gain popularity among younger consumers.⁴⁴⁷

The Middle East's e-commerce sector is among the world's fastest growing. In 2024, the MENA region's e-commerce market reached around USD 35 billion and is forecast to expand to USD 58 billion by 2029. GCC countries, especially Saudi Arabia and the UAE, are leading the charge.⁴⁴⁸ In the Middle East, the e-commerce growth is supported by digital wallets becoming mainstream: the prepaid card and digital wallet market is expected to hit USD 44 billion by the end of 2025.⁴⁴⁹ Governments are driving change, through Saudi Arabia's Vision 2030 and the UAE's Digital Economy Strategy, promoting cashless infrastructure and trust.

Recent Developments

- **National Policy Reset:**

Draft E-Commerce Policy 2.0 (2025-30), issued June 2025, is a five-year roadmap that creates regulatory roadmaps for digital inclusivity encompassing the youth, MSME's rural entrepreneurs, women and other minorities. It sets ambitious KPIs that are export-oriented and foster cross-border enablement like targeting a 300% B2C export value by 2030 in one of its pillars.

The policy also mandates platform-level dispute resolution mechanisms and introduces a national Platform Code of Conduct.⁴⁵⁰ This is a much-needed step towards supporting e-commerce players that addresses the fragmented policies surrounding the digital economy.⁴⁵¹

- **Bank Alfalah Launches Alfamall On Whatsapp:**

This platform is new to the Pakistani market, allowing users to shop within the widely used messaging app. It gives the customers full catalogue-to-checkout experience as well as features like Buy Now Pay Later as a payment method and increases accessibility to small-ticket retail.⁴⁵²

- **Visa-1Link Partnership:**

This partnership has a clear goal: it aims for a 10-fold increase in digital-payment acceptance within three years. The emphasis is on making digital payments simpler and less costly with technologies such as card tap and QR code. It focuses on expanding beyond the main cities and larger corporations, concentrating on micro-merchants. The deal also aims to improve the process of remittance transactions within a country that is ever so reliant on them.⁴⁵³

445 E-commerce Market Size, Share, Trends and Growth, 2033

446 Cross-Border Ecommerce Market Share and Forecast, 2025-2032

447 g0-dhl-e-commerce-trends-report-2025.pdf

448 <https://www.digitalcommerce360.com/2025/05/27/mena-e-commerce-market-57-billion-by-2029/>

449 <https://www.globenewswire.com/news-release/2025/06/12/3098123/28124/en/Middle-East-Prepaid-Card-and-Digital-Wallet-Market-Growth-Dynamics-Databook-2025-Saudi-Arabia-s-Unbanked-Leverage-Prepaid-Cards-for-Financial-Inclusion.html>

450 draft-e-Commerce-Policy-2025-30-for-stakeholders.pdf

451 Commerce ministry moves to roll out E-Commerce Policy 2025-30 - Profit by Pakistan Today

452 Bank Alfalah revolutionizes E-Commerce with AlfaMall on WhatsApp - Trade Chronicle

453 Visa aims for 10-fold rise in Pakistani use of digital payments | Reuters

- **Jazzcash Installs Raast QR At Cattle Markets:**

An initiative taken place on Eid ul Azha, to promote digital financial inclusion in par with the State Bank's vision. This initiative spanned over 12 cities and 27 cattle markets facilitates the digitization of over PKR 20 billion in QR transactions every month, onboarding thousands of informal livestock traders.⁴⁵⁴

- **Bazaar Technologies acquires payments firm Wemsol (Keenu):**

Bazaar, a B2B marketplace, moves beyond inventory to merge with Keenu, a digital payments player, concentrating on POS, wallet and payment gateway services. This merger integrates fintech within Bazaar's e-commerce ecosystem and will allow Bazaar to create an end-end digital ecosystem. It will provide seamless procurement, inventory financing, and digital payment solutions.⁴⁵⁵

Challenges

- **Cash On Delivery Dominance:**

Cash on delivery still accounts for approximately 75% of transactions, fueled by consumer mistrust, past negative delivery experiences, and perceived safety of cash payments.^{456,457,458}

- **Absence Of Internationally Accepted And Viable Payment System:**

Lack of globally accepted payment systems limits cross-border growth. The absence of platforms like PayPal and Stripe continues to block Pakistan's SMEs from scaling internationally. With over 60% of online SME sales coming from overseas Pakistanis, particularly in the Middle East and Europe, buyers often demand familiar, trusted options like PayPal. In its absence, sellers rely on slow bank transfers or cash-on-delivery, both of which lead to delays, cancellations, and lost trust.

While Raast is a promising step, Pakistan urgently needs to fast-track access to secure, user-friendly global payment gateways to unlock its cross-border e-commerce potential.^{459,460}

- **High Last-Mile Delivery Costs And Inefficiencies:**

Pakistan's courier and logistics industry is still heavily reliant on manual, inaccurate address systems, causing a high percentage of failed or returned deliveries, which doubles logistics costs due to repeated attempts and reverse shipping.⁴⁶¹

- **Low Digital Literacy And Security Concerns:**

Around 98% of Pakistani consumers actively adopt security practices for digital payments, and 82% express strong trust in digital transactions, yet 55% still fear scam attempts, highlighting the everpresent vulnerability.⁴⁶² A late-2024 study of 500 Pakistani consumers showed that higher digital literacy significantly improves both perceived usefulness and ease of use of e-commerce platforms, leading to increased online transaction intent.⁴⁶³

454 12 cities nationwide: JazzCash facilitating QR-based payments at 27 cattle markets - Business & Finance - Business Recorder

455 Bazaar Technologies expands into fintech with Wemsol acquisition - Profit by Pakistan Today

456 White Paper (Digitizing E-commerce Payments with Raast)

457 SMEs face e-commerce bottlenecks

458 <https://paymentscmi.com/insights/pakistan-ecommerce-market-data/>

459 Slow internet, digital payment challenges for SMEs to tap global market: BMP - Centreline

460 E-commerce: a catalyst for SME growth

461 Pakistan E-Commerce Logistics Solutions | DHL Pakistan, Post | LinkedIn

462 <https://pk.visamiddleeast.com/about-visa/newsroom/press-releases/pr1-062025.html>

463 https://www.researchgate.net/publication/389102497_DIGITAL_LITERACY_IMPACT_ON_PERCEIVED_USEFULNESS_PERCEIVED_EASE_OF_USE_AND_ONLINE_PURCHASE_INTENTION_IN_PAKISTAN

- **SME Preparedness Gap:**

Over 90% of Pakistani SMEs, which contribute roughly 40% to GDP,⁴⁶⁴ lack access to essential digital infrastructure, tools, and skills, particularly outside major cities. Many owners are unfamiliar with e-commerce marketing techniques like search engine optimization, social media, and inventory management, hindering their ability to scale and compete online. Despite government and private initiatives, such as SMEDA's partnership with Extreme Commerce, training programs remain urban-centric, limiting impact for rural entrepreneurs.⁴⁶⁵

- **Unreliable Connectivity:**

Limited internet connectivity continues to hinder both rural suppliers and consumers. Pakistan ranks 97th globally in mobile internet speed (25 Mbps), and frequent rural outages disrupt operations.

One SME in Peshawar reported losing over 50 orders during a single 12-hour blackout. Further, poor connectivity also restricts smaller vendors' ability to market and grow their online presence.⁴⁶⁶

- **Taxation Pressures On E-Commerce:**

A 5% Digital Presence Proceeds Tax (DPPT) on foreign marketplaces took effect on 1 July 2025 but was suspended just four weeks after sharp consumer backlash and price hikes of up to 300% on platforms such as Temu and AliExpress.⁴⁶⁷ The rapid policy change signals the volatility and regulatory uncertainty surrounding the sector.⁴⁶⁸

The Finance Act 2025 imposes a final withholding tax of 1% on digital payments and 2% on Cash-on Delivery (COD), collected by banks and courier firms. COD still accounts for the bulk of online orders in Pakistan. These new taxes, in addition to the 18% GST on COD parcels, have driven up the logistics costs, putting particular strain on small vendors operating on narrow margins.⁴⁶⁹

Industry groups and local e-commerce associations have raised concerns that the new tax regime may disproportionately burden small and medium sellers. Increased compliance costs and mandatory withholding deductions reduce margins for unregistered or home-based sellers. Although the FBR has assured exemptions for sellers earning below PKR 5 million annually, lack of a consensus-driven framework and implementation clarity continues to create uncertainty for smaller vendors.⁴⁷⁰

Recommendations

- **AI In E-Commerce:**

A survey conducted by DHL shows that 7 in 10 shoppers (globally) now want retailers to have AI-powered features. AI shopping features most demanded by customers include Virtual Try-ons, Shopping assistant, Automated re-ordering, AI sizing, or voice search. To capture this market, Pakistani retailers that embed AI early, win both engagement and loyalty from customers.⁴⁷¹

Using GenAI to auto-create text, images, campaigns and new product concepts, enabling hyper-personalized engagement across every channel and market segment.⁴⁷²

Deploy AI/GenAI tools to track inventory, shipments, and demand signals continuously, closing blind spots from source to shelf.

464 <https://www.brecorder.com/news/40356129>

465 <https://centrelines.com.pk/2021/06/16/smes-to-be-trained-for-e-commerce>

466 SMEs face e-commerce bottlenecks

467 Good news for Temu shoppers in Pakistan – Check latest update

468 Taxing the digital frontier: Pakistan's bold move to tap e-commerce and online revenues – Pakistan – Business Recorder

469 Pakistan's e-commerce sector faces operational costs surge amid new taxes – Markets – Business Recorder Budget proposal for imposing 18pc sales tax on e-commerce items gets Senate panel's nod

470 <https://www.startup.pk/2025-budget-pushes-pakistans-e-commerce-platforms-into-the-tax-spotlight>

471 g0-dhl-e-commerce-trends-report-2025.pdf

472 Deloitte Global Retail Outlook 2024

- Refunds And Returns:**

SBP's draft e-commerce policy outlines a national consumer protection framework, defining enforceable digital rights such as timely refunds, clear return policies, and accountability for counterfeit goods and misleading ads. These provisions are a crucial step toward restoring consumer trust and should be further refined and enforced across platforms. Policies such as these should be further explored and refined to ensure consumer rights and build trust that currently lacks in the e-commerce market.
- Strengthen Consumer Protection And Seller Verification:**

The government and digital marketplaces should establish stronger safeguards against online fraud and unreliable sellers. This includes enforcing mandatory seller verification, transparent refund and dispute mechanisms, and platform-backed buyer protection to ensure trust, reliability, and authenticity in Pakistan's e-commerce ecosystem.
- Social Commerce:**

With 70% of consumers globally purchasing via social media, platforms like TikTok are fast becoming primary retail channels, already converting 86% of Thai shoppers and 48% of Gen Z worldwide. In Pakistan, TikTok ads reach 57.8% of internet users,⁴⁷³ and the launch of its Creator-Pilot and Shop beta signals a shift toward in-app commerce.⁴⁷⁴ For smaller SMEs, WhatsApp and TikTok shops offer lowercost than a larger platform.⁴⁷⁵
- Green Is The New Baseline:**

DHL reports that 72% of global shoppers assess sustainability before buying, with 1 in 3 abandoning carts over eco concerns (rising to nearly half among Gen Z). Over 50% already prefer refurbished items. In Pakistan, recent surveys confirm a strong link between environmental values and green-buying intent among urban millennials and Gen Z, signaling rising demand for eco-conscious commerce.^{476,477}
- Address Connectivity Gaps:**

The government and telecom providers must accelerate rural 4G/5G rollouts. Incentives like tax credits or spectrum discounts should be linked to coverage in underserved regions. In parallel, e-commerce platforms can develop low-data "lite" versions of their apps.
- Shift Towards Different Payment Methods:**

Pakistan must expedite regulatory readiness for PayPal, Stripe, and similar gateways. In the interim, expanding Raast's cross-border capacity or enabling integrations with platforms like Wise and Payoneer can bridge the gap.
- BNPL And Subscriptions:**

With 50% of global consumers using Buy Now, Pay Later (BNPL), and 34% subscribing for delivery or discounts, Pakistan's fintech companies (e.g. JazzCash) should scale these services. Subscription bundles also help reduce logistics costs and increase repeat customers.^{478,479}

473 Digital 2025: Pakistan – DataReportal – Global Digital Insights 70% of consumers buying products on social media said they trust i...

474 E-commerce Trends in 2025 for Pakistan - OnePakistan

475 SMEs face e-commerce bottlenecks

476 View of Exploring Determinants of Green Buying Intentions: An Empirical Investigation Among Consumers in an Emerging Market—Evidence from Pakistan

477 DHL's E-Commerce Trends Report 2025: AI and social media reshaping online shopping | Handling-Network.com

478 JazzCash unveils Buy Now, Pay Later service

479 E-commerce Trends in 2025 for Pakistan - OnePakistan

- **Strengthen Last-Mile Logistics:**

Enhance urban location digitization, investments in regional fulfilment centers, and public-private courier coordination are also needed. Pakistan Post and private logistics firms can also pilot drone delivery in remote areas to reduce cost and delivery failures.

- **Facilitation In Tax:**

E-commerce players have implored the government to simplify Finance Bill taxes, warning that sudden, complex tax measures could hinder sector growth and slow the shift towards a regulated online economy.

Pakistan e-commerce association's chairman recommended that the withholding tax of 2% should be removed from the documented traders as they already pay 18% GST. Providing tax relief to documented sellers will reduce the financial burden, promote registration, and support broader goals of digitization and formalization of this sector.⁴⁸⁰

Local startups in underserved regions should be supported through tax incentives, grants, or subsidized financing to promote entrepreneurship and inclusive digital growth.

- **User Friendly Interface:**

User friendly and multilingual interfaces play an immense role in Ecommerce as user friendly interface makes it easy for anyone to use E-commerce whether they belong to city or a rural area. People of many languages use the internet and thus an interface which is inclusive of the domestic languages of Pakistan such as Urdu, Punjabi, Balochi, and Pashto will be much more feasible as compared to a standard English interface.

- **Enhanced Cybersecurity:**

The government should take steps in promoting cybersecurity such as developing a comprehensive data protection law, modelled after the General Data Protection Regulation (GDPR), expansion of (Prevention of Electronic Crimes Agency) PECA to identify new threats such as ransomware and (Advanced Persistent Threat) APT's, for the improvement of crises management.

A strong system like Computer Emergency Response Team (CERT) should be developed which is already proven to be effective in the United States. These steps will develop trust among the users that their sensitive data is safe, and this will lead to a better flow of transactions online. A strong cybersecurity system will develop trust of the users and will lead to growth in sales and businesses operating online.⁴⁸¹

480 New taxes on courier services hike costs for Pakistan's e-commerce sector - Profit by Pakistan Today

481 Improving Pakistan's cybersecurity architecture using US and UK insights | International Bar Association

Global Case Studies ^{482, 483, 484, 485, 486, 487}

UAE And Saudia Arabia: Noon.com

Noon.com was founded in 2017, it holds the top market position in Saudi Arabia and the UAE, serving over 4 million daily users. With approximately USD 169 million in revenue in the UAE and USD 1.37 billion in GMV by 2026, it offers high-yield features like the world-first loyalty program, Noon One, offering unlimited free delivery for a fixed fee to boost repeat usage. To accelerate logistics, Noon operates a 252,000 m² fulfillment facility in Abu Dhabi (KEZAD) servicing over 5,000 SMEs and optimizing cross-border flows. It also integrates laundry and at home beauty services through partnership with Urban Company.

Noon's success highlights the value of investing in logistics infrastructure and loyalty programs to boost repeat e-commerce usage. Pakistan's marketplaces could replicate this with subscription delivery and regional fulfillment hubs to drive scale.

Morocco: Chari

In the Gulf and North Africa region, Chari (Morocco) has successfully combined e-commerce with fintech to empower SMEs and drive digital inclusion. Chari operates a B2B platform serving roughly 15,000 Moroccan shopkeepers, offering online inventory ordering with next-day delivery and integrated credit/bookkeeping via its fintech app, Karny.

Chari's B2B model for shopkeepers with embedded inventory ordering and credit tools shows how fintech can uplift micro-retailers. This type of digital bookkeeping and inventory management systems can be used in Pakistan's "kiryana" stores shopkeepers.

Egypt Jumia

Jumia which is often dubbed as the "Amazon of Africa", has scaled its fintech arm JumiaPay. It has launched flexible payment options like installment plans through collaborations with financial partners like Contact CrediTech in Egypt, aimed at boosting online sales and reducing barriers to digital purchasing.

Jumia's JumiaPay illustrates how embedded installment options and payment flexibility can expand digital commerce. Similar strategic partnerships with fintechs can help Pakistani SMEs attract more customers and reduce COD dependency.

Egypt: Paymob + Tamara Transforming SME Commerce

In 2024, Egyptian fintech Paymob partnered with Saudi-based Tamara, a leading GCC BNPL provider, to embed "Buy Now, Pay Later" directly into Paymob's payment gateway. This integration now serves over 250,000 merchants, unlocking a 40% average order value increase, 15% lift in conversion rates, and 50% more repeat purchases, especially among SME retailers in KSA and UAE.

The plug-and-play model significantly lowers barriers to adoption for small retailers, as no complex integrations are needed, and it allows rapid consumer access to flexible payments. Paymob's reach spans 250,000 merchants across MENA-P and integrates Tamara's BNPL solution to enhance purchase experience and sales.

Mirroring this model, embedding BNPL and digital payments into Raast-enabled SME platforms, could dramatically boost order values, reduce COD reliance, and drive repeat business for corner stores and micro entrepreneurs across Pakistan.

482 <https://virtuzone.com/blog/ecommerce-industry-uae/>

483 <https://www-ft-com.ezp-prod1.hul.harvard.edu/content/0c805550-8e16-4395-8e9f-518e68cf3981>

484 <https://group.jumia.com/news/jumiapay-egypt-and-contact-expand-their-partnership>

485 <https://www.mordorintelligence.com/industry-reports/united-arab-emirates-ecommerce-market>

486 <https://thefintechtimes.com/paymob-and-tamara-bring-payments-gateway-together-with-bnpl-to-create-ecosystem-for-merchants/>

487 <https://www.entrepreneur.com/en-ae/news-and-trends/paymob-the-largest-payments-facilitator-in-the-menap/468012>

EXPORT OF IT AND IT-ENABLED SERVICES

In 2024, digitally delivered services, particularly IT, software, cloud, and professional services, continued to dominate global trade in services. According to the World Trade Organization (WTO), computer services trade rose by 12% year-on-year, with digitally deliverable services accounting for the largest share of this growth, highlighting the increasing reliance on cross-border digital transactions.⁴⁸⁸ In April 2025, U.S. exports telecommunications, computer, and information services alone contributed approximately USD 7.8 billion,⁴⁸⁹ making them the largest single category within services trade.⁴⁹⁰ This highlights continued global demand for digital expertise like cloud computing, software development, cybersecurity, and SaaS.

Emerging economies posted strong double-digit growth in IT and IT-enabled service exports during 2024. According to the OECD's Digital Economy Outlook 2024, the ICT sector, dominated by cloud, software, and digital platforms, grew on average 7.6% across OECD countries in 2023, significantly outpacing overall economic growth.⁴⁹¹ Moreover, OECD analysis highlights the rising importance of digital trade in regions like Southeast Asia, Latin America, and Africa, where digital services increasingly contribute to national exports. With developing nations like Indonesia, and Kenya reporting surging demand in outsourced IT, back-office support, and E-commerce enablement, these trends underscore a global shift toward expanding digital infrastructure, solid data governance, and enhanced human capital in the global ITeS marketplace.

As of the latest data (FY 2024–25), Pakistan exports its IT and ITeS to 170+ countries/territories. United States remains Pakistan's single largest export market for IT and IT-enabled services, accounting for approximately 54.5% of total ICT service exports, well ahead of other markets like the UK (8%), UAE (7%), Ireland (6.7%), and Singapore (5%).⁴⁹²

Pakistan's IT and IT-enabled services (ITeS) exports have reached new highs, solidifying the sector's role as a key driver of economic growth and digital transformation, with currently over 30,000 registered companies.⁴⁹³ According to the Pakistan Economic Survey, ICT exports rose to USD 2.8 billion over the first nine months (July to March) of FY 2025.^{494,495} Building on this momentum, FY2024–25 recorded the highest-ever IT export value of USD 3.8 billion,⁴⁹⁶ marking an 18% increase from the previous year.

The State Bank of Pakistan's new policy allowing IT exporters to retain up to 50% of foreign exchange earnings in specialized accounts and even invest abroad, has further improved profitability and repatriation. Under the ambitious "Uraan Pakistan" strategy, the government targets a longer-term objective of hitting USD 10 billion by 2029, indicating a CAGR of 28%.⁴⁹⁷ This impressive trajectory underscores Pakistan's evolving global footprint, driven by fintech solutions, software development, BPO, cloud services, and a rapidly expanding freelancer ecosystem.

488 WTO | 2025 News Items - Services trade growth hits new highs in third quarter of 2024, https://www.wto.org/english/res_e/booksp_e/trade_outlook25_e.pdf

489 United States - U.S. Exports of Services: Telecommunications, Computer, and Information Services - 2025 Data 2026 Forecast 1999 Historical

490 <https://www.bea.gov/news/2025/us-international-trade-goods-and-services-may-2025>

491 <https://www.oecd.org/en/publications/2024/05/oecd-digital-economy-outlook-2024-volume-1-d30a04c9.html>

492 https://www.finance.gov.pk/survey/chapters_23/15_Information_Technology.pdf

493 Pakistan's ICT exports surge to \$2.8 Billion in FY 2025 as telecom subscribers near 200 Million - Profit by Pakistan Today

494 Digital Pakistan Soars as ICT Exports Hit \$2.8B Milestone - Digital Pakistan

495 ICT exports rise by 23.7%, reaching \$2.825 bln in nine months

496 Pakistan's IT exports reach historic high IT exports hit record at \$3.8B

497 CW Pakistan - Computerworld Pakistan - Tech News

Pakistan is home to a thriving freelance community of approximately 2.37 million individuals, accounting for around 15% of the country's IT exports. This segment plays a vital role in fueling the growth of the digital economy. However, challenges persist, particularly regarding financial inclusion.⁴⁹⁸ Currently, only 38,000 freelancers in Pakistan have bank accounts, highlighting a significant gap in financial inclusion. To address this, the State Bank of Pakistan (SBP) has launched targeted initiatives to expand banking access for freelancers, resulting in approximately 500 new accounts being opened each week.

Expanding financial inclusion in this segment is critical, not only for enhancing their contribution to IT export revenues, but also for increasing transparency and formalization within the sector.

The growth in Pakistan's IT exports is driven by a combination of rising global demand for services such as software development, call center operations, and digital marketing, areas where Pakistan has built a strong outsourcing reputation, and proactive government support through tax incentives, infrastructure development, and regulatory improvements that have collectively enabled the sector's continued expansion.

Recent Developments

- **Infrastructure Development: STZs And Technology Parks:⁴⁹⁹**

In August 2024, the Special Technology Zones Authority notified four new Special Technology Zones, NUST and Tech7 in Islamabad, Mindbridge in Lahore, and Capital Smart in Rawalpindi, spanning 1.4 million sq ft over 130 acres, with over PKR 30 billion existing investment. These Special Technology Zones are designed to foster academia-industry collaboration and accelerate innovation.^{500,501} The capacity in these four zones will be accommodating over 50,000 tech professionals and will have an annual export potential of at least USD 350 million.

- **Freelancer And Startup Ecosystem Support:⁵⁰²**

Pakistan's eight tech focused National Incubation Centers have incubated over 1,900 startups across major cities like Islamabad, Karachi, Lahore, Peshawar, Faisalabad, Hyderabad, Rawalpindi, and Quetta, generating PKR 27 billion in revenue, creating 185,000 jobs, with 35% of ventures led by women. Further, programs like DigiSkills have trained over 5 million individuals in freelancing and digital tools, making Pakistan one of the top freelancer markets globally.⁵⁰³

- **Government Policies And Strategic Framework:**

Pakistan's digital transformation is guided by recently issued frameworks including the Digital Nation Act 2025, First AI policy, incentives administered by the Pakistan Software Export Board (PSEB), offering tax credits, zero income tax on IT and ITeS exports, and full foreign ownership of IT and ITeS Companies. P@SHA has urged the government to restore and extend the concessional 0.25% withholding tax on IT and ITeS export revenues for another ten years (2025–2035); to boost investor confidence, encourage exporters to reinvest locally, and level the playing field between salaried IT professionals and low-taxed freelancers in this sector.^{504,505}

498 IT Sector Targets \$4.2 Billion in Exports for FY2025

499 STZA Notifies Four New Special Technology Zones with Rs. 30 Billion Infrastructure Investment

500 Development of Special Technology Zones – Opinion – Business Recorder

501 IASP global directory of science & technology park & innovation district – IASP

502 National Incubation Centers Kickstart 1900 Startups in Pakistan

503 Pakistan's ICT exports surge to \$2.8 Billion in FY 2025 as telecom subscribers near 200 Million – Profit by Pakistan Today

504 P@SHA calls for 10-year tax exemption to boost IT exports

505 Software-Development-Export-Strategy-Pakistan-3_web.pdf

Challenges

- **Inconsistent And Unpredictable Regulatory And Tax Policies:**
Frequent changes in tax regimes, such as the shift from tax exemption to tax credit and the subsequent introduction of the Final Tax Regime (FTR), create uncertainty for businesses and deter foreign investment.⁵⁰⁶ The complex taxation structure, including advance income tax, final tax on export proceeds, sales tax on inputs, and high custom duties on imported hardware, further increases the cost of doing business and reduces liquidity.
- **Restrictions On Foreign Currency Retention:**
This disincentivizes exporters from bringing their proceeds back into the country, hindering the sector's financial agility and competitiveness.⁵⁰⁷
- **Human Resource Gap and Brain Drain:**
While Pakistan has a large young population, there is a persistent shortage of skilled talent in specialized, higher-paying areas like Blockchain, IoT, and Data Science.⁵⁰⁸
- **Inadequate Infrastructure:**
Technology parks often lack essential facilities such as subsidized electricity and sufficient space, unlike those in competing countries.
- **Untrained Freelancers And Reputational Risks On Global Platforms:**
While Pakistan boasts 2.37 million active freelancers, studies reveal significant challenges. Respondents in a Pakistani freelancer survey cited local malpractice leading to a poor international reputation, and many struggle with platform saturation and skill mismatches on sites like Upwork and Fiverr.

This has resulted in high competition, inconsistent service quality, and occasional client distrust, issues that underscore the urgent need for structured upskilling, professional development, and ethical standards to build a reliable and competitive freelance workforce.⁵⁰⁹

- **Fragile Country Image, Influenced by Political And Economic Instability:**
This affects the confidence of international companies seeking service providers or back-office locations in Pakistan.⁵¹⁰ Disruptions in internet connectivity, coupled with slow speeds and reliability issues, directly impact the operations of IT and ITeS firms, leading to reputational damage and business losses, especially for services requiring continuous operation like call centers.⁵¹¹

Recommendations

- **Promote Freelancing Through Academic Channels:**
Promote freelancing as a viable career path within academic institutions via awareness campaigns, workshops, and career counseling to increase graduate employability and foreign remittance inflows.

506 2023-24 Budget Recommendations by P@SHA - V1.1

507 Enhancing the Competitiveness of Pakistan's Computer Services Exports | Pakistan Business Council

508 Pakistan's IT and ITeS export strategy: a gateway to economic prosperity and global recognition | International Bar Association

509 <https://modern.diplomacy.eu/2024/05/07/the-flip-side-of-freelancing-industry-of-pakistan/>

510 Why Pakistan struggles to grow exports

511 Transforming services trade through digital infrastructure

- **Ensure Policy Consistency And Favorable Tax Regimes:**

Exempt withholding tax on dollar-denominated payments to non-resident service providers from Exporters' Special Foreign Currency Accounts (ESFCAs).

Eliminate custom duties and other levies on imported hardware components essential for IT and ITeS operations, recognizing them as re-export items or components for value-added manufacturing.⁵¹²

Allow full retention of inward foreign currency by IT/ITeS firms to enable agile operations and payments for imported services.⁵¹³

- **Bridge The Human Resource Gap And Combat Brain Drain:**

Develop demand-driven nationwide skill development programs for graduates and upskill existing resources, focusing on emerging technologies like AI, IoT, and Data Science.⁵¹⁴

Revamp academic curricula to align with the dynamic requirements of the IT industry, fostering strong industry-academia linkages.¹⁶⁹

Strengthen industry-academia collaboration and modernize the IT curriculum to match evolving industry demands and emerging technologies.

Significantly reduce income tax rates on salaried individuals in IT companies to incentivize talent retention and attract professionals to the local market.⁵¹⁵

Facilitate training and certifications for freelancers to enhance their global competitiveness.¹⁶⁹

- **Invest In Digital Infrastructure:**

Expand digital infrastructure, including reliable broadband networks, cloud computing capabilities, and state-of-the-art data centers across the country.⁵¹⁶

Ensure consistent and high-speed internet connectivity, as it is a fundamental requirement for IT and ITeS export businesses.

Provide subsidized electricity and modern facilities within technology parks to create a conducive environment for IT companies.⁵¹⁷

- **Improve Global Credibility:**

Incentivize IT firms participating in international events to globally promote the "Digital Pakistan" narrative.

Launch a digital awareness campaign targeting global clients to rebuild trust and promote Pakistan as a reliable and skilled freelance destination.

Facilitate participation of startups in global tech exhibitions by simplifying procedures through proactive government support while the Tech Destination Facilitation Cell is active, more streamlining is required.

Encourage greater presence of government organizations in global conferences and forums to promote Pakistan's digital achievements.

- **Strengthening Freelance Ecosystem:**

Establish publicly funded mentorship and peer-review programs to guide new freelancers and reduce malpractice that harms Pakistan's international reputation.

Collaborate with platforms like Fiverr and Upwork to recognize verified Pakistani freelancers through formal partnerships and rating transparency initiatives.

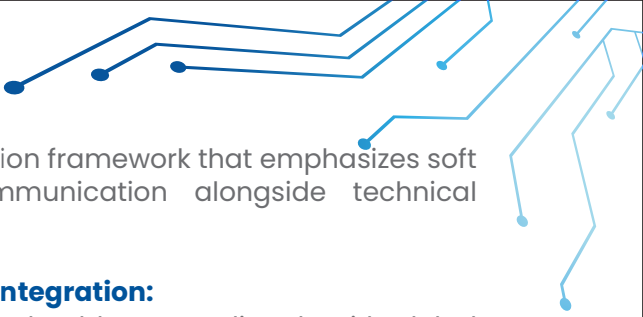
513 Enhancing the Competitiveness of Pakistan's Computer Services Exports | Pakistan Business Council

514 Pakistan's IT and ITeS export strategy: a gateway to economic prosperity and global recognition | International Bar Association

515 2023-24 Budget Recommendations by P@SHA - V1.1

516 SpecialSection.pdf

517 Why Pakistan struggles to grow exports



Introduce a national freelance training and accreditation framework that emphasizes soft skills, ethics, quality assurance, and client communication alongside technical competencies.

- **Formalize the Freelance Economy through Financial Integration:**

To boost freelance exports, the State Bank of Pakistan should partner directly with global payment gateways (e.g., Payoneer, Stripe). This would provide freelancers with a streamlined, low-cost way to receive international payments, convert foreign currency, and seamlessly deposit funds into local bank accounts, encouraging the formal repatriation of earnings.

Global Case Studies ⁵¹⁸

Ireland: Leveraging Tax Policy And Talent For IT Exports

In 2023, Ireland exported approximately USD 328 billion in digitally delivered services, accounting for 7.7% of global digital exports, positioning it among the top global players in digital trade. This success is largely attributed to a combination of favorable corporate tax policies, unrestricted access to the European Union market, and a highly skilled, English-speaking workforce. These factors have made Ireland an attractive destination for global technology giants, including Google, Apple, Facebook (Meta), Microsoft, and Amazon, many of which have established their European headquarters in cities like Dublin.

Ireland's digital export growth is also supported by strong government–industry collaboration, investments in STEM education, and the development of special economic zones tailored for tech and digital firms. Additionally, the country's focus on data privacy compliance (e.g., GDPR) and transparent regulatory frameworks has enhanced its credibility as a secure and stable environment for cross-border digital services. As a result, Ireland has evolved into a critical node in the global digital services supply chain, with IT exports playing a vital role in the country's economic growth and international competitiveness.

Pakistan can boost its IT exports by offering globally competitive tax incentives, investing in STEM education, and creating special tech zones with regulatory certainty and strong data protection laws to attract foreign investment and multinational tech firms.

United States – World's Largest Exporter Of Digital Services

The United States is the world's largest exporter of digitally delivered services, with exports reaching USD 649 billion in 2023, representing 15.3% of the global market. Its major digital exports include cloud computing, enterprise software, fintech platforms, streaming media, and cybersecurity services, driven by global tech leaders such as Microsoft, Amazon (AWS), Google, and Oracle. The U.S. maintains its leadership through an innovation ecosystem, significant R&D investment, advanced digital infrastructure, and strong intellectual property protections. These factors, combined with well-established global trade networks, make the digital services sector a key contributor to the country's GDP and high-skilled employment, firmly positioning the U.S. as a global digital economy leader.

To become a major digital services exporter, Pakistan should scale up R&D funding, enhance cloud and broadband infrastructure, and strengthen intellectual property rights. Building a solid innovation ecosystem with global linkages can help Pakistan tap into high-value digital trade markets.

OVERALL START-UP ECOSYSTEM AND THE ROLE OF ACCELERATORS AND INCUBATION PROGRAMS

As of 2025, Pakistan's startup ecosystem is steadily maturing, driven by a growing network of incubators, accelerators, and government-backed initiatives. At the heart of this ecosystem are the National Incubation Centers (NICs), operating in cities like Islamabad, Lahore, Karachi, Peshawar, Quetta, Hyderabad, and Faisalabad. Funded by the Ignite National Technology Fund under the Ministry of IT and Telecom, these centers have incubated over 1,300 startups, collectively raising more than PKR 13.85 billion and generating over 126,000 jobs.⁵¹⁹ NIC Karachi alone contributed nearly PKR 8.1 billion in investment.⁵²⁰ Startups benefit from seed funding, mentorship, co-working spaces, and training programs. The NIC Islamabad has further enhanced its support through partnerships with global accelerators such as Mass Challenge and the Founder Institute, offering zero-equity support, international mentorship, and funding up to PKR 5 million.⁵²¹

Accelerators and incubators are not only fostering early-stage innovation but are also creating exposure through events such as the Pakistan Investor Summit 2025, which brought together over 100 startups and 400 investors. Many startups from these programs have gained international recognition, including mentions in Forbes 30 Under 30 Asia and participation in global expos. Despite these successes, challenges remain - most notably regulatory fragmentation, insufficient early-stage venture capital, and infrastructure gaps. In response, the government has introduced the Pakistan Startup Fund to de-risk investor participation and is expanding IT infrastructure through new Software Technology Parks and planned Special Technology Zones. Collectively, these initiatives are reshaping Pakistan's entrepreneurial landscape, positioning the country as a rising hub for regional tech innovation.⁵²²

Recent Developments

- **Special Technology Zones Authority (STZA):**
Launched in 2020, STZA is designed to promote the growth of the tech sector by establishing dedicated Special Technology Zones with tax incentives and regulatory facilitation. The zones aim to attract both local and foreign investments, support R&D, and offer a globally competitive environment for tech-based startups and companies.⁵²³
- **Pakistan Startup Fund (2023–2024):**
In 2023, the IT minister launched the PKR 2 billion Pakistan Startup Fund to offer matching grants and de-risk investment for early-stage startups. This initiative aims to attract domestic and foreign venture capital by covering part of the financial risk for investors.⁵²⁴

⁵¹⁹ <https://moitt.gov.pk/ProjectDetail/ZDZjYzY3ZDA1ZTQ2OS00NGRhLTl1NmItMzJmMzdiYTU3ZDE0>

⁵²⁰ NIC Karachi's Legacy of Innovation: 6 Years of Empowering Entrepreneurs and Transforming Pakistan's Tech Landscape - Welcome to National Incubation Center Karachi

⁵²¹ NIC partners with leading global accelerator

⁵²² Pakistan Investor Summit 2025 Hosts Over 100 Startups and 400 Participants

⁵²³ Special Technology Zones Authority | STZA

⁵²⁴ IT Minister Launches Rs. 2 Billion Pakistan Startup Fund

- **Launch Of Shark Tank Pakistan:**⁵²⁵

Shark Tank Pakistan premiered on November 3, 2024 on Green Entertainment, delivering an 11-episode inaugural season that featured over 90 startup pitches before a panel of investors including Rabeel Warraich, Aleena Nadeem, Junaid Iqbal, and Karim Teli, offering entrepreneurs mentorship, funding opportunities, and nationwide visibility.

Shark Tank Pakistan made history with Saraaf securing a record-breaking PKR 1.5 billion deal.⁵²⁶ Other notable deals include Arshad "Chai Wala" Khan's PKR 10 million investment and funding for startups like Yumkins Foods and Shahtaj Qaiser.⁵²⁷ Among the standout ventures was "KangarooCare AI", a health tech startup incubated under the National Expansion Plan of NICs at Sindh Madrassatul Islam University (Karachi), secured PKR 30 million for a 25% equity stake. The company provides AI-powered neonatal care solutions designed to monitor and support premature and low-birth-weight infants.⁵²⁸ Further, Cobblers Cartel, a premium handcrafted Pakistani footwear brand launched in 2018, received PKR 8.5 million in funding through the show, contributing to the demand of local crafted footwear.⁵²⁹

However, despite these high-profile announcements, only 4 out of 36 deals have secured funding post due diligence, reflecting deeper challenges in Pakistan's startup ecosystem such as funding shortages, red tape, and investor caution that continue to hinder the materialization of many on-air promises.⁵³⁰ Looking ahead, a new startup show titled "Bazaar" is set to launch in 2026, aiming to provide enhanced funding access and mentorship.⁵³¹

- **Private Sector Initiatives:**

Programs such as Plan9 (by PITB), Invest2Innovate (i2i), The Nest I/O, Founders Institute, and Techstars Lahore have played a vital role in nurturing early-stage startups. These platforms offer mentorship, investment readiness programs, and global linkages.⁵³²

- **Accelerator-Driven Competitions:**

The Google Cloud Startup Competition 2024 attracted over 700 applications from 70+ cities, awarding PKR 1 million per track winner, mentorship from Google experts and VC introductions, plus up to USD 25,000 in cloud credits through ten ecosystem partners (including NICs), emphasizing the critical role of accelerators and incubators in scaling innovation.⁵³³

- **Gender-Balanced Funding Breakthrough:** ⁵³⁴

In 2023, female-led startups captured 13.9 % of total funding (USD 10.5 million), up sharply from a 1.3% four-year average, reflecting targeted diversity initiatives and more sophisticated investor criteria.

- **Private Sector Co-Working Space:**⁵³⁵

Coworking spaces are a key startup enabler in Pakistan. Daftarkhwan, COLABS, and CalmKaaj have each become vital hubs in Pakistan's startup ecosystem, offering much more than just desks and chairs, they fuse workspace, community, and direct links to accelerators and incubators.

525 Tech Startup Ecosystem For Web

526 Pakistan's Shark Tank deal worth Rs1.5 billion breaks global record

527 Arshad Khan, the 'Chai Wala,' Wins Rs 10 Million Deal for His Tea Brand on Shark Tank Pakistan

528 <https://pitb.gov.pk/node/10426>

529 <https://www.werisebyliftingothers.in/2024/12/biography-of-jibran-rahim-founder-and.html>

530 <https://www.bolnews.com/technology/2025/07/reality-check-just-4-out-of-36-shark-tank-pakistan-deals-actually-materialize/>

531 <https://www.bolnews.com/technology/2025/07/reality-check-just-4-out-of-36-shark-tank-pakistan-deals-actually-materialize/>

532 Welcome to Plan9 | Plan9

533 Tech Startup Ecosystem For Web

534 Tech Startup Ecosystem For Web

535 Tech Startup Ecosystem For Web

Daftarkhwan's multi-city hubs host pitch days, hackathons, and mentorship sessions that connect founders to funding and expertise. COLABS leveraged strategic pre-Series A funding to scale its flexible offices and community events in partnership with global VCs and academic incubators.

CalmKaqj's Islamabad campuses offer reliable infrastructure alongside curated introductions to mentors, investors, and government initiatives, fostering collaboration across the ecosystem.

Together, they complement formal acceleration programs by nurturing startups in a hands-on, community driven environment.

Challenges

- **Regulatory Challenges:**

After peaking at USD 350 million in startup funding across 81 deals in 2021, 536 total funding plummeted to just USD 76 million in 2023 and decreased further by 70% to USD 22.5 million in 2024, according to industry trackers.^{537,538} This funding drought reflects not only global capital tightening, but also Pakistan's fragmented and investor-unfriendly regulatory landscape.

Regulatory fragmentation remains a key challenge with regulators including SECP, SBP, and FBR creating confusion over tax treatment, compliance, and access to incentives, discouraging foreign venture capital. SECP's market-oversight focus clashes with SBP's currency controls and FBR's revenue priorities. These overlapping priorities leads to regulatory friction.^{539,540}

Current laws surrounding the registrations of VCs are outdated and are not consistent with the model of early-stage investing. This further discourages VCs specifically on earlier stage startups.

Startups face duplicated KYC and document requirements across banks, SECP, SBP and FBR, with no data-sharing, stretching timelines and undermining cross-border investments.

- **Economic Instability:**

In 2024, Pakistan's startup funding dropped by over 70%, totaling just USD 22.5 million across 15 deals, marking the lowest in years. Q1 2025 also saw negligible venture activity, reflecting investor caution amid macroeconomic instability.⁵⁴¹ This decline stems from economic uncertainty, investors shifting towards more sustainable business models, and restrictions on profit repatriation, which have made foreign investors increasingly cautious.

Macroeconomic headwinds, including inflation above 25% and record rupee volatility, have eroded business confidence and increased operational risks for emerging ventures, making sustainability and scalability more difficult heading into 2025.

- **Urban Concentration:**

Incubators and accelerators remain overwhelmingly concentrated in urban hubs, of Karachi, Lahore, and Islamabad, leaving regional talent underutilized.

536 Pakistan's startups in 2021: \$350mn raised across 81 deals - Technology - Business Recorder 537 Resilience in the rough: Startup ecosystem in 2025 - BR Research - Business Recorder

538 Tech & VC Landscape 2024

539 Policy-Paper-Startups.pdf

540 StartupEcosystem-Paper

541 Tech & VC Landscape 2024

- **Ineffective Incubation:**

Many public incubators, such as National Incubation Centers (NICs), lack performance-based KPIs and often provide non-equity capital or support without measurable commercialization outcomes.

- **Gender Imbalance:**

Female-led startups account for less than 10% of funded ventures, highlighting significant gender gaps. The absence of a national fund-of-funds mechanism, limited M&A activity, and no active exit markets (e.g., IPO pipeline via PSX GEM Board) further hinder investor confidence.⁵⁴²

Recommendations ⁵⁴³

- **Strengthen Digital Presence And Marketing:**

Startups should build strong digital visibility through search engine optimization, social media engagement, and user-friendly web/app design. A focus on content quality, targeted digital advertising, and performance analytics is essential for brand growth and customer retention.⁵⁴⁴

- **Leverage Incubators And Accelerators:**

Engagement with platforms like NIC, Plan9, and Invest2Innovate offers mentorship, funding access, and structured support. These programs enhance business models, pitch readiness, and professional networks, accelerating growth and visibility.⁵⁴⁵ While incubators form the backbone of early-stage support in Pakistan, the role of accelerators like Invest2Innovate must be elevated to complement incubation and spur the scale-up.

The government should actively partner with and promote these high-impact accelerator initiatives through co-funding, strategic grants, or official referrals, especially targeting sectors like climate-tech, women-led ventures, and regional scale-ups, to ensure that Pakistani startups move beyond incubation into scalable, investment-ready enterprises.⁵⁴⁶

- **Access To Diverse Funding Channels:**

Beyond venture capital, startups should explore crowdfunding, angel networks, government grants, and diaspora investments. Building strong pitch decks and tapping into innovation funds can secure critical early-stage capital.⁵⁴⁷

- **Engaging Worldwide Donors:**

The inclusion of additional international organizations like the World Bank, USAID, and the Asian Development Bank could enhance opportunities for startups, resulting in a surge of innovation and growth in sectors aligned with the social objectives of these entities.

- **Invest In Team Building And Leadership:**

Hiring aligned, skilled talent and offering equity incentives can strengthen team cohesion. Inclusive, transparent work environments and leadership training enhance innovation and long-term resilience.⁵⁴⁸

542 Fact Sheet: Women in Startups and Business in Pakistan - LUMS Centre for Entrepreneurship

543 *SECURITIES AND EXCHANGE COMMISSION OF PAKISTAN

544 10 Tips on How to Build a Strong Brand Online in 2025

545 Top 16 Startup Accelerators & Incubators in Pakistan

546 Redefining acceleration: i2IScale's founder-centric approach - Perspectives - Business Recorder

547 Capital Raising Process: Alternative Funding Sources: Beyond Traditional Venture Capital - FasterCapital

548 Equity Incentive Plan for Startups | Eqvista

- **Adapt To Local Needs And Constraints:**

Successful startups design scalable solutions for local challenges in health, education, agriculture, and finance. Tailoring models to meet underserved market needs with flexible pricing and offline-compatible tools increases reach and impact.⁵⁴⁹

- **Regulatory Reforms To Strengthen Startup Financing And Investment:**

To reduce ambiguity, Pakistan must adopt a single, legally recognized definition of a “startup” across SECP, SBP, and FBR. A dedicated Startup Regulatory Cell should streamline tax, licensing, and compliance processes. Enabling exit pathways, reforming the PSX GEM Board, simpler listing procedures will boost investor confidence and capital deployment.

Develop a regulatory framework for equity and debt crowdfunding to provide alternative funding sources, reducing reliance on grants and promoting sustainable financing.

- **Tax Exemptions And Credits:**

Offering tax exemptions and credit facilities to the startups in the initial years will ease financial burden on them, so the following policies can be adopted e.g. 100% tax credit against income tax liabilities, reducing taxes on capital gains and relaxation from withholding taxes.

- **Workshops And Webinars:**

SBP should coordinate with SECP and FBR to have workshops and educational programs for entrepreneurs, firms and investors to provide guidance on dividends and gains. Legal matters, tax implications and compliance issues should also be discussed, aiming to make the stakeholders more knowledgeable about startups.

- **Entrepreneurial Education And Mentorship:**

Courses regarding entrepreneurship and innovation should be included in the curriculum to encourage students to develop an entrepreneurial mindset which will lead to more startups. Furthermore, crafting mentorship programs with well-established entrepreneurs and professionals will enhance the skills of students and improve their networking abilities.

⁵⁴⁹ Startup Ecosystem in Pakistan: Emerging Trends and Opportunities

Global Case Studies ^{550,551,552,553}

Spain – Startup Law And ENISA Program

In 2025, Spain reinforced its position as a European startup hub through its Startup Law (“Ley de Startups”), which provides a broad array of incentives to attract both local and international entrepreneurs. Under this law, newly registered startups benefit from a reduced corporate tax rate of 15% (down from the standard 25%) for the first four years after profitability, and founders can defer their tax obligations without penalties for up to 12 months.

Additionally, Spain reformed its taxation of stock options traditionally a burden for startup employees to make them more competitive with Silicon Valley standards. Foreign entrepreneurs are also supported through the Spanish Startup Visa and Digital Nomad Visa, both offering residency rights and tax benefits under the so-called Beckham Law, which allows eligible foreigners to pay tax on only Spanish-sourced income at a reduced rate.

The government also funds ENISA, a public financing body that issues zero-collateral loans starting from €25,000 to startups in various growth stages, especially those with innovative, scalable models. These loans often come with grace periods of up to 5 years and can help bridge equity funding gaps. Together, these policies make Spain an increasingly attractive launchpad for tech ventures in Europe.

Pakistan can encourage entrepreneurship by introducing a Startup Law that offers reduced corporate tax rates for early-stage ventures and reforms stock option taxation to attract and retain talent. A local version of ENISA, offering zero-collateral, government-backed loans with grace periods, could support scalable, innovative startups lacking access to equity.

Singapore – Startup Tax Exemption And Grant Schemes

Singapore continues to be one of the most business-friendly nations for startups in 2025, thanks to its Startup Tax Exemption Scheme (SUTE) and a wide range of government grants. Under SUTE, eligible startups enjoy 75% tax exemption on the first SGD 100,000 of chargeable income and 50% on the next SGD 100,000, for their first three years of operation greatly reducing early-stage financial pressure.

In parallel, Startup SG, a government initiative under Enterprise Singapore, offers multiple grants like the Startup SG Tech Grant, which provides up to SGD 250,000 for Proof-of-Concept projects and SGD 500,000 for Proof-of-Value (POV) projects in deep tech and innovation-focused fields. Startups can also access mentorship, market access programs, and co-investment opportunities through this platform. Moreover, the Global Innovation Alliance (GIA) allows Singaporean startups to collaborate internationally through market immersion programs in cities like Berlin, Jakarta, and San Francisco. Singapore also ranks highly in ease of doing business, IP protection, and digital infrastructure, making it a regional powerhouse for innovation and a favored location for launching ventures in Southeast Asia.

Pakistan can take example of the tax friendly environment created for startups from this, by adopting structured tax exemption schemes for startups in their initial years and develop a consolidated national grant platform like Startup SG that funds R&D-intensive ventures. Integrating international collaboration programs can also help Pakistani startups expand globally and access mentorship and investment networks.

550 New Spain Startup Law: Measures and Advantages – Lawants

551 ENISA Financing for Startups: complete guide

552 What are the Tax Incentives for Start-ups in Singapore? – SG Company Services 553 Singapore Startup Grants & Funding | Acclime

553 Singapore Startup Grants & Funding | Acclime

SUSTAINABILITY THROUGH DIGITIZATION

Digital technologies are playing a pivotal role in reducing global greenhouse gas emissions, even as the digital sector itself becomes a major emitter. According to the World Bank and ITU, data centers and telecommunications now account for 1.5–4% of global carbon emissions, rivaling sectors like aviation; data center electricity consumption alone is approximately 1–1.5% of global demand.⁵⁵⁴ Meanwhile, public cloud, IoT, AI, and blockchain solutions are helping industries optimize energy, resource use, and emissions, though the ICT sector must drastically scale up green infrastructure to mitigate its own footprint. Notably, carbon reporting and performance benchmarking, guided by frameworks like the GHG Protocol, are now critical tools for data centre operators to measure, report, and reduce emissions.

In the Middle East, major telecom operators and national regulators are embedding sustainability into tech infrastructure. UAE's du telecom, for instance, deployed solar-powered sites to cut 8.6 kt CO₂ in 2024, while Saudi Arabia's Communications and IT Commission (CITC) launched the C.I.R.C.L.E. initiative, covering circular economy, smart cities, and renewable energy integration, all under ICT sustainability frameworks.⁵⁵⁵

In South Asia, ICT-driven digitalization has proven significantly beneficial for environmental quality. Research shows that rising internet penetration contributes to slowing emissions by improving resource efficiency in industries, greening energy systems, and enhancing governance frameworks.⁵⁵⁶ Regional ITU initiatives now support green digital transformation, by connecting climate action and e-waste management through standardized ICT standards for emissions monitoring and circularity.⁵⁵⁷

Pakistan is increasingly embracing digitalization to tackle environmental challenges and advance sustainability. By integrating eco-friendly technologies and emphasizing Green IT, the country is promoting energy-efficient hardware, sustainable manufacturing, and responsible e-waste management. As businesses strive to reduce their environmental impact, they must embed sustainability into their core strategies, using technology to track progress and measure outcomes. With the expansion of Pakistan's digital infrastructure, prioritizing low-impact, environmentally responsible tech will be essential to achieving a truly green digital future. This includes adopting digital tools for carbon accounting, tracking emissions, and data-driven forecasting to support informed and effective climate action. Key global initiatives leveraging digitization to advance sustainability goals include the following:

Carbon Accounting

Carbon accounting is a key method that enables organizations to track, calculate, report, and reduce their greenhouse gas (GHG) emissions, forming the foundation of effective sustainability strategies. As global climate warnings intensify, businesses are under growing pressure to not only commit to environmental responsibility, but also to demonstrate measurable action. Carbon accounting provides a structured approach for organizations to assess the environmental impact of their operations, products, and services by quantifying GHG emissions. This data is crucial for identifying inefficiencies, reducing emissions, and making informed, long-term decisions aligned with sustainability goals. Moreover, it allows businesses to transparently communicate their environmental performance to stakeholders.⁵⁵⁸

554 <https://www.worldbank.org/en/topic/digital/publication/green-data-centers-towards-a-sustainable-digital-transformation>, Data centres & networks – IEA

555 <https://www.du.ae/about/media-centre/newsdetail/du-unveils-sustainability-report-2024>

556 <https://pmc.ncbi.nlm.nih.gov/articles/PMC11532819/>

557 <https://www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Pages/Events/2023/South-Asia-Information-Session-Green-Digital-Transformation-and-a-Circular-Economy-for-Electronics.aspx>

558 Carbon Accounting | Microsoft Sustainability

Microsoft Cloud

The Microsoft Cloud for Sustainability carbon data model enables organizations to unify, standardize, and integrate their carbon sustainability data, supporting efforts to track and achieve net-zero and waste reduction goals. As part of the broader Cloud for Sustainability platform, this model provides a comprehensive structure for storing carbon emissions data alongside sustainability reference data, making it suitable for regulatory reporting and emissions disclosures.⁵⁵⁹ Aligned with the Greenhouse Gas Protocol, an internationally recognized standard, the tool categorizes emissions into three scopes: Scope 1 (direct emissions from combustion and industrial processes), Scope 2 (indirect emissions from energy consumption), and Scope 3 (other indirect emissions such as those from the supply chain).⁵⁶⁰

Salesforce Net Zero Cloud

Salesforce Net Zero Cloud is a dynamic, data-driven platform designed to support organizations in achieving carbon neutrality through analytics, benchmarking, forecasting, and automated tracking of sustainability progress. By centralizing real-time sustainability management, it enables businesses to reduce both emissions and operational costs. The platform is aligned with global standards and best practices, having been recognized for its contributions to responsible business conduct, environmental performance, supply chain management, and the circular economy. Notably, it is part of the Task Force for Climate-related Financial Disclosure (TCFD), which has played a key role in developing the Greenhouse Gas Protocol, and benefits from the expertise of Zero, Salesforce's long-term sustainability reporting advisor.⁵⁶¹

Use of Big Data

While Artificial Intelligence, Big Data, and emerging technologies like blockchain are playing an increasingly vital role in addressing the impacts of climate change on people, ecosystems, and economies. These innovations enable real-time monitoring of carbon emissions, improve disaster preparedness through predictive analytics, and support climate-smart decision-making. AI algorithms can identify optimal land use and soil types, while data-driven insights are being used to develop carbon capture, storage, and sequestration strategies by geo-referencing suitable deployment areas. In Pakistan, advanced machine learning and time-series models have been applied to forecast CO₂ emissions, based on variables such as fossil fuel demand and energy consumption.^{562,563} Additionally, integrating blockchain with big data creates transparent, traceable systems for managing carbon credits and offsets. Tokenized carbon credits recorded on decentralized ledgers ensure secure, auditable transactions, building trust in sustainability efforts and promoting greater accountability in carbon markets.⁵⁶⁴ Pakistan officially launched its carbon market in early 2025, under Article 6 of the Paris Agreement, attracting initial buyers like Singapore, Norway, Switzerland, and South Korea, signaling active participation in global offset systems.⁵⁶⁵

559 Cloud for Sustainability carbon data model overview - Microsoft Cloud for Sustainability | Microsoft Learn 560 Calculation methodology for Azure emissions - Microsoft Cloud for Sustainability | Microsoft Learn

561 Salesforce Net Zero Cloud | PwC Switzerland

562 How AI and Big Data can help reduce the impact of climate change | Earthly Blog

563 Modeling and forecasting carbon dioxide emission in Pakistan using a hybrid combination of regression and time series models - PMC 564 Spydra Blog | Carbon Credits 2.0: The Power of Blockchain for a Sustainable Future

565 https://sdpi.org/8926/blogs_detail

Recent Developments

- **The Environmental Protection Agency (Pak-EPA):**

The agency established a Geomatic Centre to integrate satellite remote sensing (SRS), GIS, and GPS for national environmental monitoring. It maps glaciers, forests, water resources, and hazard zones, supporting decision-making across climate and biodiversity domains.^{566,567}

- **The Land Information And Management System (LIMS):**

Launched mid-2023, this system provides GIS-based agro-farming analytics to farmers, including soil health, weather, and crop monitoring via satellite and remote sensing for climate-smart agriculture.⁵⁶⁸

- **Provincial Government Projects:**

Sindh (May 2025) is implementing a Smart Surveillance System to detect polluting vehicles and enforce air quality norms using automated emission monitoring and e-challans in coordination with traffic police.⁵⁶⁹

Punjab (Sept 2024) began a pioneering drone-based environmental monitoring system, flagging non-compliant industrial activities like smoke emissions and sealing illegal factories with aerial surveillance and thermal imaging.⁵⁷⁰

- **The Green Pakistan Program (GPP):**

This program aims to promote reforestation, conserve biodiversity, and combat environmental degradation. In 2021, Pakistan further advanced its efforts by introducing the National Forest Monitoring System (NFMS) under the REDD+ Readiness Project, with support from the World Bank and the Ministry of Climate Change.⁵⁷¹

NFMS comprises three key components: the Satellite Land Monitoring System (SLMS), the National Forest Inventory (NFI), and the Greenhouse Gas Inventory (GHG-I). Together, they track forest cover changes, calculate biomass and carbon stocks, and support IPCC-compliant carbon reporting. SLMS uses satellite imagery such as Landsat and Sentinel-2 to detect land cover changes, while forest degradation data is manually collected by forest staff and local communities. The centralized NFMS web portal ensures access to data across provincial and federal levels.^{572,573}

GIS plays a critical role in monitoring activities under the Green Pakistan Program by supporting accurate data collection and real-time decision-making in sectors like forestry, agriculture, and urban management. One notable example is the “Re-Green Lahore” mobile application, developed by the Parks and Horticulture Authority in collaboration with the Punjab Information Technology Board. The app enables the geotagging of trees in green belts and parks, with field staff assigned to digitally tag both existing and newly planted trees across different city zones. This initiative helps build a transparent and verifiable urban tree database, strengthening accountability and urban forestry efforts.⁵⁷⁴

566 <https://environment.gov.pk/Detail/NTAYzgwNTUtZjc4Yy00MzZkLTg2OWItNjkyZGEINzE0ZDRi>

567 <https://tribune.com.pk/story/2547205/govt-goes-digital-to-combat-pollution>

568 <https://www.greenpakistaninitiative.com/liims>

569 <https://www.pakistantoday.com.pk/2025/05/22/sindh-govt-to-launch-smart-surveillance-system-to-reduce-environmental-pollution/> 570

<https://24newshtd.tv/21-Apr-2025/pakistan-launches-first-ever-environmental-drone-surveillance>

571 PID

572 NFMS & MRV | REDD+ Pakistan

573 Forests | February 2023 - Browse Articles

574 PHA implements geotagging of trees for transparent and engaged urban forest management | Pakistan Today

- **EcoSurvey Pakistan:**

This is a geospatial firm, which specializes in ecological mapping, forest and habitat surveys, and environmental impact assessments, using GIS to support sustainable development projects across Pakistan.

- **Terraview Technologies:**

An AI-powered geospatial startup (active by 2025), offers drone imaging, AI analytics for crop health (NDVI), soil erosion forecasting, and real-time dashboards, aiding agriculture, and conservation sectors.

- **AI Geo Navigator:**

Established in 2024, this navigator leverages AI+GIS for urban planning, disaster management, and environmental monitoring, delivering predictive spatial intelligence across sectors like infrastructure and land development.⁵⁷⁵

- **Sustainability Investment Expo (SIE 2024):**

In this expo, Pakistani startups presented innovations in climate tech, sustainable agriculture, renewable energy, and carbon accounting, supported by private sector participation and awareness-raising among investors and policymakers.⁵⁷⁶

Challenges

Pakistan faces several challenges in effectively implementing GIS and remote sensing technologies for environmental monitoring. These include a shortage of trained personnel, outdated and incomplete geospatial data, and institutional issues such as fragmented governance, limited funding, and poor interdepartmental coordination.⁵⁷⁷

- **E-Waste:**

Pakistan generates approximately 500,000 metric tons of e-waste annually (2024). This e-waste is mostly handled informally without a standard procedure, due to inadequate infrastructure, exposing workers and ecosystems to toxic substances like lead and mercury.⁵⁷⁸ Proper recycling of this e-waste can itself present an opportunity of recovering valuable metals and reduce the current reliance on imports.

- **Shortage Of Trained GIS/Remote-Sensing Professionals:**

Efforts by FAO and national universities to train GIS and remote-sensing experts highlight a persistent gap: Pakistan lacks sufficient skilled personnel to operate and maintain geospatial monitoring systems for agriculture, disaster response, and environmental management.

- **Rapid Growth Of AI Labs And Datacenters:**

Rapid expansion of data centers and AI labs is significantly increasing energy demand in Pakistan. Without green infrastructure and efficiency standards, this growth risks worsening carbon emissions. To align with sustainability goals, Pakistan must pair this digital expansion with steps towards renewable energy adoption, energy-efficient hardware, and mandatory environmental reporting for high-consumption facilities.

575 <https://aigeo360.com/top-15-geospatial-and-land-surveying-companies-in-pakistan/>

576 <https://www.app.com.pk/national/sie-2024-private-sector-drives-green-change-for-sustainable-pakistan/> 577 Remote Sensing & Geographic Information Systems in Pakistan.

578 Pakistan's growing e-waste crisis: A call for action

Recommendations

- **Collaborating With Global Tech Firms For Localized Carbon Tracking:**

Pakistan's climate goals demand accurate, accessible carbon tracking tools. While global platforms like Microsoft, SAP, IBM, and Salesforce offer advanced solutions, their impact in Pakistan depends on localization and integration. Collaborating with these firms enables knowledge transfer, local capacity building, and seamless integration with national databases. The Ministry of IT and Telecom's Ignite program is already fostering green innovation, creating a strong foundation for developing Pakistan-specific sustainability software.

- **Support Localization And Climate Tech Development:**

Establish public-private partnerships between global tech firms and government bodies (e.g., Ministry of Climate Change, provincial agencies) to co-develop localized carbon tracking platforms.

Expand access to green finance through green bonds, concessional loans, and impact investments, supported by regulatory reforms and tax incentives for clean tech ventures.

Customize software with local GHG emission factors, Urdu interfaces, and user training modules; ensure integration with national databases like PBS, NDRMF, and EPAs.

Build on existing initiatives such as NUST's GreenTech Hub, and Ignite, which already support climate tech innovation and entrepreneurship.⁵⁷⁹

- **Incentivizing Industry-Wide Sustainability Reporting And Emission Reductions:**

To support carbon tracking adoption, Pakistan must promote transparent sustainability reporting and incentivize emission reductions. With the global green tech market at USD 1.77 trillion (2023) and the EU's CBAM in effect, Pakistani industries face pressure to decarbonize and stay export competitive. This shift demands investment in renewable energy, energy efficiency, and cleaner production.

Pakistan should modernize industrial infrastructure, expand low-carbon workforce training, and establish clear sustainability regulations. Support mechanisms like the Responsible Business Help Desk can help SMEs adopt clean technologies. A phased domestic carbon pricing system, along with tax incentives and SECP-mandated reporting for major emitters, will guide and accelerate emissions reductions.⁵⁸⁰

⁵⁷⁹ Climate Techs in Emerging Markets: Opportunities and Barriers for Pakistan – Invest2Innovate

⁵⁸⁰ Carbon Border Adjustment Mechanism (CBAM) An Opportunity for Industrial Decarbonization in Pakistan.pdf

Global Case Studies ^{581,582,583}

Rwanda's Green Fund (FONERWA)

It is a pioneering climate finance vehicle that has mobilized over USD 217 million to support 46 green projects, spanning green energy, climate-smart agriculture, urban sustainability, and e-waste management. By deploying digital MRV systems leveraging GIS and big data, the Fund ensures transparent monitoring of environmental outcomes such as planting nearly 39,500 ha of forests, avoiding 126,000 tCO₂e, and benefiting more than 120,000 people. Recent initiatives include developing Article 6 compliant carbon credit schemes in partnership with Gold Standard and GenZero, along with flagship efforts like the Green Gicumbi watershed project and the Green City Kigali pilot.

These interventions are positioning Rwanda as a digital climate-finance leader in Africa, aligning closely with its ambitions for low-carbon, resilient development. Rwanda's integration of digital MRV (Monitoring, Reporting, and Verification) systems into its climate finance model illustrates how targeted digitalization can enhance transparency and impact tracking in resource-constrained settings like Pakistan.

Pakistan can develop a national digital MRV framework using GIS and big data to monitor reforestation, urban greening, and e-waste programs. Leveraging platforms like the NFMS (National Forest Management System) and partnerships with local universities can build the technical foundation needed for real-time environmental reporting.

Kenya: Advancing Digital Carbon Finance For Sustainability

Kenya is leveraging digital innovation to scale its participation in voluntary carbon markets and support national emissions reduction targets. In partnership with IFC and the World Bank, Kenya launched a National Carbon Registry, a digital platform that ensures transparency, prevents double counting, and supports credible carbon credit issuance.

The registry is paired with a digital guidebook developed with the Kenya Private Sector Alliance (KEPSA), offering local enterprises step-by-step instructions on how to generate, verify, and trade credits. In 2022, Kenya issued 11 million carbon credits, making it Africa's second-largest issuer. These digital tools are enabling private firms to monetize carbon savings from projects in clean energy, reforestation, and transport, while laying the groundwork for future domestic carbon trading platforms. Kenya's launch of a digital carbon registry offers a replicable blueprint for countries like Pakistan to enter voluntary carbon markets with credibility and transparency.

Pakistan should establish a centralized digital carbon registry, supported by sector-specific guidebooks for local enterprises. This would open carbon finance opportunities while ensuring MRV compliance under Article 6 frameworks.

Digital Transformation Of Vietnam

Vietnam is rapidly becoming a digital leader in Southeast Asia, with its economy growing over 20% annually through initiatives under the National Digital Transformation Program (2020–2025). The country has expanded e-government services via a unified portal and is using AI, big data, and blockchain in banking, healthcare, and trade to streamline services and reduce environmental footprints. Banks like Vietcom bank have implemented blockchain for fast, paperless transactions, while AI-driven diagnostics are enhancing healthcare efficiency.

These innovations support smart city development in Ho Chi Minh City and Da Nang, which use IoT and big data for emission monitoring. Vietnam's digital foundation positions it well for adopting platforms like Salesforce Net Zero Cloud for future carbon accounting. Vietnam's integration of AI, blockchain, and IoT into public and private sectors underscores the transformative role of digital infrastructure in digital sustainability.

Pakistan should expand its Digital National Pakistan Act to include sectoral pilots in smart cities, especially for emission tracking and energy optimization. Building alliances with local tech startups and fintech firms can help embed sustainability into urban governance and industrial systems.

581 Kenya's Carbon Finance Moment

582 Sharing Rwanda's commitment and Journey on Financing its Climate Action Plan 583 Digital Transformation In Vietnam: Leading The Charge Into A Tech-Driven Future

583 Digital Transformation In Vietnam: Leading The Charge Into A Tech-Driven Future

IMPROVING DEI AND WOMEN EMPOWERMENT

In Pakistan, where youth and women constitute approximately 60 percent and 49 percent of the population respectively, empowering women and girls through equal access to information and communication technologies (ICTs) is critical for reducing inequality and achieving gender parity. As of 2025, Pakistan has made notable strides in digital inclusion for women, yet substantial disparities and systemic challenges persist. According to the GSMA Mobile Gender Gap Report 2025, 8 million Pakistani women became online in 2024, reducing the mobile-internet usage gender gap from 38 % to 25 %, the largest annual improvement among the countries surveyed.^{584,585}

Globally, the World Bank's 2024-30 Gender Strategy emphasizes that enhancing broadband access for women, targeting 300 million more, supports economic growth and education equity.⁵⁸⁶ In Pakistan, female mobile ownership still lags behind male usage, exacerbated by cultural norms and limited literacy, especially in rural regions where only about 16% of women in Balochistan and 37% in Khyber Pakhtunkhwa own mobile devices.⁵⁸⁷

Countries in South Asia show diverse progress in advancing women's digital inclusion and empowerment. Sri Lanka has made strong strides in ICT integration and gender-focused digital initiatives. The Suhuruliya 2.0 National Digital Strategy (2024-26)⁵⁸⁸ actively addresses the gender digital divide by empowering women with digital skills and competencies across demographics. Similarly, Bangladesh's "Digital Bangladesh" vision includes grassroots ICT interventions that have empowered women entrepreneurs and rural communities.⁵⁸⁹ Pakistan performed better than neighboring countries in women's mobile internet adoption, with 45% of women using mobile internet compared to 26% in Bangladesh.⁵⁹⁰

In Pakistan 3.1 percent of the population is reported to be living with a disability according to Pakistan's 2023 Population Census.⁵⁹¹ To safeguard their rights, acts like the "Islamabad Capital Territory Rights of Persons with Disability Act, 2020", prohibit disability-based discrimination and mandate reasonable accommodation. Yet digital inclusion remains very limited: for instance, government and educational platforms lack assistive technologies like screen-readers and Urdu-language voice tools, excluding many visually impaired users.⁵⁹² At the university level, students with vision impairments face significant barriers in accessing screen-reading software due to limited availability, high cost, insufficient training, and lack of institutional support.⁵⁹³ Currently, about 270 local groups and international partners support PWDs, while Disabled Persons Organizations (DPOs) increasingly drive advocacy and policy engagement.⁵⁹⁴ Embedding digital accessibility standards, such as universal design, local-language support, and built-in assistive features, into national IT policies is essential for inclusive digital transformation.⁵⁹⁵

Pakistan is increasingly prioritizing inclusive development by advancing women's empowerment and strengthening support for persons with disabilities through digitization and the adoption of Diversity, Equity, and Inclusion (DEI) frameworks. These frameworks are helping create more inclusive environments where individuals from all backgrounds are respected, supported, and enabled to realize their full potential. As part of this broader shift, several impactful DEI campaigns have been launched to further bridge the gender digital divide.

584 https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/gsma_resources/a-breakthrough-year-for-womens-digital-inclusion-in-pakistan/

585 Pakistan demographics 2025 - StatisticsTimes.com

586 Event | Women Transforming the World | World Bank Live

587 <https://www.worldpulse.org/story/technological-access-and-digital-inclusion-of-women-in-pakistan-65873>

588 <https://dig.watch/resource/suhuruliya-2-0-national-digital-strategy-for-women-development-2024-2026> 589 2024-07-31-05-17-3ac329036c2688662e0f6b39afaal215.pdf

590 8 m women come online in 2024 as digital gender divide narrows - Business - DAWN.COM

591 Disability-in-Pakistan.pdf,

592 <https://digitalrightsmonitor.pk/silenced-online-and-offline-the-accessibility-struggles-of-women-with-disabilities-in-pakistan/> 593 Microsoft Word - 10_05_22_Muhammad Babar_Thesis_corrected_final_clean.docx

594 The Economics of Persons With Disability (PWDs) in Pakistan - Paradigm Shift

595 CT-Rights-of-PWDs-Act-2020.pdf

Recent Developments

- **Jazz Collaboration With GSMA:**

The GSMA Connected Women Commitment Initiative aims to close the gender gap in mobile internet and money use in low- and middle-income countries. In Pakistan, Jazz partnered with GSMA in 2023 to boost women's digital and financial inclusion, especially among female micro-entrepreneurs. Through the Mera Gaon Live campaign and GSMA's MISTT toolkit, Jazz reached over 40,000 people in 97 villages, enhancing digital literacy and promoting JazzCash adoption. Local female ambassadors and trainers led hands-on sessions, empowering women to engage more confidently in the digital economy.⁵⁹⁶

- **PTA With UNESCO And NCSW:**

Since early 2023, the Pakistan Telecommunication Authority (PTA) and UNESCO have been implementing a Digital Gender Inclusion Strategy to enhance women's access to mobile technology and digital literacy. Validated in 2023 and presented at Mobile World Congress 2024, the strategy reflects Pakistan's commitment to inclusive digital growth. PTA also partnered with the National Commission on the Status of Women (NCSW) and GSMA to host a workshop on closing the mobile gender gap and signed an LOI to launch the Action Coalition on Women's Digital Inclusion, promoting nationwide access and awareness for women.^{597,598}

- **The Punjab Govt's E-Rozgar Program:**

The e-Rozgaar Program, a joint initiative by the Punjab Government and PITB, equips youth with freelancing and digital skills for platforms like Fiverr and Upwork. With 41 centers (including 5 women-only), it has trained over 16,000 individuals, 52% of whom are women, contributing half of the reported PKR 230 million in earnings. Offering free 3-month training, the program supports youth employment, gender inclusion, and foreign exchange generation, helping bridge digital and economic divides across Punjab.⁵⁹⁹

- **KPITB Women Civic Digital Internship Program:**

The Women Civic Digital Internship Program, launched by KPITB in partnership with Code for Pakistan, is a six-month remote initiative enabling women to gain civic-tech experience from home. Out of 50 selected participants, 47 completed the training, receiving mentorship from industry professionals. Around 40% secured jobs soon after, with an average monthly income of PKR 36,250. A Demo Day and Job Fair held in June 2023 showcased their projects and connected them with potential employers.^{600,601}

- **Karandaaz Women Economic And Digital Inclusion Initiative:**

The initiative aims to empower women by promoting equitable access to digital financial services (DFS) through gender-responsive solutions, fostering an inclusive financial ecosystem. Karandaaz Pakistan and the Bank of Punjab (BOP) have partnered to enhance financial access for women-led businesses by leveraging G2P (government-to-person) payment systems. However, challenges remain, while national financial inclusion rose to 35% by June 2025 (from 8% in 2013), women's account ownership lags at just 14%, compared to 56% for men, highlighting the persistent gender gap in financial access.⁶⁰²

596 Jazz Pakistan educates rural women and men about the transformational benefits and uses of mobile | Mobile for Development

597 <https://www.unesco.org/en/articles/unesco-collaborate-pakistan-telecommunication-authority-digital-inclusion-and-gender-mainstreaming#main-content>

598 <https://www.pta.gov.pk/index.php/category/pta%2C-ncsw%2C-and-gsma-collaborate-to-host-workshop-on-bridging-the-mobile-gender-gap-in-islamabad-846989021-2024-08-08> 599 <https://yas.punjab.gov.pk/erozgar>

600 Demo Day and Job Fair for our KP Women Civic Digital Internship Program | KPITB | Khyber Pakhtunkhwa Information Technology Board

601 Women Civic Digital Internship Program | KPITB | Khyber Pakhtunkhwa Information Technology Board

602 <https://tribune.com.pk/story/2551555/financial-inclusion-surges-gaps-persist>

- **Ba-Ikhtiyar And ICT For Girls Program:**

The Ba-Ikhtiyar Program, a joint effort by PTCL Group and PPAF, equips women with digital, financial, and e-commerce skills. In Haripur, 100 women received training, smartphones, and free internet. Meanwhile, the ICT for Girls Programme, led by the Ministry of IT and USF, trains 10,000 underprivileged girls annually in digital and 21st-century skills. Now active in 226 schools in Islamabad, it has trained 202 teachers and benefited 73% of participants. Both award-winning initiatives are advancing women's digital and economic empowerment in Pakistan.^{603,604}

- **Women's Empowerment Digital Organization:**

WEDO is backed by a team of 50+ experts, has delivered 100+ projects aimed at digital empowerment and serves as a bridge connecting marginalized women to economic opportunities in Pakistan's digital economy. WEDO empowers women in Pakistan with the digital tools, career support, and community needed to succeed in today's digital landscape, creating lasting socio-economic impact.

Challenges

- **Persistent Digital Access Gap:**

While 45% of women in Pakistan now use mobile internet, a rise from 33% in 2023, women still remain 25% less likely than men to access mobile internet (45% vs. 70%).^{605,606} Moreover, 35% of female users rely on borrowed devices, limiting usage patterns compared to male smartphone owners.⁶⁰⁷

- **Cultural And Mobility Restrictions:**

Studies show over half of women require male permission to own/use mobile phones, reflecting patriarchal norms that limit women's digital autonomy, particularly in rural regions.⁶⁰⁸

- **Online Safety And Harassment:**

The Digital Rights Foundation's helpline has handled 16,000+ cyber-harassment cases, reflecting widespread online abuse. Around 40% of women in Pakistan have experienced cyber-harassment, ranging from trolling to stalking, which discourages digital participation.⁶⁰⁹

- **Low Digital Literacy And Skills:**

While 45% of women now use mobile internet, many lack basic digital skills, from app navigation to online safety, hindering meaningful digital engagement.⁶¹⁰

603 ICT for Girls Programme in Pakistan: Unlocking the potential of women and girls through ICT skills

604 <https://ptcl.com.pk/uploads/Social%20Impact%20Report%202024.pdf>

605 <https://propakistani.pk/perspective/digital-gender-inclusion-in-pakistan-challenges-opportunities-and-initiatives/>

606 GSMA – The Mobile Gender Gap Report 2025

607 <https://www.bolnews.com/technology/2025/05/pakistan-sees-surge-in-female-mobile-users-with-8-million-users-in-2024/>

608 <https://www.bolnews.com/technology/2025/05/pakistan-sees-surge-in-female-mobile-users-with-8-million-users-in-2024/>

609 Cyberbullying in Pakistan: A Silent Crisis in the Digital Age

610 GSMA – The Mobile Gender Gap Report 2025

- **Underrepresentation In Tech And Decision-Making:**

Women make up only 29.6% of social media users⁶¹¹ and similarly low proportions in tech leadership roles. Existing structural barriers further limit women's participation in policymaking and digital industries. Women in Pakistan's tech workforce make up just approximately 14% of employees in the technology industry, reflecting significant gender bias in digital careers.⁶¹²

Recommendations

- **Subsidized Device And Data Programs:**

Launch partnerships between telcos, government and NGOs to provide low-cost smartphones and data bundles to women in underprivileged areas, directly addressing the 45% cost barrier.

Prioritize Government-to-Person (G2P) systems, like the BISP Kafaalat program to distribute mobile devices and subsidized data packages for women beneficiaries. These efforts should be supported with localized safe-usage modules such as digital literacy workshops, pictorial guides, and dedicated assistance through onsite agents.

- **Community-Centric Digital Literacy Initiatives:**

Scale localized training programs using GSMA's MISTT toolkit and female digital ambassadors. Mobile-based visual courses and women-only digital hubs can help overcome cultural and literacy barriers.

- **Engage Male Gatekeepers:**

Conduct awareness campaigns targeting husbands, fathers, and community leaders to shift norms around women's phone use and mobility, building on GSMA endorsement of male engagement for digital inclusion.

- **Strengthen Cyber Safety And Legal Protection:**

Expand Digital Rights Foundation's helpline; train cybercrime units in FIA and NCCIA; and mandate digital platforms to enforce robust moderation, harassment reporting, and victim support systems.

- **Support Female-Focused Bootcamps And Tech Training:**

Roll out STEM and digital-skills training for girls and women, adapting successful low-cost, context-aware models like HER Digital Future and Tech Herfrica. Collaborate with ministries, corporate CSR, and NGOs to boost digital literacy and income-generation.

- **Promote Women In Leadership And Decision-Making:**

Encourage quotas and mentorship within government bodies (PTA, BOP, PTCL), digital-sector boards, and policy committees to amplify female voices in shaping Pakistan's digital and financial inclusion agenda.

611 <https://datareportal.com/reports/digital-2025-pakistan>

612 <https://www.worldpulse.org/story/technological-access-and-digital-inclusion-of-women-in-pakistan-65873>

Global Case Studies ^{613,614}

United Nations Development Program (UNDP), China

China is actively advancing efforts to reduce the gender gap in STEM education through initiatives like the HER Digital Future bootcamp, launched in 2023 as part of UNDP's Digital X program. Implemented in collaboration with the global tech education non-profit Technovation and local NGOs, the program equips girls with knowledge of emerging technologies and guides them in developing digital solutions to real-world issues such as waste management and responsible consumption. A dedicated digital platform has also been created to make the HDF curriculum and lessons publicly accessible. So far, with support from partners including UNV and Technovation Girls, the initiative has reached over 5,000 girls across more than 90 rural schools in China.

Pakistan can replicate the HER Digital Future model by launching targeted digital bootcamps for girls in underserved areas, focusing on emerging technologies like AI, sustainable innovation, and responsible consumption. Partnerships with both global tech-education nonprofits and local NGOs would enable the co-creation of inclusive and culturally relevant STEM programs. Moreover, building an open-access digital platform to host interactive lessons and toolkits could extend the reach of these programs nationwide and allow continuous self-paced learning for girls across Pakistan.

Tech Herfrica, Africa

Tech Herfrica is a social impact organization working to bridge the digital gender divide and break the cycle of poverty for women and girls in rural African communities by advancing both digital and financial inclusion. Through an innovative and localized approach, the program provides women farmers and traders with access to smartphones, digital and financial literacy training, e-commerce platforms, and essential agricultural and business information. These resources enable women to improve their digital skills, make informed decisions, increase their income, reduce post-harvest losses, and gain better access to competitive markets. Beyond economic empowerment, Tech Herfrica strengthens women's agency by involving them in program design, encouraging them to voice their needs, and supporting their active participation in socio-economic development. By targeting not only adult women but also young girls and students in underserved areas, the program lays the foundation for long-term digital equity. As of 2023, Tech Herfrica has enhanced the digital and financial capabilities of over 6,300 rural women, girls, and youth in Nigeria, with a bold vision to reach 1 million beneficiaries across Africa by 2030.

Pakistan can benefit from a localized approach to digital and financial inclusion that provides rural women with smartphones, digital training, and access to e-commerce platforms. By combining digital literacy with support in agriculture and small business, similar initiatives could significantly boost rural women's income and resilience. Equally important is involving women directly in the design and feedback process of such programs, ensuring they are not just beneficiaries but active agents shaping their economic empowerment journey.

613 Women and Digital Pathways | United Nations Development Programme

614 Tech Herfrica – Tech Herfrica

DIGITAL LITERACY

As of 2025, the digital literacy in Pakistan remains uneven and limited, especially among the rural population. In 2025 only 45.7% of the population, about 116 million people, are online, most of them in urban cities.⁶¹⁵ A Business Recorder survey shows that barely 1 in 10 residents of Islamabad meet basic digital-literacy standards, which is alarmingly low.⁶¹⁶ Digital skills of an economy have a substantial economic impact. Research by Sustainable Development Policy Institute states that Enhancing Digital Literacy can improve Pakistan's GDP by USD 36 billion and create an estimate of 4 million jobs in the economy growing heavily towards digital economy, making digital literacy a clear investment priority.⁶¹⁷

Globally, digital literacy shows wide disparities between high-income and low-income countries. A UNESCO report shows this divide: 65% of adults in high-income countries can send an email with an attachment, however this number is a lot lower at 20% for lower middle-income countries. Only 7% of adults in high-income countries can write a program in a computer language, compared to 2% in middle-income countries.⁶¹⁸ Approximately 2.6 billion people worldwide remain offline, especially in rural and underserved areas.⁶¹⁹ 75% of students in developing countries lack basic digital skills, 42% of adults worldwide have no digital literacy skills, and 70% of teachers feel unprepared to teach digital content.⁶²⁰

Across South Asia, countries face similar challenges in bridging the digital divide, but progress varies widely. Sri Lanka has improved ICT integration in schools, while Nepal and Afghanistan lag behind due to infrastructure and conflict-related barriers.^{621,622} Bangladesh provides a more structured and accelerated approach to digital literacy. Under its "Digital Bangladesh" vision, the Bangladesh Computer Council (BCC) has trained over countless individuals, including students and teachers. In comparison, Pakistan's digital skills programs are more fragmented and less institutionalized. Bangladesh has also deployed Union Digital Centers across rural regions to ensure access to digital public services and education.⁶²³ While Pakistan has made some progress through programs like e-Rozgaar⁶²⁴ that has trained more than 100,000 candidates in digital skills, it still lags behind Bangladesh in integrating ICT into formal education and rural outreach. Compared to its neighbors, Pakistan's efforts are moderate in scale and less coordinated nationally.

Efforts to improve digital literacy are underway, though limited in scale. Platforms like Virtual University's DigiSkills, e-Rozgaar, and Pakistan Institute of Engineering and Applied Sciences (PIEAS) offer teacher training in digital tools like Excel, Canva, and beginner programming languages such as Python and SQL. However, there is no national-level teacher training program yet mandated for public school educators. The Punjab IT Board's e-Rozgaar centers offer structured training for young graduates and some educators, providing courses in digital marketing, creative writing, and technical skills.⁶²⁵

615 Digital 2025: Pakistan – DataReportal – Global Digital Insights.

616 <https://www.brecorder.com/news/40356807/bridging-the-digital-divide>

617 Sustainable Development Policy Institute (SDPI) Post | LinkedIn

618 Global education monitoring report, 2023: technology in education: a tool on whose terms?

619 Global Internet use continues to rise but disparities remain, especially in low-income regions

620 Digital Literacy Statistics Statistics: ZipDo Education Reports 2025

621 Nepal's persistent digital divide: From high penetration to inclusion - The Himalayan Times - Nepal's No.1 English Daily Newspaper | Nepal News, Latest Politics, Business, World, Sports, Entertainment, Travel, Life Style News

622 Afghanistan-Development-Update-April-2025-Final.pdf

623 BRAC: Annual Reports and Publications

624 e-Rozgaar

625 e-Rozgaar

Recent Developments

- **Internet Dost And Internet Zabardast Program:**

The Ministry of IT and Telecommunication, in collaboration with global partners, launched the 2-year Internet Dost and Internet Zabardast program spanning from July 2023 to July 2025, to build digital awareness among youth, parents, and teachers. The internet dost program works as a “train the trainer” model, it also integrates environmental and climate resilience in the curriculum. These campaigns targets to reach over 103,500 participants (underserved women, youth, parents, teachers and children) in 48 rural districts, teaching smartphone use, safe browsing, and exploring online opportunities.⁶²⁶

- **DigiSkills:**

Another major initiative is DigiSkills, Pakistan’s flagship program introduced by Ignite-National Technology Fund, which provides free online courses in freelancing, digital marketing, and IT tools. Since 2018, it has imparted training to over 4.5 million people, with over 800,000 female participants, and many from remote and rural backgrounds.⁶²⁷

- **Bolo Bhi And CodeGirls:**

NGOs like Bolo Bhi ⁶²⁸ and CodeGirls Pakistan ⁶²⁹ have conducted localized digital literacy workshops targeting marginalized groups in areas like Gilgit-Baltistan, Sindh, and South Punjab. These workshops cover basic ICT skills, cyber hygiene, and even beginner-level coding.

Bolo Bhi’s training focuses on cybersecurity and digital rights.

CodeGirls provides hands-on training in HTML, CSS, and JavaScript for rural women and youth.

- **Private And Public Collaborations Towards Digital Literacy:**

Over 75 Tech Fellows, trained by NUST (National University of Sciences and Technology), are now delivering block-based programming, Python basics, and AI fundamentals to students. The main focus is primary school students, addressing the critical need for early-age digital literacy.⁶³⁰

Recently, the British Council, Jazz and Tech Valley signed a two-year MoU to expand digital learning across Pakistan. The partnership focuses on teacher training, youth empowerment, and EdTech solutions for underserved communities.⁶³¹

Jazz and Tech Valley Pakistan introduced Digital Safar, a nationwide initiative using Google’s CS First and Be Internet Awesome platforms. The program targets over a diverse range of 300,000 students aged 8-14, teaching foundational coding, computational thinking, digital citizenship, and online safety through interactive modules.⁶³²

Tech Valley has partnered with Google and provincial education bodies to enhance digital learning in Sindh and Punjab.^{633,634} In Sindh, Google Workspace for Education was introduced across 32 universities, while Punjab launched a “Google Education Village” with 200,000 Chromebooks and teacher training in AI tools and online safety.

626 Project aiming to enhance youth digital literacy launched - Newspaper - DAWN.COM

627 DigiSkills Training Program

628 Digital Access Warriors- Bolo Bhi. Bolo Bhi is vocal about all the ongoing... | by Youth Action Hub- Pakistan | Medium

629 CodeGirls

630 The Nation. Education Ministry to equip primary school students with necessary technology skills

631 Media Center Detail Jazz British Council And Tech Valley Join Forces To Expand Digital Learning Across Pakistan

632 Media Center Detail Jazz And Tech Valley Join Forces To Empower Young Minds With Digital Safar Program

633 Tech Valley Partners with Sindh Education Department and Higher Education Commission to Empower Students with Google for Education Tools

634 Tech Valley, PEF Establish Google Education Village to Transform Punjab Education



Allied Corporation secured a USD 132 million agreement with Google and Pakistan's government to locally assemble over 500,000 Chromebooks by 2025 in Haripur, Khyber Pakhtunkhwa, enhancing classroom tech access.^{635,636}

UNESCO engages policymakers for a high-level policy discussion to craft Pakistan's first national Media and Information Literacy Strategy, aiming to embed responsible digital citizenship and critical thinking into national frameworks.⁶³⁷

In collaboration with Google and Tech Valley, the Sindh Government, launched over 30,000 Google Career Certificate scholarships for students across 30 public universities for the broader Digital Pakistan Vision. They aim to equip youth with in-demand skills in AI, cybersecurity, digital marketing, and IT automation. The earlier 2024 pilot project was successful with 1,500 students achieving a 100% course completion rate and landing high paying jobs.⁶³⁸

Challenges

- **Readiness Deficit:**

Pakistan was ranked as the least prepared country for digital education in Asia in 2023, under the ADB Digital Education Readiness Framework. This was primarily due to weak infrastructure and platforms paired with a lack of ICT training for teachers.⁶³⁹ Even when digital resources are available, high maintenance costs and the lack of technical support frequently leave equipment unused.

- **Access Barriers:**

Promoting digital literacy in Pakistan's schools faces numerous challenges rooted in infrastructure gaps, high costs, and insufficient teacher capacity. Frequent power outages and slow internet coverage make it increasingly difficult to access digital tools, especially in rural areas.

- **Policy Vacuum:**

Currently, Pakistan does not have a nationwide policy mandating computer science or coding education at the school level. However, the Single National Curriculum (SNC) includes digital literacy elements in middle grades, but without coding or hands-on programming. Education advocates have called for curriculum reform to include Python, Scratch, and digital citizenship from grade 6 onward.

- **Gender Divide:**

Cultural norms and mobility restrictions place additional hurdles on girls, significantly limiting their access to digital devices, reflected by a 30% gender gap in smartphone ownership.⁶⁴⁰

- **Language Exclusion:**

Digital learning content is rarely available in regional languages like Sindhi, Pashto, and Saraiki, excluding a major chunk of students.

635 HunarNama

636 Allied To Manufacture Google Chromebooks In Pakistan

637 UNESCO Engages Policymakers to Shape Pakistan's First National Media and Information Literacy Strategy 638 Sindh govt partners with Google, Tech Valley to provide over 30,000 digital skills scholarships

639 Dawn News. Pakistan ranked least prepared country for digital education in Asia.

640 Dawn News. Project aiming to enhance youth digital literacy launched

Recommendations

- **National Rural Digital Literacy Campaign:**

Government related nationwide initiatives to equip rural schools with devices, reliable internet, and age-appropriate digital-skills lessons. Scaling proven pilots such as The Citizens Foundation's program that modernizes labs, refreshes the computer-science curriculum, and provides bilingual e-content. New rollouts can follow public-private models like TCF's partnership with Jazz, which has already reached 250,000 students, while teachers and community leaders act as digital ambassadors to gather feedback and fine-tune the initiative on the ground.⁶⁴¹
- **Mandatory Coding and Digital Skills In School Curricula:**

Make coding and digital literacy a core part of the national curriculum from elementary schools, following the PM's 2025 directive. The curriculum should embed algorithmic thinking, Python, SQL and basic data-analytics projects, introduced with block-based tools in earlier grades.

Further, regular assessments should be conducted to track student progress, and mandate annual reviews of the syllabus to keep pace with new technologies and market needs.⁶⁴²
- **National Teacher Training Program:**

A structured program should train teachers nationwide in modern digital tools, online teaching platforms, and programming languages relevant to education.

Certifications should be offered with incentives, such as salary increments or promotions, to motivate teacher participation. Partnerships with universities and EdTech companies to deliver advanced workshops on AI, coding, and relevant digital resources.

641 Jazz Pakistan. Jazz enables TCF to impart digital-age skills to over 250,000 students.

642 The Express Tribune. PM directs integration of IT education from grade 6

Global Case Studies ^{643, 644}

Digital Saathi Program

As part of BRAC's Digital Upazila Obhijan (DUO) initiative, the Digital Saathi program is working to narrow the digital gender divide in Bangladesh's wetland regions. In a June 2024 pilot in Kishoreganj, adolescent girls taught their mothers essential digital skills, ranging from smartphone use and mobile banking to online safety, encouraging intergenerational learning. Supported by BRAC's Integrated Development Programme and Social Innovation Lab, the project reached 40 participants (20 young girls and 20 mothers). Results were promising: 80% of mothers reported confidently using smartphones, 60% adopted mobile financial tools, and 95% accessed agricultural updates online, contributing to digital inclusion and rural empowerment.

Pakistan can replicate intergenerational learning models by empowering adolescent girls to teach digital skills to female family members, particularly in underserved rural areas. Partnering with local NGOs and schools could enhance digital inclusion and close the gender digital divide.

Ajira Digital Program

The Ajira Digital Program, launched by Kenya's Ministry of ICT in collaboration with the Kenya Private Sector Alliance (KEPSA) and Mastercard Foundation, aims to equip youth with digital work skills to thrive in the online job market. The initiative provides training in digital marketing, content writing, transcription, and virtual assistance. As of 2024, over 500,000 have participated in the program, and many now earn through platforms like Upwork and Fiverr.

Pakistan should expand digital freelancing training programs targeting youth, integrating them with platforms like DigiSkills and fostering public-private partnerships to boost employability and access to global online markets.

643 ID-IDP-05-12-2023.pdf, BRAC: Annual Reports and Publications

644 Ajira Digital

PUBLIC SAFETY REFORMS

As urban populations grow and security challenges become more complex, countries around the world are increasingly turning to digital technologies to enhance public safety. Artificial intelligence (AI), smart surveillance, and real-time data analytics are at the forefront of this transformation, enabling faster response times, proactive crime prevention, and more efficient law enforcement. The global shift toward AI-powered safety infrastructure reflects a broader move to build smarter, more secure cities.

Globally, digital transformation is enhancing public safety through the widespread deployment of AI-based surveillance systems. The AI video surveillance market reached USD 21 billion in 2023, with nearly a billion cameras in operation, 80% using AI for anomaly detection and threat analysis. Cities using these systems report crime reductions of up to 78%, and facial recognition tools, now 90% accurate, have cut false alarms by 60%.⁶⁴⁵ AI has also improved evidence analysis and case-solving efficiency. Major cities like London and Paris are heavily investing in these technologies, though concerns over privacy and misuse remain, as seen in New Orleans where facial recognition sparked legal scrutiny.⁶⁴⁶

Digital twin technology is emerging as a powerful asset in smart city planning and safety management. By creating virtual replicas of physical environments, these tools allow authorities to simulate scenarios, test responses, and forecast outcomes without real-world risks and are becoming central to public safety reforms. Moving forward, more than 500 cities worldwide are adopting some form of digital twin technology, leveraging it to monitor groundwater, manage transportation network, reduce pollution, and optimize waste, demonstrating its versatility in both safety and sustainability.⁶⁴⁷ These trends highlight the growing role of emerging technologies in building safer cities, while emphasizing the need of ethical governance and oversight.

Digital transformation is significantly enhancing public safety and security in Pakistan, through the implementation of advanced Safe Cities Projects and citizen-centric digital platforms. Key initiatives include the establishment of Integrated Command, Control, and Communication (IC3) Centers in major cities like Lahore, Rawalpindi, Multan, and Faisalabad, which utilize extensive CCTV networks, AI-based analytics for traffic violations and criminal activity detection, and real-time coordination for police, fire, and ambulance services.⁶⁴⁸ Complementing these infrastructure projects, the introduction of police emergency apps and e- portals, such as the “Pakistan Citizen Portal” and various provincial police applications, facilitates direct citizen engagement for complaint redressal and access to online services, collectively contributing to a more responsive and efficient public safety ecosystem.

In 2025, Pakistan strengthened its cyber governance through amendments to the Prevention of Electronic Crimes Act (PECA), establishing the National Cyber Crime Investigation Agency (NCCIA) to replace the FIA’s cybercrime wing and lead all digital investigations nationwide.⁶⁴⁹ The amendments also proposed the creation of a Social Media Protection and Regulatory Authority (SMPRA) and a Digital Rights Protection Authority (DRPA), expanding state control over digital content, with provisions allowing platforms to be blocked and charged with penalties of up to three years imprisonment for spreading “fake or false” information.⁶⁵⁰ In parallel, Pakistan operationalized its National Cyber Emergency Response Team (PKCERT) in March 2024⁶⁵¹ to coordinate real-time responses to cyber threats and is progressing toward launching a National Cyber Security Authority to enforce mandatory security standards across sectors by 2028.⁶⁵²

645 <https://seosandwitch.com/ai-in-public-safety-stats/>

646 https://www.lemonde.fr/en/pixels/article/2024/07/24/paris-2024-controversial-ai-led-video-surveillance-put-to-the-test-during-olympics_6697267_13.html 647 <https://www.reuters.com/sustainability/climate-energy/how-ai-is-arming-cities-battle-climate-resilience-2024-05-23/>


648 <https://punjabpolice.gov.pk/pzca>

649 <https://www.dawn.com/news/1887118>

650 <https://thefridaytimes.com/03-Mar-2025/pakistan-s-cyber-laws-peca-amendments-2025-and-the-struggle-between-security-and-censorship>

651 <https://pkcert.gov.pk/>

652 <https://www.brecorder.com/news/40314368/cyber-security-authority-to-be-set-up-by-2025>



In 2025, Islamabad saw a remarkable 20% drop in overall crime, including robbery, vehicle theft, burglary, and murder, with approximately 600 fewer reported incidents compared to the previous year.⁶⁵³ Police leadership attributed this success to modern strategies like expanded “Safe City” surveillance, virtual patrol units, K-9, and rapid-response squads. Punjab’s Crime Control Department, launched in February 2025, deploys around 4,258 specially trained officers in dedicated stations and uses drone-based surveillance capable of reaching crime scenes within five minutes to tackle organized crime such as kidnapping, extortion, land grabbing, and rape.⁶⁵⁴

Recent Developments

- **Smart Islamabad Project And Integrated 'Super App':**

Plans are underway for a pilot Smart Islamabad project and a new 'super app' for the capital. These initiatives aim to integrate various public services and enhance urban management through digital platforms, improving efficiency and convenience for citizens.⁶⁵⁵

- **National Intelligence Fusion And Threat Assessment Centre (NIFTAC):**

Formally launched in May 2025, NIFTAC centralizes real-time intelligence coordination across civilian and military institutions under NACTA. It centralizes real-time intelligence aggregation, analysis, and dissemination through a unified national database and secure coordination platform linking federal and provincial fusion centers.^{656,657}

NIFTAC is far more than a coordination hub, it operates as a technology-enabled national intelligence platform.

It integrates over 50 federal and provincial departments and agencies into a centralized digital intelligence database, enabling secure aggregation of threat data and information flow to and from six Provincial Fusion Centres (PIFTACs)

The Punjab Cabinet confirmed that NIFTAC functions as a 24/7 digital operations centre, consolidating data from diverse law enforcement and security agencies into a unified, real-time terror risk dashboard.⁶⁵⁸

Built on state-of-the-art IT infrastructure, NIFTAC allows automated data-sharing, analytics, and decision support across civilian-military lines, improving response speed and resource utilization.

- **Operationalization Of National Cyber Crime Investigation Agency (NCCIA):**

In July 2025, Pakistan’s NCCIA, formed in 2024 to replace FIA’s cybercrime wing, arrested dozens involved in IMEI tampering, social media blackmail, and financial scams. The agency has emerged as a specialized national enforcement unit.⁶⁵⁹

NCCIA operates a fully operational National Threat Intelligence Centre, featuring advanced digital forensics labs, network-security departments, and automated tools to analyze cyber incidents, trace fraud rings, and respond in real-time to emerging threats.⁶⁶⁰

653 <https://tribune.com.pk/story/2543103/islamabad-among-100-safest-cities>

654 <https://www.nation.com.pk/27-Feb-2025/cm-maryam-orders-establishment-of-crime-control-department>

655 Govt unveils major tech initiatives with new IT parks, digital reforms

656 https://pid.gov.pk/site/press_detail/28970

657 <https://www.thenews.com.pk/print/1309122-civil-military-top-brass-briefed-on-preparedness-against-threat-matrix>

<https://www.thenews.com.pk/print/1280624-punjab-cabinet-reviews-counter-terrorism-plan>

659 <https://www.thenews.com.pk/print/1298419-formation-of-nccia-an-innovative-step-to-check-cyber-threats>

660 <https://www.thenews.com.pk/print/1298419-formation-of-nccia-an-innovative-step-to-check-cyber-threats>

In June 2025, the Interior Minister inaugurated a 24/7 Helpline Center (1799), a digital platform enabling direct cybercrime reporting by citizens. This channel is integrated with NCCIA's case-management and response workflows.⁶⁶¹

Funded and staffed by cybercrime experts, NCCIA utilizes modern software and hardware infrastructure, network traffic analysis, and cross-border data-sharing APIs for enforcement. It collaborates with national intelligence bodies and international agencies to track and dismantle cyber-threat networks.

Challenges

- **Transformation Lag:**
A fundamental hurdle is the slow pace of digital transformation across various government ministries, which can hinder the full realization of "digital citizenship" and a truly digital economy.
- **Policy Fragmentation:**
No unified national policy or legal framework currently exists. Pakistan's Safe Cities operate under provincial mandates (e.g. Punjab), but there is no federal-level standard or regulation for AI-driven surveillance, Inter-Command Centers, data interoperability, or biometric systems. As a result, governance remains fragmented and inconsistent, undermining national coordination.⁶⁶²
- **Operational Breakdown:**
Maintenance issues persist, recent reporting shows nearly half of the CCTV cameras in Lahore and Multan Safe City projects were non-functional as of January 2025, severely undermining effectiveness in street crime monitoring.⁶⁶³
- **Privacy Gaps:**
Despite collecting sensitive biometric and behavioral data, Pakistan lacks comprehensive data protection laws. The Personal Data Protection Bill (2021/2023) remains in draft form, and PECA 2016 offers limited safeguards, raising serious privacy and surveillance concerns.⁶⁶⁴
- **Capacity Deficit:**
Law enforcement and emergency personnel receive minimal training in using AI tools, digital dashboards, and cybersecurity protocols. A recent report by the Digital Rights Foundation (2024) emphasized the need for comprehensive training programs to properly handle investigations and digital evidence.⁶⁶⁵
- **System Incompatibility:**
There is a continuous need for technological upgrades and integration of advanced AI analytics, ensuring these systems remain effective against evolving criminal methods. Furthermore, achieving seamless real-time coordination between various emergency agencies (police, fire, ambulance) across different platforms remains a challenge, requiring strong interoperability solutions.

661 <https://www.ptv.com.pk/mobileView/ptvWorldMobile/newsdetail/6796>

662 National Policy and Legislative Framework for AI Governance in Law Enforcement Agencies and Criminal Justice System of Pakistan, https://asef.org/wp-content/uploads/2021/11/ASEFSU23-Background-Paper_Sustainable-Urbanisation-in-Pakistan.pdf

663 <https://minutemirror.com.pk/punjab-safe-cities-project-fails-to-curb-street-crimes-amid-non-functional-cameras-333399/>

664 <https://www.dlapiperdataprotection.com/index.html?c=PK&t=law>

665 <https://digitalrightsfoundation.pk/2024/05/>

- **Adoption Barriers:**

For police emergency apps and e-portals, limited public awareness and digital literacy gaps can hinder widespread adoption and effective utilization, and ensuring the data privacy of these citizen-facing platforms is a major concern.^{666,667,668}

Recommendations ⁶⁶⁹

- **Establish a Unified National Policy And Legal Framework:**

To address fragmented governance, the federal government should formulate a comprehensive National Digital Public Safety Strategy. This must define minimum standards for AI surveillance, IC3 interoperability, and citizen data protection. A dedicated Digital Public Safety Authority could oversee Safe City projects, ensure coordination among provinces, and introduce AI ethics guidelines aligned with global practices. The Personal Data Protection Bill should be finalized and enacted with specific provisions for law enforcement use of biometric and behavioral data, ensuring both transparency and public accountability.

- **Modernize Infrastructure And Ensure Technical Uptime:**

Provinces should prioritize audit-based upgrades of Safe City infrastructure, focusing on faulty CCTV networks, outdated software, and storage bottlenecks. Introducing predictive maintenance systems, leveraging IoT-based alerts for camera downtime, and signing long-term vendor contracts for performance-based upkeep can improve reliability.

Federal support should incentivize public-private partnerships (PPPs) with AI and telecom providers to scale secure infrastructure to Tier-2 and Tier-3 cities.

- **Implement Data Protection, Cybersecurity And Oversight Protocols:**

In parallel with legal reforms, operational protocols must be introduced to safeguard citizen data. These include:

- End-to-end encryption of surveillance feeds.
- Role-based access controls for law enforcement staff.
- Independent audits of AI algorithmic fairness.
- A Public Safety Oversight Board composed of legal experts, data scientists, and civil society members to ensure accountability in system deployment and use.

- **Bridge The Digital Divide through Inclusion And Literacy Programs:**

To maximize the impact of emergency e-services, the government must pair technology rollouts with awareness and literacy efforts, especially in underserved rural areas.

Embedding digital safety modules into existing literacy programs (e.g., BISP's Taleemi Wazaif).

Launching Urdu and regional-language media campaigns promoting police apps and online complaint platforms.

Training local government units and union councils to function as digital help desks. This will increase citizen uptake of platforms like the Pakistan Citizen Portal and virtual police kiosks.

666 Integrated Command, Control and Communication Center | PITB

667 Capital to get AI-powered crime watch

668 Pakistan implements AI-powered criminal identification system – Artificial Intelligence Institute

669 DIGITAL PAKISTAN MONITOR – May 2025 – FNPk

- **Invest In Capacity–Building And AI Readiness For Law Enforcement:**

Training must be institutionalized via certified digital investigation and AI-surveillance courses offered to police, rescue teams, and command centre staff. Partnerships with NADRA, NITB, and local universities can scale this. Each province should mandate digital skill KPIs for Safe City project staff and adopt sandbox models to assess new tools in controlled settings before full deployment.

- **Enhance Inter–Agency Integration And Data Sharing:**⁶⁷⁰

To maximize the impact of Safe Cities Projects, it is crucial to further enhance the integration of IC3 Centers with all emergency services (police, fire, ambulance, city authorities) through unified communication protocols and data-sharing platforms. This will facilitate quicker, more coordinated responses to incidents and streamline operational efficiency.

- **Promote Public Awareness And Digital Literacy For Emergency Services:**⁶⁷¹

To ensure the effective adoption and utilization of police emergency apps and e-portals, targeted campaigns should be launched to raise public awareness about these platforms. Simultaneously, efforts to improve digital literacy among citizens, especially in rural and underserved areas, will empower more people to access and benefit from these vital digital services.

670 Pakistan's Tech Industry Enters a New Era of Innovation and Growth

671 Ways to Improve Public Safety with Smart Cities Technology | Verizon Business

Global Case Studies ^{672,673}

Moscow's Safe City Program – AI-Driven Surveillance At Scale

Moscow's Safe City initiative is one of the world's most advanced urban surveillance systems, featuring over 217,000 CCTV cameras integrated with AI-powered facial recognition. Managed under the city's Department of Information Technologies, this network supports real-time crime detection, contact tracing (used during COVID-19 lockdowns), and streamlined coordination with law enforcement. Authorities report improved incident response times and enhance public safety coverage in metro stations, public transport, and busy intersections.

- The system reportedly led to the detention of hundreds of individuals on federal watchlists during its early deployment.
- Facial recognition enabled automated detection of quarantine violators during the pandemic. Moscow's model demonstrates the operational strength of real-time surveillance and AI analytics for urban safety. However, Pakistan must balance technological advancement in Public Safety Reforms with data privacy, legal frameworks, and civic trust.

Pakistan can learn to strengthen inter-agency coordination and invest in AI-integrated surveillance at high-impact urban zones. A phased rollout must be backed by clear legal frameworks for data privacy and algorithmic accountability. Civic trust should be prioritized through transparency, oversight, and public engagement.

Sharjah (UAE) – AI-Enabled Patrol Cars

The Sharjah Police have recently deployed AI-equipped patrol vehicles featuring live biometric facial recognition and advanced traffic-monitoring technologies. These vehicles connect to national watchlists and ANPR databases, enabling real-time alerts when they detect wanted individuals, stolen vehicles, or traffic violations like DUI, using phones while driving, and speeding. This initiative also integrates predictive analytics to identify risky driving behaviors before incidents occur, and coordinates with traffic signals to prioritize emergency vehicles. Trials are underway, with a phased rollout planned throughout the emirate. The project is part of a broader smart policing strategy that includes drones and interactive patrol units, the aim is to transform road safety and law enforcement responsiveness for intelligent public safety infrastructure.

Pakistan can adopt AI-enabled mobile surveillance units to enhance law enforcement mobility and responsiveness in real-time. Integrating patrol systems with national crime and vehicle databases can improve detection of violations and criminal activity. To ensure effectiveness, Pakistan must invest in predictive analytics, inter-system connectivity, and localized testing before scaling nationwide.

672 Inside Safe City, Moscow's AI Surveillance Dystopia | WIRED

673 Exploring the Dark Side of AI Surveillance in Moscow's Safe City – Bytefeed - News Powered by AI



CHAPTER 4: EMERGING TECHNOLOGIES

The world is entering a new era shaped by emerging technologies, like Blockchain, Digital Currencies, Artificial Intelligence (AI), collectively referred to as Web 3.0. These technologies represent a fundamental shift in how people interact with data, services, and one another in the digital realm.

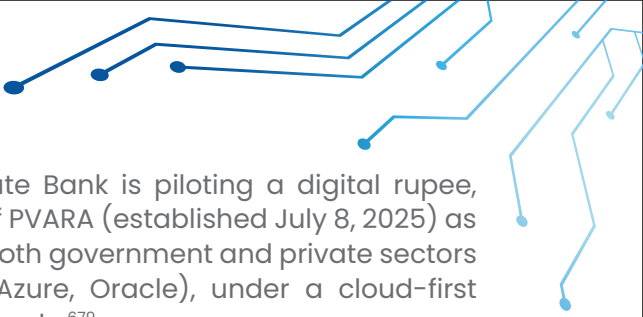
US Congress is advancing crypto legislation focused on stablecoins, broader regulations, and SEC oversight, with strong industry lobbying and support from the “crypto president” aiming to reshape how Americans use digital assets.⁶⁷⁴ Under favorable Trump policies, crypto firms are expanding. Wintermute opened a New York office and hired a former Ripple executive to lead policy, while rising weekend market volatility has increased demand for traders. Hedge fund Tephra Digital also reported an 11% gain in May amid strong crypto rallies. Meanwhile, Shanghai regulators are exploring yuan-backed stablecoins in response to pressure from companies like JD.com and Ant Group, with potential pilot launches in Shanghai and Hong Kong despite ongoing capital control challenges. Globally, 134 countries are now exploring central bank digital currencies (CBDCs), with 44 in pilot phases, China leads with its e-CNY nearing full rollout, while the Bahamas and Nigeria report growing adoption.^{675,676}

Currently, Pakistan has made notable strides in digital transformation through both public policy and private innovation. Pakistan’s Digital Nation and National AI Policy is driving the growth of AI hubs and innovation centers, with the National Centre of AI (NCAI) developing over 200 AI solutions across sectors like healthcare,

674 <https://www.axios.com/2025/07/10/crypto-senate-legislation-regulation-clarity>

675 <https://www.reuters.com/business/retail-consumer/major-shift-shanghai-regulator-mulls-policy-responses-stablecoins-2025-07-11/>
<https://www.reuters.com/markets/currencies/central-bank-digital-currency-momentum-growing-study-shows-2024-09-17/>

676 Crypto hedge fund Tephra Digital gains 11% in May



agriculture, smart cities, transport, and justice.⁶⁷⁷ The State Bank is piloting a digital rupee, supported by the new Virtual Assets Act and the creation of PVARA (established July 8, 2025) as an independent regulator for virtual assets.⁶⁷⁸ Meanwhile, both government and private sectors are transitioning to hybrid cloud infrastructures (AWS, Azure, Oracle), under a cloud-first mandate issued by the Ministry of IT for all federal departments.⁶⁷⁹

This section explores how Pakistan can position itself to benefit from the Web 3.0 wave and highlights the foundational steps needed to build a resilient and inclusive digital future.

BLOCKCHAIN

As the global economy transitions toward a digital-first paradigm, blockchain technology has emerged as a foundational enabler of this transformation. Its decentralized architecture enhances data integrity, transparency, and security across a range of applications from financial services and digital identity to supply chain management and public sector governance. It powers applications such as secure cross-border payments, digital identity systems, land and property registries, smart contracts, public procurement, and welfare disbursement, offering heightened transparency and trust. In 2024, governments, enterprises, and startups worldwide accelerated their blockchain integration strategies: from decentralized finance (DeFi) to digital identity and carbon tracking systems. The evolution of Web 3.0 technologies, especially blockchain, presents Pakistan with a critical juncture to redefine its digital, financial, and governance systems.

The global blockchain market was valued at USD 20 billion in 2024 and is forecasted to reach USD 393 billion by 2032, growing at a CAGR of over 43%.⁶⁸⁰ While financial services dominate blockchain usage, significant growth is being seen in healthcare, supply chain, energy, identity verification, and government sectors.

In 2024, countries such as the UAE, Singapore, and Estonia launched national strategies to embed blockchain in public infrastructure. Pakistan, though still in its emerging stages, has demonstrated promising use cases, particularly in remittances, health, and property markets. However, widespread adoption is hindered by regulatory uncertainty, bottlenecks in the infrastructure, and limited public awareness.

Across South Asia, blockchain innovation exhibits wide variation in scope and implementation. Bangladesh, under its “Smart Bangladesh”⁶⁸¹ vision, has implemented blockchain for transparent public procurement and is piloting blockchain-enabled welfare disbursement in partnership with A2I and UNDP.⁶⁸² Sri Lanka has engaged with blockchain firms to improve food supply chain traceability and test digital banking applications.⁶⁸³ Relative to these developments, Pakistan’s blockchain ecosystem is still in early stages and lacks cohesive national coordination, but in contrast, countries like Bangladesh demonstrate stronger institutional alignment and a deeper integration of blockchain into broader digital governance frameworks.

677 <https://www.thenationalnews.com/advertorial/2025/02/04/pakistan-takes-centre-stage-at-ai-everything-global-2025/>

678 <https://www.reuters.com/world/asia-pacific/pakistan-central-bank-launch-pilot-digital-currency-says-governor-2025-07-09/>

679 <https://propakistani.pk/2025/06/23/pakistans-tech-industry-enters-a-new-era-of-innovation-and-growth/>

680 Blockchain Technology Market Size, Share, Value | Growth Report [2032]

681 National Blockchain Strategy: Bangladesh a2i's yearlong initiatives build foundation of Smart Bangladesh - SAMENA Daily News

682 Blockchain in Bangladesh & the way to transparency | The Financial Express

683 Sri Lanka's digital leap: AI, Blockchain, and future of public service | Daily FT Central Bank of Sri Lanka Completes blockchain-based POC on shared KYC | norbloc

Recent Developments

- **Pakistan Crypto Council (PCC):**

Pakistan has taken bold steps to position itself within the global blockchain ecosystem, most notably through the establishment of the Pakistan Crypto Council (PCC) on March 14, 2025. Formed under the Ministry of Finance, the PCC is led by entrepreneur Bilal Bin Saqib⁶⁸⁴ as CEO and Changpeng Zhao, co-founder of Binance, as an adviser,⁶⁸⁵ the council aims to revolutionize the crypto and blockchain infrastructure nationwide.

In just 50 days, the Pakistan Crypto Council (PCC) has positioned the country as a rising player in the global blockchain space. It has signed major international agreements, including a partnership with US-based World Liberty Financial, and is promoting Pakistan as a hub for DeFi, stablecoins, and cross-border blockchain solutions. The council is also exploring Bitcoin mining projects, AI data centers, and the tokenization of real-world assets like land and commodities. Talks with Malaysia hint at a regional partnership in Shariah-compliant digital finance, reflecting PCC's focus on innovation, inclusion, and global engagement.⁶⁸⁶

- **Blockchain-Driven Land Reforms In Sindh:**

Recently in March 2025, the Sindh government, under CM Syed Murad Ali Shah, launched a blockchain-based land record system in select districts (Matari and Sukkur). Manual records were digitized, authenticated, linked to CNICs, and stored immutably on blockchain. The system, supported by IBA Sukkur, enables biometric verification through service centers and integrates with NADRA, FBR, and banks, streamlining title transfers and preventing land fraud.⁶⁸⁷

- **Blockchain And AI Education:**

The Ministry of Federal Education and Professional Training launched a program to introduce Blockchain, AI, and Data Science courses in federal degree colleges across Islamabad. Partnering with NUST (National University of Sciences and Technology), COMSATS, NUML (National University of Modern Languages), NSU (National Skills University), and NAVTTC (National Vocational and Technical Training Commission), this six-month certification initiative targets both graduates and undergraduates, with infrastructure to train 200–300 students per college using NAVTTC funding.⁶⁸⁸

Furthermore, Pakistan's Ministry of IT and Telecom and academic institutions have launched targeted blockchain pilots and educational programs. In late May 2025, Binance Academy partnered with the ministry to train 300 university educators and reach 80,000 students across 20 universities by 2026, a strategic investment in Web3 talent development.⁶⁸⁹

- **Revolutionizing Property Investment Via Blockchain:**

DAO PropTech launched Pakistan's first blockchain-based real estate tokenization platform at FutureFest 2025. Backed by the Arif Habib Group and Share Group (KSA), it enables fractional real estate investing, transparent ownership records, and automated investor tools like AI chatbots and ROI calculators.⁶⁹⁰

684 Pakistan's crypto and blockchain chief unveils country's first strategic bitcoin reserve | Arab News

685 Binance founder Zhao appointed as strategic adviser to Pakistan Crypto Council - Business - DAWN.COM

686 <https://profit.pakistantoday.com.pk/2025/05/04/pakistan-crypto-council-puts-nation-on-global-blockchain-map-in-just-50-days/>

687 CM launches blockchain-based land record system - Newspaper - DAWN.COM

688 Consortium planned to empower youth with emerging IT skills - Newspaper - DAWN.COM Islamabad colleges to offer AI, blockchain, and data science training programmes Technology - HUM News

689 Binance Academy and Pakistan's Ministry of IT and Telecom Partner to Advance Nationwide Blockchain Education

690 DAO PropTech Unveils Pakistan's First Blockchain Real Estate Platform at FutureFest 2025! - TEC Spectrum

- **HAQQ, An Islamic Finance Blockchain Layer:**

HAQQ Blockchain is a Shariah-compliant blockchain layer tailored for financial applications, designed to support secure, ethical, digital transactions aligned with Islamic finance principles, thus targeting the underserved Muslim population.⁶⁹¹

- **SME Lending Enhanced Via Blockchain:**

Finja has integrated blockchain into its existing fintech suite to enhance SME micro-lending, payroll, and digital payments by reducing fraud and improving transparency.⁶⁹²

- **B2B Blockchain Innovation In Pakistan:**

PKISol and Hybrid Hub Technologies are leading B2B blockchain solutions in Pakistan, offering services like smart contract development, Ethereum/Hyperledger applications, decentralized PKI, and enterprise blockchain integration, recognized among the top blockchain development firms as of early 2025.

Challenges

- **Lack Of Unified Blockchain Framework In Pakistan:**

The State Bank of Pakistan (SBP) and Securities Exchange Commission Pakistan (SECP) have not yet issued comprehensive guidelines, leading to investor hesitation and institutional inertia. Pakistan still lacks a clear, unified legal framework governing blockchain beyond cryptocurrencies. While the Pakistan Crypto Council (PCC) was launched in 2025, crypto remains officially discouraged, and blockchain-specific regulation is either absent or fragmented across sectors (finance, identity, land records).⁶⁹³

- **Infrastructure Hurdles For Blockchain-AI Expansion:**

Blockchain applications require significant energy and data center support. Pakistan's fragile grid, frequent load-shedding, and transmission losses make infrastructure hosting unreliable. The 2,000 MW allocated for blockchain-AI in April 2025, is yet to be approved by the IMF, which has raised concerns on disruption of the competitive landscape and artificial price difference in tariffs.⁶⁹⁴

- **Offline Population Limits Blockchain Reach:**

Pakistan's startup ecosystem experienced a dramatic funding collapse: it saw a 90% drop in investment with the total drop to just USD 22.5 million in 2024, compared to USD 331 million in 2022. Unlike regional leaders like the UAE, Pakistan lacks blockchain-specific incubators or regulatory sandboxes. While it has general initiatives like Ignite's National Incubation Centers and the Pakistan Startup Fund, none are focused solely on promoting Web3 or blockchain R&D, hindering entrepreneurial experimentation and innovation.⁶⁹⁵

691 EXPLORING HOW PAKISTANI STARTUPS ARE DISRUPTING FINANCIAL SERVICES WITH BLOCKCHAIN TECHNOLOGY - ezajeer

692 EXPLORING HOW PAKISTANI STARTUPS ARE DISRUPTING FINANCIAL SERVICES WITH BLOCKCHAIN TECHNOLOGY - ezajeer

693 Domicile seekers want old system restored - Newspaper - DAWN.COM

694 IMF Rejects Pakistan's 2,000 MW Crypto Mining Subsidy Plan

695 Tech & VC Landscape 2024

- **Cross-Border Challenges:**

In 2025, Pakistan's integration into the global blockchain landscape is constrained by several cross-border challenges. These include jurisdictional uncertainty, stringent international data privacy regulations, and fragmented AML/KYC compliance frameworks. Ambiguities in cross-border taxation, inconsistent consumer safeguards, and limited interoperability further impede seamless adoption. Collectively, these hurdles undermine regulatory clarity, operational efficiency, and international trust, posing significant barriers to Pakistan's global blockchain ambitions.^{696,697}

- **Regulatory And Infrastructure Hurdles For Fintech:**

Fintech in Pakistan faces key challenges including unclear regulations, low digital access, limited funding, and weak cybersecurity. Poor infrastructure, resistance from traditional banks, and low consumer trust also hinder growth, despite rising demand and innovation.

Recommendations

- **Centralized Blockchain Policy Framework:**

Pakistan should develop a centralized, multi-year Blockchain Strategy Roadmap, spearheaded by the Ministry of IT and Telecom, in collaboration with the Pakistan Crypto Council and academia. This roadmap must outline sector-specific priorities, like supply chain traceability, e-governance, and digital identity, alongside clearly defined KPIs, funding timelines, and sandbox policies. It would help unify fragmented pilots into a coherent national agenda, sending a strong signal to investors and innovators that blockchain is a priority, not just a side experiment.

- **Blockchain Innovation Grant Fund:**

To encourage large-scale adoption, the government should launch a Blockchain Innovation Grant Fund through Ignite or the Pakistan Startup Fund. This would co-finance enterprise blockchain pilots in high-impact sectors such as healthcare data management, agriculture traceability, and public procurement. The fund can be performance-based, requiring measurable outcomes before the next funding round, ensuring accountability while stimulating real-world applications of blockchain.

- **Academic Reforms For Blockchain Literacy:**

Pakistan must embed blockchain development and governance modules into undergraduate curricula for CS, law, and business degrees at public and private universities. This can be coordinated by HEC in partnership with institutions like NUST, COMSATS, and the Virtual University. Building a blockchain-literate workforce is essential to support startups, regulatory bodies, and enterprise integration.

- **Cross-Border Cooperation For Blockchain Growth:**

Pakistan should actively collaborate with countries like the UAE, Bahrain, and Bangladesh to share regulatory insights, harmonize standards, and open cross-border corridors for blockchain use, especially for remittances, logistics, and identity verification. Bilateral MoUs, joint R&D labs, and South-South cooperation forums would help Pakistan leapfrog bottlenecks and align itself with proven models adapted for emerging economies.

696 <https://coinlaw.io/cross-border-blockchain-transactions-legal-challenges-statistics/>

697 https://issii.org.pk/wp-content/uploads/2025/05/IB_Salik_May_17_2025.pdf

- Roadmap For Fintech Advancement In Pakistan:**

To advance fintech in Pakistan, there is a need for a unified regulatory framework, improved digital literacy, and stronger cybersecurity laws. Investments in infrastructure, fintech-focused funding, and open banking initiatives can drive growth. Aligning with global standards and ensuring consumer protection will further build trust and support long-term expansion.

Prominent Blockchain applications in Pakistan 2024-2025

Sindh Blockchain Land Record System⁶⁹⁸

The Government of Sindh has launched a blockchain-based land record system in districts like Sukkur and Matiari, in partnership with IBA Sukkur. This system digitizes manual records, links them to CNICs, and enables biometric-verified, tamper-proof property transactions, streamlining bureaucratic processes and reducing fraud.

DAO PropTech-Blockchain Real Estate Tokenization⁶⁹⁹

At FutureFest 2025, DAO PropTech launched Pakistan's first blockchain-backed real estate tokenization platform. Backed by Arif Habib Group and Share Group, the platform allows fractional investment in properties via smart contracts, promoting transparency, lowering barriers, and democratizing access to real estate for a broad population.

Binance Academy- MoITT Blockchain Education Partnership⁷⁰⁰

Binance Academy, in collaboration with Pakistan's Ministry of IT and Telecom, launched a nationwide blockchain education initiative. The program will train 300 university educators and reach 80,000 students across 20 universities by 2026, integrating blockchain fundamentals, Solidity programming, and Web3 concepts into university curricula.

698 Sindh integrates blockchain for secure land records - Profit by Pakistan Today

699 DAO PropTech Unveils Pakistan's First Real-World Asset Tokenization Platform At FutureFest 2025

700 Binance Academy partners with IT Ministry of to promote blockchain education - Profit by Pakistan Today

Global Case Studies ^{701, 702, 703, 704}

eGovChain Of the Philippines

The Department of Information and Communications Technology (DICT) launched eGovChain in 2024 which is a blockchain-based platform to secure government document-sharing and services across ministries, boosting transparency and data integrity. Simultaneously, the Bangko Sentral ng Pilipinas (BSP) piloted Project Agila, a wholesale Central Bank Digital Currency. By late 2024, over six banks participated, including BDO and UnionBank, to test interbank settlements and securities clearing using blockchain-like infrastructure. Through this dual approach, the Philippines is mainstreaming blockchain into both its administrative services and financial system. This demonstrates how blockchain can strengthen both governance and financial infrastructure when ministries and central banks coordinate. The Philippines' use of eGovChain for secure government document sharing and Project Agila for testing a wholesale digital currency shows how coordinated efforts between ministries and the central bank can enhance transparency, efficiency, and trust.

Pakistan can adopt a similar strategy by piloting blockchain-based platforms for governance while exploring central bank digital currency to modernize financial infrastructure.

USA: Transforming Public Recordkeeping Through Blockchain

The California Department of Motor Vehicles partnered with Oxhead Alpha and Avalanche Labs to migrate 42 million vehicle titles onto a blockchain system. This initiative enables residents to access and transfer their digital titles via a mobile wallet, drastically reducing DMV visits and deterring lien fraud. The pilot also includes a blockchain-powered disaster recovery platform for FEMA reimbursements, ushering in a new era of digital recordkeeping in government services. Blockchain can digitize public registries and disaster response systems, reducing fraud and administrative burdens. California's use of blockchain to digitize public registries and disaster recovery systems offers a strong example for countries like Pakistan to enhance transparency, reduce fraud, and streamline public service delivery.

Malaysia: National Blockchain Infrastructure

In early 2025, Malaysia formally launched its Malaysian Blockchain Infrastructure (MBI) under its National Blockchain Roadmap. Spearheaded by Malaysian Institute of Microelectronic Systems Berhad under Ministry of Science, Technology and Innovation and Malaysian e-government solutions provider (MY E.G). MBI offers a shared blockchain platform for public and private sector applications. It includes governance frameworks, a developer sandbox, and scalable infrastructure designed to support use cases in e-government, smart cities, and enterprise-grade tokenization.

The initiative signals Malaysia's ambition to become Southeast Asia's blockchain innovation hub. A unified blockchain platform fosters innovation across sectors while ensuring state oversight. Malaysia's launch of a unified national blockchain platform shows how shared infrastructure, regulatory sandboxes, and developer support can drive innovation across public and private sectors.

Pakistan can follow this model by creating its own national blockchain framework to enable scalable use cases while maintaining government oversight.

701 PH laws, gov't support drive blockchain adoption: report

702 California DMV puts 42 million car titles on blockchain to fight fraud | Reuters

703 Medici Land partners with Rwandan government for blockchain land registry - Ledger Insights

704 Malaysia launches national blockchain infrastructure

DIGITAL CURRENCIES

Digital currencies are quickly becoming a major part of how people around the world think about money. Currencies like Bitcoin or Ethereum, are decentralized and run without any central authority, while others known as Central Bank Digital Currencies (CBDCs) are being developed by governments to offer a more controlled, stable version of digital money. Across the globe, countries are utilizing digital currencies in different ways. In places like the U.S., U.K., Canada, and Australia, regulators are working to create legal frameworks and pilot programs. However, countries like Vietnam, Nigeria, and Pakistan are adopting them in everyday use. People have turned to digital currencies to protect their savings, send money home, or simply because they do not have easy access to traditional banks. With more than 130 countries now exploring CBDCs,⁷⁰⁵ digital currencies are not just a passing trend. They are shaping the future of money.

Across the globe, countries with similar economic challenges and youthful populations are embracing digital assets in ways that reflect their unique social and financial realities.

Vietnam, ranked 3rd in the global crypto adoption, has become something of a quiet leader in the region. What sets it apart is its well-developed DeFi (decentralized finance) ecosystem and strong peer-to-peer (P2P) culture. In Vietnam, crypto is not just about trading. It is used for everyday transactions, digital savings, and cross-border remittances. The country's grassroots level digital fluency has allowed crypto to seep into the daily lives of its citizens, creating a sense of financial agency that traditional systems often failed to provide.⁷⁰⁶ Nigeria, ranks 2nd globally in crypto adoption. In a nation grappling with inflation, currency instability, and restricted access to global finance, Nigerians have turned to crypto out of necessity. Whether it is using stablecoins to protect savings, sending remittances home, or transacting through P2P platforms when banks fall short, digital currency has become a survival tool. It is not about chasing trends; it is about securing stability in uncertain times.⁷⁰⁷

Over the past few years, Pakistan's digital currency market has quietly transformed from a fringe interest to a mainstream economic conversation. What began as underground trading among a few risk-takers has evolved into a massive user-driven movement, fueled by a young, tech-savvy population searching for financial alternatives in a country marked by inflation, currency devaluation, and limited access to formal banking. As of April 2025, Pakistan is estimated to have 15–20 million cryptocurrency users, a figure that reflects not only robust engagement but also a rising trust in decentralized finance despite the absence of a formal regulatory framework.⁷⁰⁸ According to the Pakistan Software Houses Association (P@SHA), this user base is dominated by digital-native youth who primarily use crypto for remittances, peer-to-peer trading, and digital savings, functions where traditional financial institutions have often failed to deliver speed, accessibility, or trust.

705 Trump's digital dollar ban gives China and Europe's CBDCs free rein | Reuters

706 <https://www.coinsurges.com/global-crypto-adoption-report-2025/>

707 Despite clampdown, Nigeria emerges 2nd in global crypto adoption - Chainalysis

708 Pakistan turns to bitcoin miners, AI data centers to use surplus power | Reuters

Recent Developments

- **A New Policy Engine: The Pakistan Crypto Council (PCC):**

Islamabad has recently moved to formalize its approach to digital currencies with the launch of the Pakistan Crypto Council (PCC). Backed at the cabinet level, the Council was directed to develop a coordinated roadmap for virtual assets in collaboration with the State Bank of Pakistan (SBP) and the Securities and Exchange Commission of Pakistan (SECP). This marked a shift from policy debate to concrete planning. In June this year, the PCC held its first official meeting and formed a multi-agency technical committee to begin drafting the country's first comprehensive regulatory framework for crypto.^{709,710}
- **A Sovereign Bitcoin Reserve:**

At the Bitcoin 2025 conference in Las Vegas, Pakistan made headlines for stepping boldly onto the global crypto stage. In a moment that surprised many, Pakistan's newly appointed Minister for Crypto and Blockchain, took the stage to unveil the country's first government-backed Bitcoin wallet.⁷¹¹ He made it clear: this wallet would serve as a strategic sovereign reserve, not a trading tool. It was a signal to the world that Pakistan sees digital assets as part of its long-term economic playbook.
- **CBDC Groundwork Inside The SBP:**

By late 2024, the State Bank of Pakistan (SBP) began shifting its tone. It proposed the possibility of launching a digital rupee, hinting at a future where the country's own central bank digital currency (CBDC) could coexist with private-sector crypto.⁷¹² Rather than rushing to regulate or reject, the SBP took a measured approach: in 2025, it moved these ideas into a regulatory sandbox: a controlled environment to safely test digital currency models. Here, with a sharp focus on cybersecurity and data protection, experts are experimenting with how a digital rupee might function in the real world. It is a cautious step that suggests Pakistan's financial regulators are beginning to embrace innovation without compromising security or public trust.
- **Tokenized Gold For The Masses:**

Fasset, a Dubai-based fintech platform, received approval from the Securities and Exchange Commission of Pakistan (SECP) to test a bold idea: making gold ownership accessible to everyone. Through a blockchain-powered app, users can now buy tiny fractions of real, vaulted gold even as little as PKR 100 worth right from their smartphones. No middlemen, no hefty fees, no need to buy entire coins or bars. This fractional gold product is not just about tech; it is a step towards inclusion. For millions of Pakistanis who have seen gold as a symbol of security but never had the means to own it, Fasset's innovation turns that dream into something tangible, one microgram at a time.⁷¹³
- **Virtual Asset Ordinance 2025:**

On July 8, 2025, the Virtual Assets Ordinance 2025 was enacted, establishing the Pakistan Virtual Asset Regulatory Authority (PVARA) as the country's first dedicated regulator for digital assets. The authority will license and supervise service providers, monitor crypto-related activities, enforce compliance, and ensure consumer protection.⁷¹⁴

709 Crypto council agrees on technical committee to draft framework for digital and virtual assets - Business - DAWN.COM

710 Pakistan takes a step closer to crypto regulation with new technical committee

711 Pakistan unveils first government-backed strategic Bitcoin reserve

712 Pakistan moves to regulate cryptocurrency, CBDCs as legal tender

713 Fasset Secures Sandbox License to Launch Pakistan's First Tokenized Gold Solution - Dawn News Urdu

714 Virtual Asset Ordinance 2025: Explanation and comments-I - Business & Finance - Business Recorder

The authority will license and regulate virtual asset providers, monitor crypto-related activities, ensure consumer protection, and take enforcement actions against non-compliance, requiring all entities in the sector to obtain a PVARA license.⁷¹⁵

Challenges

- **Regulatory Disconnect: PCC Versus The State Bank On Cryptocurrency:**

While the Pakistan Crypto Council (PCC) advocates for initiatives like a national Bitcoin reserve and mining hubs, the State Bank and Ministry of Finance continue to deem all crypto transactions illegal. In May 2025, both institutions reaffirmed that cryptocurrency remains banned. This disconnect has led to regulatory uncertainty, weakening investor confidence and policy coherence.^{716,717}

- **Fraud, Scams And Anti-Money Laundering Void:**

In the absence of clear and dedicated crypto legislation, Pakistan has become increasingly vulnerable to financial crime. Ordinary people, often new to the world of digital assets, are being lured into unauthorized investment schemes that promise fast returns but end in loss and frustration. A June 2025 report by DAWN raised alarm over the growing number of such scams, highlighting how the lack of proper anti-money laundering (AML) safeguards and the inability to trace wallet owners have created a breeding ground for cybercriminals.⁷¹⁸ Without a solid legal and regulatory foundation, even well-intentioned users are left exposed to trading in an ecosystem that offers no real protection. The result is a growing sense of mistrust, not just among users, but also within the global financial community watching Pakistan's crypto journey with caution.

- **Bank Account Freezes And P2P Disputes:**

For many everyday crypto users in Pakistan, engaging in peer-to-peer (P2P) trading can feel like walking a financial tightrope. While the appeal of fast, borderless transactions is strong, the consequences can be unexpectedly harsh. On local forums and social media, people regularly share stories of their bank accounts being abruptly frozen not because of fraud or illegal activity, but simply for trading crypto with another user.

These freezes often lead to frustrating "chain disputes," where transactions get stuck and funds remain inaccessible for weeks or even months. For someone sending money to family, paying a vendor, or trying to grow their small savings, this uncertainty can be devastating. It is no surprise that new users are hesitant to get involved, and many who do are left feeling trapped in a system where there is no one to turn to when things go wrong.

- **Public Awareness And Financial Inclusion Barriers:**

In Pakistan, the road to digital currency adoption is not just blocked by regulation, it is also hindered by mindset and access. In many parts of the country, especially rural areas, cash is still king. Roughly 80- 90% of all transactions happen in paper form, not because people reject progress, but because digital systems still feel foreign or even untrustworthy to them.⁷¹⁹ For someone who's never used a QR code or does not own a smartphone, the idea of "cryptocurrency" can seem far-fetched. Many shopkeepers, farmers, and small business owners prefer to keep their money where they can see it: in their pockets, not behind a screen. This deep-rooted digital hesitation is a real and pressing barrier. Until these communities are included and empowered, any talk of nationwide crypto adoption or a central bank digital currency (CBDC), risks leaving them behind.

715 PAKISTAN: Law to Regulate Crypto and Digital Assets Approved | HKTDC Research

716 Crypto policy in disarray as SBP, ministry insist ban is still in place - Pakistan - DAWN.COM 717 Our crypto delusion

718 The dangers of rushing crypto adoption - Business - DAWN.COM

719 Digitalisation: avenues, hurdles | The Express Tribune

- **Infrastructure And Regulatory Preparedness:**

As of mid-2025, there is still no official legislation, no public white papers, and no clear roadmap despite all the talk about a Virtual Assets Bill. For ordinary users, investors, and startups, this lack of structure means operating in a space full of uncertainty. Without rules, guidelines, or protections, the ecosystem feels like it is floating with potential, but with nothing solid to stand on.⁷²⁰

- **Institutional Capacity And Coordination Gaps:**

Foundational regulations like the SBP Act (1956) and the Foreign Exchange Regulation Act (1947) were written long before anyone could imagine digital currencies, let alone blockchain. Even relatively recent frameworks, including the Anti-Money Laundering Act (2010) and the Income Tax Ordinance, lack provisions to accommodate cryptocurrency.⁷²¹ As a result, regulators face significant challenges in applying outdated legal instruments to emerging technologies.

For any meaningful change, there needs to be real coordination between key institutions like the State Bank of Pakistan (SBP), SECP, FBR, and FIA not just in theory, but with dedicated teams who understand how crypto works. But as noted in early 2025 policy proposals, that level of collaboration and technical know-how is still deeply lacking. The outcome is a regulatory environment that struggles to keep pace with innovation, constrained by rules conceived in a fundamentally different era.

Recommendations

- **Aligning Institutions For A Coherent Digital Asset Framework:**

Pakistan needs a dedicated Virtual Assets Act to bring clarity and structure to its digital finance landscape. This law should formally define cryptocurrencies, stable coins, and tokenized assets, giving them legal recognition and outlining how they can be used. To resolve regulatory contradictions, a legislative alignment process must be initiated between the Ministry of Finance, the State Bank of Pakistan (SBP), and the Pakistan Crypto Council (PCC), ensuring that all digital asset policies reflect a unified national stance and eliminate institutional ambiguities. This will help clearly assign regulatory roles whether to SBP, SECP, or FIA so oversight is coordinated, not conflicted. Just as importantly, the Act should embed consumer protections, AML/CFT standards, fair taxation, and dispute resolution mechanisms to ensure that digital assets are not only legal, but also safe, transparent, and accessible to the public.

- **Establish A National Crypto Regulatory Authority:**

Pakistan needs a dedicated Crypto Regulatory Commission: a central body that brings together all the key players: SBP, SECP, FBR, and FIA under the guidance of the Ministry of Finance. Right now, these institutions are working in silos, leading to confusion and gaps in oversight. By working together, they can create clear technical rules, license trustworthy crypto platforms, and monitor compliance to ensure the system is secure and fair. It is about building a coordinated, unified approach that keeps pace with the fast-moving world of digital finance.

⁷²⁰ Pakistan's Ongoing Crypto 'Revolution' is No Way Near Where it Should Be

⁷²¹ Pakistan's roadmap to crypto legalization-I - Opinion - Business Recorder

- **Build Technical Capacity:**

Regulators, investigators, and tax officers should be trained in blockchain sleuthing, advanced KYC/AML checks, and digital forensics, so they can spot fraud and trace illicit funds with confidence.

Pakistan can collaborate with seasoned partners like the IMF, BIS, and FATF to bring in world-class expertise and proven playbooks, helping our agencies leapfrog the learning curve instead of reinventing the wheel.

- **Launch A Controlled Central Bank Digital Currency (CBDC) Pilot:**

A smart way to roll out a digital currency in Pakistan is to start with wholesale use like interbank transfers and government payments where systems are easier to control and monitor. Once that runs smoothly, it can gradually expand to everyday retail use. To make it truly useful, the digital rupee should be tested with popular platforms like JazzCash and Easypaisa, so people can use it just as easily as they already use mobile wallets.

- **Strengthen Cybercrime And Fraud Investigation Units:**

To protect users and build trust in the system, Pakistan must strengthen the FIA's cybercrime wing with the right tools to trace digital wallets in real time and investigate cross-border crypto scams. At the same time, crypto exchanges should be legally required to report any suspicious activity to the FIA or SECP just like banks do. This kind of oversight does not just deter fraud; it helps create a safer space for everyone using digital assets.

- **Facilitating Local Crypto Mining:**

Encourage collaboration between government and private sector to support local crypto mining. The government can offer incentives such as regulatory facilitation and power allocation, while the private sector provides capital, technical expertise, and infrastructure (data centers, hardware). This model can lower entry barriers, boost efficiency, and attract domestic and foreign investment in a regulated framework. The government's recent allocation of 2,000 MW of electricity for crypto mining and AI data centers highlights the scale of this opportunity.^{722,723}

722 Pakistan Taps Surplus Power Capacity to Fuel Bitcoin Mining, AI Data Centers

723 Pakistan allocates 2,000 megawatts of electricity to bitcoin mining, AI data centres | Reuters

China's Digital Yuan

China's digital yuan (e-CNY) is a state-backed central bank digital currency developed to enhance domestic financial control and support national interests. Initially designed for retail use, it also serves broader strategic goals, including strengthening China's economic influence and enabling real-time financial surveillance. The e-CNY is integrated with China's broader geopolitical agenda, aligning with initiatives like the Belt and Road and regional trade agreements.

Developing a state-backed digital currency in Pakistan can enhance financial inclusion, reduce reliance on cash, and strengthen monetary control.

A phased rollout helps manage risks and encourages public adoption. Integration with regional trade frameworks and cross-border digital payment systems can boost trade efficiency. Digital currency can also improve tax transparency, support economic formalization, and modernize the payment ecosystem through investment in FinTech, preparing the economy for future shifts in global financial systems.

U.S. Stablecoin Framework (GENIUS And STABLE Acts)

In June 2025, the U.S. Senate passed (by 68–30) the GENIUS Act, creating the first federal regulatory framework for USD-pegged stablecoins. Complemented by the House-passed STABLE Act, this legislation enforces 1:1 reserve backing, mandates monthly audits, and institutes AML/KYC compliance, effectively integrating stablecoins into regulated finance. The aim is to protect consumers, maintain monetary sovereignty, and foster innovation opening the door for authorized issuers like Circle, Ripple, and even retailers to operate within a legally sanctioned ecosystem.

Pakistan, where stablecoins are already used informally for remittances and saving against inflation, can adopt similar guardrails to unlock their potential without compromising financial integrity.

724 <https://www.geopoliticalmonitor.com/cbdc-with-chinese-characteristics-political-economy-of-the-e-yuan/>
725 Senate passes GENIUS stablecoin bill, giving crypto industry first major legislative win

ARTIFICIAL INTELLIGENCE

From voice assistants that understand your commands to tools that write, draw, and diagnose, AI is becoming part of everyday life. The AI market size reached around USD 760 billion in 2024, and if current trends continue, it could skyrocket to USD 3.68 trillion by 2034.⁷²⁶ That means the industry is growing at an average of about 19.2% every year, showing just how rapidly AI is becoming a central part of the global economy.

Taking a regional perspective, Vietnam's digital economy is rapidly advancing, with its AI market projected to reach USD 932 million by the end of 2025.⁷²⁷ Nigeria shows similar momentum, with its AI sector forecasted at USD 1.3 billion by the end of 2025.⁷²⁸ Both countries outpace Pakistan slightly in digital uptake and monetization. Further, Bangladesh is making strides under its Smart Bangladesh Vision, including early AI integration in public services.⁷²⁹ The UAE leads regional AI adoption, with nearly 80% of professionals using AI tools in certain sectors.⁷³⁰ While at different stages, these countries are emerging as strong players in the global tech economy.

By the end of 2025, Pakistan's Artificial Intelligence (AI) market is expected to be valued at USD 861 million, and it is projected to grow at a CAGR of approximately 26.28%, reaching around USD 3.49 billion by 2031.⁷³¹ This surge is driven by increasing demand for automation, data solutions, and global freelance exports. Pakistan is currently ranked among the top five freelance markets globally, with a growing share of its digital exports linked to AI-enabled services such as mobile app development, data analytics, and software solutions. This reflects rising international demand among Pakistani freelancers in the AI domain.⁷³²

Together, these numbers signal a major digital transformation underway in Pakistan. AI is rapidly becoming a foundational technology across industries, and paving the way for immersive digital economies. While challenges like regulatory clarity, internet infrastructure, and digital literacy persist, the momentum suggests that Pakistan is on the cusp of tapping into the next-generation internet economy with significant potential for job creation, tech-led exports, and inclusion in the global digital innovation landscape.

One critical area is the ethical dimensions of AI. For Pakistan, embracing insights from international ethical strategies can illuminate the path toward cultivating a principled AI ecosystem. Key considerations include the need for an established "Responsible AI framework" that addresses potential biases and ensures trustworthiness in automated decision-making. Furthermore, with the increasing use of data, the principle of data sovereignty, controlling where data is stored and processed, should be a focus for national security and privacy.⁷³³

726 <https://rss.globenewswire.com/news-release/2025/02/11/3024340/0/en/Artificial-Intelligence-Skyrocketing-Shaking-the-Market-with-3-680-47-Bn-by-2034.html?>

727 <https://www.statista.com/outlook/tmo/artificial-intelligence/vietnam>

728 Artificial Intelligence - Nigeria | Market Forecast

729 The Complete Guide to Using AI in the Government Industry in Bangladesh in 2025

730 UAE AI usage jumps to 80% among professionals - LinkedIn

731 <https://www.statista.com/outlook/tmo/artificial-intelligence/pakistan>

732 Pakistan's freelance economy could top \$1 billion annually with stronger support - association

733 TRANSFORMING SOCIETIES WITH ETHICAL AI: GLOBAL PERSPECTIVE AND LESSONS FOR PAKISTAN -

Pakistan, along with 187 other countries, is ranked in the Oxford Insights Government AI Readiness Index 2024, which provides a comprehensive framework for evaluating the capacity of governments to adopt and integrate Artificial Intelligence into public administration. Now in its seventh edition, the index is widely recognized as a global benchmark, referenced by leading institutions such as UNESCO and the G20. It assesses AI readiness through 40 indicators across three key pillars: Government, Technology Sector, and Data & Infrastructure offering valuable insights into progress, existing gaps, and opportunities for strengthening public sector capabilities. By doing so, it enables policymakers to better understand their position and chart strategies for leveraging AI to enhance service delivery and address national challenges more effectively.⁷³⁴

Recent Developments

- **Google Launches AI Futures Fund For Pakistani Startups:**
In May 2025, Google launched its AI Futures Fund for Pakistan, offering local startups access to powerful DeepMind models, mentorship, and cloud resources marking a major step in connecting Pakistani innovation with the global AI landscape.⁷³⁵
- **Jazz And NUST Develop Pakistan's First Multilingual AI Model:**
Jazz, in collaboration with NUST and the National IT Board, is working on Pakistan's first homegrown AI language model to support Urdu, Pashto, and Punjabi. This move is a big step toward making AI more accessible for people who speak regional languages. The goal is to help teachers, doctors, farmers, and others get the information and tools they need in their own languages. Pakistan's IT Minister stressed its cultural and national importance. The five-year agreement reflects VEON's broader mission to promote AI that speaks to everyone.⁷³⁶
- **AI Deployment Across Public Services:**
On the ground, AI is no longer just a buzzword: Punjab is testing traffic-monitoring systems in Lahore, NADRA is using facial recognition in national ID systems, the FBR is trailing AI to flag suspicious transactions, and even the Lahore High Court is experimenting with AI-assisted legal research. Health officials are piloting outbreak forecasting tools, and farmers in Punjab and Sindh are benefiting from early-stage agri-data models. All of this feeds into the Digital Pakistan 2.0 roadmap, which aims to integrate AI into over 25 federal departments by 2028.⁷³⁷
- **National AI Policy Approved With Defined Milestones:**
The government is turning its ambition into action through bold initiatives such as the Digital Nation Pakistan Act and the National AI Policy, both aimed at developing local talent, enhancing smart infrastructure, and accelerating AI adoption. In July this year, the federal cabinet unanimously approved this first-ever AI policy. The policy sets out ambitious targets, including training one million AI professionals by 2030, launching an AI Innovation Fund, supporting 50,000 civic AI projects, and enabling the development of 1,000 locally built AI solutions.⁷³⁸

734 2024 Government AI Readiness Index

735 <https://www.startup.pk/google-ai-futures-fund-2025-a-new-era-for-ai-innovation-in-pakistan/>

736 <https://www.veon.com/newsroom/press-releases/veons-jazz-enters-partnership-to-support-local-language-ai-llm-development-in-pakistan>

737 <https://www.pakuptech.com/blogs/ai-in-pakistans-public-sector-promise-pilots-and-the-path-forward>

738 Federal cabinet approves National AI Policy 2025 - Pakistan - DAWN.COM

- **Pakistan Gains Global Recognition In AI And Tech:**

At the international level, Pakistan made waves at AI Everything Global 2025 in Dubai, showing the world, it is ready to lead in tech innovation. Pakistan has also been named as The Tech Destination of the Year at Gitex 2024.⁷³⁹

- **Digital FDI Hub And AI Applications Launched In Islamabad:**

Islamabad is now home to the world's first Digital FDI hub, making it easier for global tech giants to invest and grow in Pakistan. The National Centre of Artificial Intelligence has already rolled out 221 real-world AI solutions, from healthcare to transport. With USD 800 million raised by local startups, over 600,000 IT professionals, and a booming digital economy, Pakistan is setting the pace.⁷⁴⁰

- **National Taskforce Introduces 10-Year AI Integration Plan:**

The Federal Minister led sessions of the National Taskforce on AI, where he announced a 10-year roadmap aimed at integrating artificial intelligence into 12 critical sectors, including education, healthcare, agriculture, climate, governance, and business.⁷⁴¹

Challenges

- **Infrastructure Deficits:**

AI needs strong internet and powerful computing systems to thrive but in Pakistan, especially in rural areas, digital access is patchy at best. Without reliable connectivity or enough local infrastructure, AI cannot reach its full potential. Building better 5G networks and cloud services is crucial. Currently, too much reliance on foreign tech is holding back local startups and making it harder for homegrown innovation to take off.⁷⁴²

- **Growing Skill Gaps And The Risk Of Job Loss:**

As automation picks up pace, many traditional roles in factories, offices, and customer service are at risk of disappearing. Without strong reskilling efforts, millions of workers could be left behind. Pakistan urgently needs to invest in vocational training and STEM education to help its people adapt to an AI-powered future. But progress is slow: limited funding, weak policy direction, and a lack of large-scale research facilities mean the country is still trailing far behind global AI leaders.⁷⁴³

- **Overreliance On Foreign AI Solutions:**

Right now, Pakistan depends heavily on imported AI technologies that often come with high costs and are not always designed for local realities. This reliance limits the country's ability to build solutions that truly address its own challenges. By investing in local startups, researchers, and homegrown innovation, Pakistan can create more affordable, relevant, and sustainable AI tools shaping a tech future that works for its people.⁷⁴⁴

- **Digital Literacy And Cybersecurity Risks:**

Most citizens in Pakistan still do not have the basic skills needed to navigate or work with AI and emerging technology platforms. At the same time, these platforms are becoming more vulnerable to hacking, data leaks, and even deepfakes posing serious risks to both users and organizations. Without digital literacy and stronger safeguards, the promise of these technologies could quickly turn into a threat.⁷⁴⁵

739 Pakistan named 'Tech Destination'

740 <https://www.thenationalnews.com/advertorial/2025/02/04/pakistan-takes-centre-stage-at-ai-everything-global-2025/>

741 <https://tribune.com.pk/story/2554176/planning-minister-pushes-for-ai-integration-across-key-government-sectors>

742 <https://www.digiit.pk/future-of-ai-in-pakistan-opportunities-and-risks/>

743 <https://www.digiit.pk/future-of-ai-in-pakistan-opportunities-and-risks/>

744 <https://www.digiit.pk/future-of-ai-in-pakistan-opportunities-and-risks/>

745 <https://www.thenews.com.pk/print/1285214-pakistan-s-digital-revolution>

Recommendations

- **Skill Development And Public Awareness:**

To prepare for a tech-driven future, Pakistan must equip its youth with relevant skills by integrating AI, blockchain, VR/AR, and Web 3.0 into the school curriculum from grades 6 to 12 and expanding vocational training. Nationwide digital literacy campaigns targeting young people are essential to spark interest and close the skills gap. Without early and inclusive tech education, Pakistan risks being left behind in the global tech race. Investing now can empower the next generation to lead future innovation.

- **Build Local Infrastructure For AI:**

For Pakistan to truly unlock the potential of the emerging technologies, it needs the right digital infrastructure. This means building high-performance computing clusters, expanding affordable cloud platforms, setting up “Augmented and Virtual Reality” labs in universities and tech parks, and a nationwide 5G rollout that reaches not just major cities but also rural and underserved communities. At present, patchy internet access and lack of advanced computing power hold back innovation, especially outside urban hubs.

By investing in the digital backbone of the country, Pakistan can level the playing field allowing young creators, developers, and startups from all corners of the country to build, scale, and compete in the global digital economy.

- **Create Innovation Funds And Incubators For Local Startups:**

Pakistan’s startup scene has already attracted over USD 800 million in venture capital, yet early-stage founders working on cutting-edge ideas, apps still struggle to find the resources that turn concepts into companies.⁷⁴⁶

A National Emerging Tech Fund could change that story by offering grants, equity-free capital, and dedicated incubation programs. With steady backing and expert guidance, the next wave of innovators would have the runway to experiment, iterate, and eventually scale turning bold ideas into products that create jobs, draw foreign investment, and place Pakistan firmly on the global tech map.⁷⁴⁷

- **Cybersecurity Preparedness For AI Systems:**

As AI systems become more integrated into public services and daily life, they are increasingly vulnerable to misuse, particularly through deepfakes, data breaches, and algorithm-driven fraud. Pakistan currently lacks the regulatory safeguards and skilled cybersecurity workforce needed to address these threats.

To build trust in AI adoption, the government must prioritize cybersecurity readiness, establish clear standards for AI system protection, and enforce accountability for digital threats that compromise public safety.

⁷⁴⁶ <https://www.thenationalnews.com/advertorial/2025/02/04/pakistan-takes-centre-stage-at-ai-everything-global-2025/>

⁷⁴⁷ <https://www.thenationalnews.com/advertorial/2025/02/04/pakistan-takes-centre-stage-at-ai-everything-global-2025/>

Global Case Studies ^{748,749,750}

Kenya's National AI Strategy

In 2025, Kenya unveiled its first National Artificial Intelligence Strategy (2025–2030), a people-first roadmap rooted in ethics, inclusion, and innovation. The plan prioritizes local data sovereignty, cybersecurity, and privacy, aiming to develop AI that reflects Kenya's social and economic realities. Kenya is fostering homegrown innovation in vital sectors like healthcare, agriculture, finance, and public services.

The strategy calls for building national AI infrastructure through public-private partnerships, with a focus on sustainability. While not yet legally binding, it lays the groundwork for future regulation and oversight. Aligned with the African Union's digital goals, Kenya's approach positions AI as a tool for empowerment: transparent, secure, and human-centric. Kenya's people-centered AI strategy highlights how developing countries can shape technology to serve their own needs. Its focus on local innovation, data sovereignty, and public-private collaboration offers a strong model for Pakistan.

To follow suit, Pakistan should promote homegrown AI solutions in key sectors like healthcare, agriculture, and public services, while also aligning with international AI standards (OECD, UNESCO) for ethical and inclusive development. Importantly, Kenya's strategy lays the groundwork for future AI legislation and regulatory oversight, a step Pakistan must also prioritize by accelerating its AI policy and legal frameworks to guide safe and responsible AI adoption.

Kazakhstan's National AI Strategy

In 2025, Kazakhstan launched its first National Artificial Intelligence Strategy, transforming its AI vision into actionable policy backed by draft legislation. The strategy focuses on six pillars such as human capital, infrastructure, data governance, and more to ensure secure, ethical, and inclusive AI development rooted in local needs. A landmark draft bill outlines ethical standards, and clearly defined roles for AI developers and users. Kazakhstan also introduced a Kazakh-language AI model trained on 148 billion tokens to promote linguistic inclusion.

Kazakhstan's National AI Platform now provides datasets, computing resources, and pre-trained models to accelerate innovation. Nearly 2,000 civil servants have already been trained in AI, preparing the public sector for practical adoption. With this coordinated approach, Kazakhstan is positioning itself as a regional leader in responsible and human-centric AI governance. Pakistan could learn from Kazakhstan's model by prioritizing legislative clarity, local language models, and public sector readiness to drive meaningful AI integration.

Kazakhstan's investment in a Kazakh-language AI model underscores the importance of linguistic inclusion. Pakistan should similarly develop Urdu and regional language AI models to widen access and relevance.

748 <https://www.globalpolicywatch.com/2025/04/kenyas-ai-strategy-2025-2030-signals-for-global-companies-operating-in-africa/>

749 <https://www.allaboutai.com/ai-news/kazakhstan-to-launch-national-ai-strategy-in-2025/>

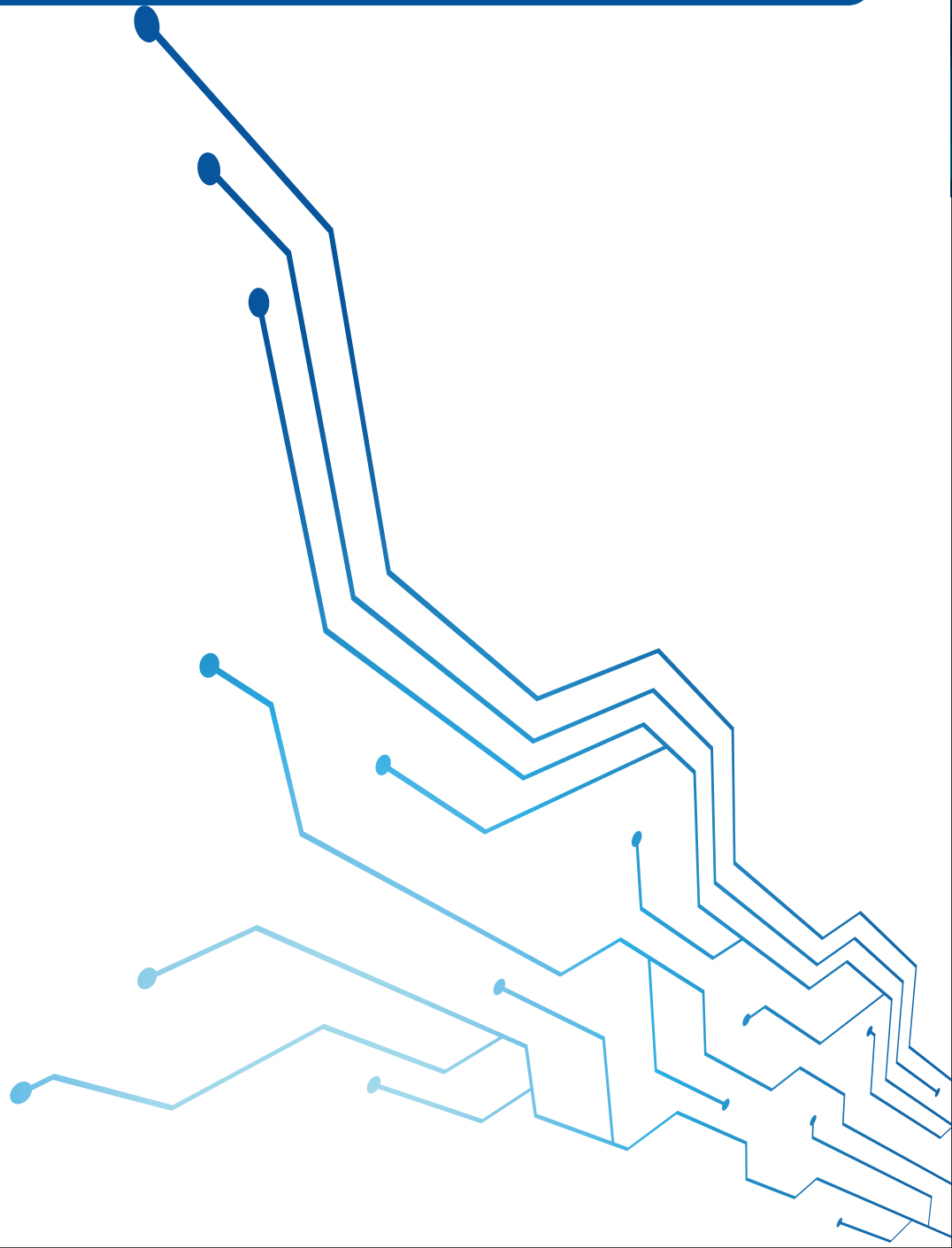
750 <https://www.reuters.com/business/finance/us-uae-multi-billion-dollar-ai-data-campus-deal-far-finalised-sources-say-2025-06-06/>, <https://medium.com/arabianpost/uae-to-embed-ai-in-cabinet-from-2026-4fbc3ebed4>, <https://mbzuai.ac.ae/>

United Arab Emirates: AI Infrastructure

With bold ambition and strategic foresight, the UAE is rapidly positioning itself as a global leader in artificial intelligence. The upcoming Stargate AI campus in Abu Dhabi, covering 10 square miles with 5 GW of power, is set to become one of the world's largest AI hubs.

Backed by G42, Nvidia, OpenAI, and Cisco, it is expected to launch in 2026. Since appointing its first Minister of State for Artificial Intelligence in 2017, the UAE has introduced major initiatives such as the UAE AI Charter, a unified generative AI policy for government, and an AI system certification program. Institutions like MBZUAI now offer AI degrees.

Pakistan should take similar steps by investing in national AI infrastructure, establishing dedicated institutions with ethical oversight, and developing talent through partnerships and public sector training to ensure data sovereignty and sustainable innovation.



Recent Developments

The following are key legislative frameworks and institutional mechanisms that shape Pakistan's digital governance landscape:

- **Data Protection Bill (PDPB):**

The Personal Data Protection Bill (PDPB) 2023 marks a critical step in Pakistan's digital evolution, aiming to foster public trust and promote ethical data practices across sectors. As the country experiences rapid digitalization, spurred by the rise of e-commerce, fintech, and e-governance, the need for an effective legal framework becomes essential to address concerns around identity theft, financial fraud, and surveillance.⁷⁵⁵ The PDPB, aligned with global standards such as the GDPR, is expected to enhance the credibility and international competitiveness of Pakistan's digital services.⁷⁵⁶ However, its effective implementation hinges on inclusivity, regulatory independence, clarity in definitions, and a balanced approach to data localization.

The revised draft has been shared with stakeholders for feedback, which is currently under review, with consultations on key clauses ongoing to ensure a comprehensive and effective legal framework. While the Bill has been approved by the Federal Cabinet, it awaits enactment and final review by an inter-ministerial committee. For the PDPB to succeed, stakeholders emphasize the importance of a rights-based, locally tailored framework that ensures privacy without stifling innovation, laying the foundation for sustainable digital growth.⁷⁵⁷

- **Prevention Of Electronic Crimes Act (PECA):**

The Prevention of Electronic Crimes Act (PECA) 2016 is Pakistan's primary legislation for combating cybercrime and protecting its digital ecosystem. Enacted to address offenses such as cyber harassment, identity theft, online fraud, and unauthorized data access, PECA empowers law enforcement to investigate and penalize cyber offenders while safeguarding citizens' digital rights.⁷⁵⁸

The 2025 amendments have further strengthened the law by introducing clearer definitions, stricter penalties, and establishing key institutions like the Social Media Protection and Regulatory Authority (SMPRA) and the National Cyber Crime Investigation Agency (NCCIA). These reforms aim to tackle emerging threats, including deepfakes and child exploitation, while enhancing legal protections for victims. Although PECA has significantly bolstered digital security and accountability, it continues to face criticism for potential misuse and limitations on free expression.⁷⁵⁹

- **Electronic Transactions Ordinance (ETO) 2002:**

The Electronic Transactions Ordinance (ETO) 2002 provides legal recognition to electronic documents and signatures in Pakistan, ensuring their admissibility in court and exempting them from stamp duty and notarization for an initial period of two years. It also mandates the establishment of a certification council to regulate and accredit electronic services, operating under the Ministry of IT to ensure secure and reliable digital transactions through the approval of cryptographic tools and certificate providers.

⁷⁵⁵ <https://www.thenews.com.pk/tns/detail/1244178-protecting-rights>


⁷⁵⁶ <https://www.uschamber.com/international/submission-on-the-draft-pakistan-personal-data-protection-bill-2023>

⁷⁵⁷ <https://www.nation.com.pk/19-Mar-2025/pakistan-s-personal-data-protection-bill-faces-further-delay>

⁷⁵⁸ <https://www.idealsole.com/peca-2016-cyber-crime-bill-pakistan/>

⁷⁵⁹ <https://rsilpak.org/2025/2025-amendments-to-the-prevention-of-electronic-crimes-act-2016-an-introduction/>

<https://policy-wire.com/prevention-of-electronic-crimes-amendment-act-and-the-cybersecurity/>



The Electronic Certification Accreditation Council (ECAC) plays a key role in fostering trust in digital interactions both locally and internationally.^{760,761} Complementing this, updates to the Qanoon-e- Shahadat Order have enabled the acceptance of digital evidence in legal proceedings, advancing the use of technology in the judicial system and supporting Pakistan's broader digitization agenda. However, to fully realize these benefits, the country still requires clearer digital data management regulations and stronger mechanisms to ensure its authenticity and reliability.⁷⁶²

- **FIA Cyber Crime Wing:**

The FIA Cyber Crime Wing, also known as the National Response Centre for Cyber Crime (NR3C), was established in 2007 to investigate digital offenses and enhance nationwide digital forensic capabilities. Its core functions include probing cyber fraud, hacking, harassment, and crypto-related crimes, alongside offering services such as digital forensics, system audits, and penetration testing.

Despite handling around 92,000 complaints annually with limited resources, the Wing has improved its efficiency through AI-focused training provided by NUST and Digital Waseb.⁷⁶³ From 2020 to 2024, it processed over 639,000 complaints, with around 414,000 verified, demonstrating its crucial role in strengthening public confidence in digital platforms and e-commerce.⁷⁶⁴

In 2025, FIA's cybercrime wing, has officially been dissolved. All responsibilities related to cybercrime investigations and complaints have now been transferred to the National Cyber Crime Investigation Agency (NCCIA). NCCIA arrested dozens involved in IMEI tampering, social media blackmail, and financial scams. The agency has emerged as a specialized national enforcement unit.^{765,766}

Challenges

- **Legal And Regulatory Gaps:**

Pakistan suffers from a fractured and underdeveloped legal regime for data protection, characterized by the absence of comprehensive legislation, ambiguous legal definitions, and a lack of explicit implementation mechanisms. This is further compounded by significant regulatory and approval delays, as evidenced by the long-stalled Personal Data Protection Bill (PDPB), which prevents the establishment of a strong legal framework and leads to significant gaps where data violations can occur without consequence.

Pakistan's governance structures exhibit weaknesses that impede effective data protection, including decentralized policy leading to regional disparities, a lack of coordinated efforts among government organizations, and insufficient training for enforcement staff, all of which undermine the effectiveness of existing laws.

- **Capacity And Infrastructure Challenges:**

Many organizations in Pakistan, particularly SMEs, lack the necessary technological infrastructure, tools, and expertise to effectively implement data security protocols and comply with data protection regulations, exacerbated by insufficient integration of cybersecurity measures.

760 <https://www.dawn.com/news/56846/www.tupernic.com>

761 <https://ecac.gov.pk/message/>


762 <https://www.bsolpk.org/digital-evidence-and-the-administration-of-criminal-justice>

763 <https://pakobserver.net/fia-cyber-crime-wing-enhancing-the-capacity-building-of-their-team/>

764 <https://humenglish.com/pakistan/fias-cyber-crime-wing-receives-over-639000-complaints-in-five-years/>

765 <https://www.thenews.com.pk/print/1298419-formation-of-nccia-an-innovative-step-to-check-cyber-threats>

766 <https://www.brecorder.com/news/40359039>



The financial resources required to implement comprehensive data security protocols pose a significant burden, especially for small and medium-sized organizations, leading to non-compliance due to cost implications and a preference for short-term financial benefits over long-term data protection investments.⁷⁶⁷

- **Public Awareness And Cultural Norms:**

There is a significant lack of public awareness regarding data privacy rights among Pakistani citizens, hindering their ability to protect themselves and hold organizations accountable. Furthermore, prevailing cultural norms often devalue data privacy, leading to social acceptance of data exploitation.

Recommendations

- **Establishing A Comprehensive Legal Framework:**

It is crucial to establish a comprehensive legal framework that clearly defines the rights of data subjects (including access, correction, and deletion), and explicitly outlines the roles and responsibilities of data controllers and processors in safeguarding information.

The legislation must emphasize the importance of consent and give individuals control over their personal data, learning from successful models like General Data Protection Regulations (GDPR) and California Consumer Privacy Law (CCPA) which prioritize user autonomy.

- **Strengthening Oversight And Collaboration:**

Establish an independent body with the power to oversee compliance, enforce regulations, investigate non-compliance allegations, rule on violations, and recommend best practices, free from political or business interference.

Promote coordinated efforts among government agencies, NGOs, the private sector, and citizens to prepare methods for compliance resources and ensure the inclusion of disadvantaged groups.

The government should introduce policies and programs to help organizations, especially SMEs, acquire the necessary cybersecurity tools and expertise. This could include subsidies, tax breaks for data security investments, or partnerships for shared infrastructure.

- **Enhancing Public Awareness And Continuous Improvement:**

Educate citizens about their data privacy rights and how to exercise them, fostering a privacy-sensitive culture and empowering individuals to protect themselves and hold organizations accountable for data mismanagement.

Establish systems for regular review of data protection legislation to ensure its relevance and effectiveness considering continuous technological advancements and the emergence of new data types.⁷⁶⁸

⁷⁶⁷ (PDF) DATA PROTECTION LAWS IN PAKISTAN: CHALLENGES AND OPPORTUNITIES

⁷⁶⁸ (PDF) DATA PROTECTION LAWS IN PAKISTAN: CHALLENGES AND OPPORTUNITIES

Global Case Studies ^{769,770,771,772}

South Korea's AI Framework Act

Set to take effect in January 2026, South Korea's AI Framework Act is the Asia-Pacific region's first comprehensive AI law, adopting a risk-based approach to regulate artificial intelligence. It places stringent requirements on "high-impact AI" used in critical sectors like healthcare, finance, and public services, while allowing flexibility for low-risk systems. The law mandates transparency, including labeling of generative AI content, and applies extraterritorially, requiring certain foreign AI providers to appoint domestic representatives.

Non-compliance may result in fines of up to KRW 30 million (around USD 21,000). Enforcement is overseen by the Ministry of Science and ICT, with the Personal Information Protection Commission managing AI-related data governance. The Act also promotes innovation through public support for AI infrastructure, aiming to position South Korea as a global leader in trustworthy AI.

A risk-based regulatory approach allows for strict oversight of high-impact AI while encouraging innovation in low-risk areas, something Pakistan can adopt to avoid overregulation.

The emphasis on transparency, such as labeling AI-generated content and requiring foreign AI providers to appoint local representatives, underscores the importance of accountability and user awareness. Additionally, integrating AI regulation with data protection governance and investing in national AI infrastructure shows the value of a coordinated and forward-looking strategy. These elements can guide Pakistan in developing effective, trustworthy AI policies.

China's Cybersecurity And Data Governance Enforcement

In 2023, China intensified enforcement of its key digital laws including the Personal Information Protection Law (PIPL), the Data Security Law (DSL), and the Cybersecurity Law (CSL), alongside sector-specific regulations in finance, healthcare, and automotive. Organizations handling core or sensitive data faced stricter requirements, such as mandatory risk assessments and tighter controls on cross-border data transfers. Regulators publicized hundreds of data security violation cases, with penalties ranging from fines to enforced data deletion.

Cybersecurity enforcement also expanded through proposed revisions to the CSL, new breach reporting requirements, and updated standards for risk classification and product testing. Oversight by the Cyberspace Administration of China and the Public Security Bureau increasingly focused on national security and supply chain vulnerabilities.

The implementation of mandatory risk assessments for sensitive data, tighter controls on cross-border data transfers, and sector-specific regulations demonstrate the importance of a proactive, risk-based approach to data governance.

For Pakistan, this shows the need to embed similar safeguards within its upcoming Personal Data Protection Bill. China's emphasis on breach reporting, public enforcement actions, and national security in data oversight highlights the value of coordinated regulatory mechanisms, something Pakistan can adopt by strengthening institutional capacity and aligning cybersecurity and data protection under a unified governance framework.

769 <https://tpf.org/blog/south-koreas-new-ai-framework-act-a-balancing-act-between-innovation-and-regulation/>

770 <https://conventuslaw.com/report/china-data-protection-and-cybersecurity-annual-review-of-2023-and-outlook-for-2024-ii/>

771 <https://tpf.org/blog/south-koreas-new-ai-framework-act-a-balancing-act-between-innovation-and-regulation/>

772 https://www.mayerbrown.com/-/media/files/uploads/tt-conference-decks-2023/unpacking_tt2023.pdf

CHAPTER 6: FOLLOW UP ON 2022'S RECOMMENDATIONS

This chapter tracks the implementation and impact of the recommendations proposed in the OICCI 2022 report, evaluating their progress made as of 2025. It highlights policy actions, private sector developments, and implementation gaps across priority areas.

Chapter 2: Digital Infrastructure And Connectivity

Fiber Optics

Recommendation # 1: Invest In Fiber Optic To Improve Connectivity

Status: Implemented (2022–2025)

Notes: The USF Board approved 10 new projects worth PKR 21 billion to expand digital connectivity across unserved areas of Punjab, Sindh, Baluchistan, and KPK. Three OFC projects worth PKR 7.7 billion will deploy 1,554 km of fiber to connect 187 Union Councils in Punjab and KPK.⁷⁷³

In June 2025, USF approved two OFC projects, worth PKR 5.65 billion, to install 940 km of fiber: 415 km in Sanghar and 525 km in Jhang, covering 113 towns/unions and serving around 2.8 million residents.⁷⁷⁴

Recommendation # 2: Recommendations For The Universal Services Fund

Status: Implemented (2025)

Notes: USF offers subsidies to licensed telecom operators through a competitive bidding process.⁷⁷⁵

The Ministry of IT and Telecommunication (MoITT) through the Universal Service Fund (USF) has approved five broadband services projects, valued at over Rs 1.83 billion will bring 4G services to over 0.965 million residents in 347 unserved and underserved areas across 10 districts.⁷⁷⁶

Recommendation # 3: Reduce Taxes On Fiber Optic, Broadband Users, And USF Funding

Status: Implemented (2023–2024)

Notes: The government cut FED on telecom services from 19.5% to 16% and reinstated a lower 8% withholding tax to improve affordability. It also proposed duty exemptions on fiber imports and deployment to boost 5G rollout, as only 9% of towers are fiber-connected (vs. 40% benchmark). Removing the 5% regulatory duty and retail valuation on essential equipment like batteries aims to cut costs and promote renewable energy in telecom networks.^{777,778}

Recommendation # 4: Financing Schemes And Incentives To Encourage Local Production

Status: In Progress (2025 onwards)

Notes: Pakistan's upcoming National Fiberization Policy, led by the Ministry of IT, aims to expand broadband by connecting 7.5 million homes and achieving 80% fiber coverage in five years. A key priority is boosting local manufacturing of fiber components to cut import reliance and support domestic industry. The policy also promotes private investment, infrastructure sharing, and streamlined approvals. A Project Management Unit will oversee implementation, with the final draft due by end-2025.⁷⁷⁹

773 Universal Service Fund (USF) Annual Report 2023–2024 Iol.cdr

774 USF | Universal Service Fund Pakistan

775 Universal Service Fund (USF) Annual Report 2023–2024 Iol.cdr

776 Ch, Z. U. (2025, June 29). USF approves Rs 7.49b projects to expand digital connectivity to 3.76m residents. Associated Press of Pakistan. <https://www.app.com.pk/national/usf-approves-rs-7-49b-projects-to-expand-digital-connectivity-to-3-76m-residents>

777 ProPakistani. (2023, June 9). Telecom services and packages to get cheaper as govt cuts tax rate in Budget 2023–24. <https://propakistani.pk/2023/06/09/telecom-services-and-packages-to-get-cheaper-as-govt-cuts-tax-rate-in-budget-2023-24/>

778 Shahnawaz, H. (2025, May 9). FY26 Budget: telecom sector seeks 15% withholding tax removal. Pkrevenue.com. <https://pkrevenue.com/fy26-budget-telecom-sector-seeks-15-withholding-tax-removal/>

779 News Desk. (2025, April 21). Pakistan to expand fiber connectivity to 7.5m homes in five years. The Express Tribune. <https://tribune.com.pk/story/2541345/pakistan-to-expand-fiber-connectivity-to-75m-homes-in-five-years>

Handset / Smartphones

Recommendation # 1: Local Manufacturing Of Mobile Phones

Status: In Progress (2024)

Notes: In 2024, local production met 95% of Pakistan's mobile phone demand, a sharp increase from the five-year average of 67% and the eight-year average of 47%, according to Topline Securities. The growth of local manufacturing is strongly supported by Chinese partnerships and is now considered one of the fastest-growing industrial segments within Pakistan's digital economy.⁷⁸⁰

Recommendation # 2: Public Awareness To Improve The Gender Gap

Status: In Progress (2024)

Notes: Telecom companies in Pakistan are advancing digital inclusion for women. Telenor's Khushhal Aangan promotes internet literacy among rural women. Jazz has introduced digital education in 75 girls' schools and partnered with UN Women to enhance financial literacy. Zong 4G, with the Dar-e-Yateem Welfare Trust, set up a digital lab to train orphaned girls in digital skills. The Pakistan Telecommunication Authority (PTA) has undertaken multiple initiatives to support women's digital literacy, skills development, and online safety. It is actively conducting awareness campaigns to promote secure and inclusive digital participation for women across the country.⁷⁸¹

Recommendation # 3: Pre-loaded Applications On Locally Manufactured Smartphones

Status: Not Implemented

Notes: Since 2022, no substantial regulatory action or reform has been introduced in Pakistan regarding pre-loaded applications (also called bloatware) on locally manufactured smartphones.

Recommendation # 4: Reduction In Tax On Low-Cost Smartphones

Status: In Progress (Budget FTY 2025-2026)

Notes: As part of the Digital Pakistan initiative, the Federal Board of Revenue (FBR) introduced tax reductions on smartphones priced at PKR 15,000 or below, aiming to make digital access more affordable for low-income citizens. This policy supports broader efforts to bridge the digital divide by enabling greater use of essential digital services.⁷⁸²

Recommendation # 5: Devise A Mechanism To Encourage Smartphone Financing

Status: In Progress (2023)

Notes: Jazz partnered with Kistpay in January 2023 to offer affordable smartphones on easy, Shariah-compliant installments, starting at PKR 2,243/month. The initiative targets low and middle-income users, especially women and rural communities, supporting Jazz's "4G for All" vision and aligning with UN SDGs on gender equality and digital inclusion.⁷⁸³

780 PT Profit. (2025, February 8). Pakistan meets 95% of mobile demand through local manufacturing in 2024: report. Profit by Pakistan Today. <https://profit.pakistantoday.com.pk/2025/02/08/pakistan-meets-95-of-mobile-demand-through-local-manufacturing-in-2024-report/>

781 ProPakistani. (2024, March 6). Digital Gender Inclusion in Pakistan: Challenges, Opportunities, and Initiatives. Retrieved from <https://propakistani.pk/perspective/digital-gender-inclusion-in-pakistan-challenges-opportunities-and-initiatives>

782 Sarfraz, H. (2025, May 16). FBR reduces smartphone import tax in Pakistan – 2025 update. Mobile Ki Shop. <https://mobilekishop.net/blog/fbr-reduces-smartphone-import-taxes/>

783 Jazz. (2023, January 26). Jazz partners with Kistpay to provide affordable smartphones with easy installments. Retrieved from <https://jazz.com.pk/media-center/detail/jazz-partners-with-kistpay-to-provide-affordable-smartphones-with-easy-installments>

In November 2023, the Ministry of IT finalized a Smartphone Financing Policy to expand digital access through installment-based smartphone ownership, especially for low-income users. Backed by Minister Dr. Umar Saif, the policy proposes safeguards like blocking phones or ID cards of defaulters. While some telecoms raised concerns, microfinance banks showed strong support. The policy builds on existing models like Jazz's Kistpay partnership and aligns with the GSMA's "Smartphone for All" vision.⁷⁸⁴

Internet, Spectrum and Landing Stations

Recommendation # 1: Improvement In Internet Security, The Local Language, And Digital literacy Status: In Progress (2023–2025)

Notes: In September 2023, PTA and TikTok launched a digital safety initiative in 100 government schools across Pakistan. It includes training, educational materials, and awareness videos to promote safe and responsible social media use. Initial sessions were successfully held in Sindh and Gilgit-Baltistan.⁷⁸⁵

Recent amendments to PECA 2016 led to the creation of the Digital Rights Protection Authority (DRPA) under PECA 2024. DRPA will promote online safety, regulate content, and enforce digital rights in collaboration with social media platforms.⁷⁸⁶

The "Internet Dost and Internet Zabardast" project, launched by NRSP in 2023, aims to boost digital literacy for over 100,000 underserved individuals across 48 districts. It focuses on training women, youth, teachers, and parents in internet safety, digital skills, and environmental awareness, helping bridge the digital divide by July 2025.⁷⁸⁷

Recommendation # 2: Focus On Expanding 4G For All Instead Of 5G For A Few Status: Implemented (2024)

Notes: In early 2024, Zong 4G deployed over 400 new sites, particularly along the CPEC route, and completed 1,400 Li-Ion battery power upgrades to enhance coverage and sustainability. In July 2024, Jazz secured a PKR 75 billion loan to expand its 4G network and improve digital services, with a focus on underserved regions. Both initiatives support Pakistan's broader digital inclusion and infrastructure development goals.⁷⁸⁸

By December 2024, the Pakistan Telecommunication Authority (PTA) had extended 4G coverage to 81% of the population, driven by targeted infrastructure initiatives. PTA continues to lead efforts to further expand coverage and enhance service quality, aiming to advance digital inclusion across the country.⁷⁸⁹

Recommendation # 3: Expand The Existing Infrastructure Status: In Progress (2023–2024)

Notes: PTA facilitated the landing of the 2Africa submarine cable in Karachi, set to go live by late 2025. Backed by global partners, it will greatly boost Pakistan's international internet capacity and connectivity.⁷⁹⁰

The Rolling Spectrum Strategy 2020–23 supports telecom infrastructure expansion by enabling timely spectrum allocation, improving LTE, and preparing for 5G rollout, especially in underserved areas.⁷⁹¹

784 Ghulam Abbas. (2023, November 2). <https://www.pakistantoday.com.pk/2023/11/02/it-ministry-unveils-smartphone-financing-policy-to-boost-digital-inclusion/>

785 Institutional Framework for Child Online Protection – The state of children in Pakistan. (n.d.). <https://stateofchildren.com/child-online-protection-in-pakistan/institutional-framework-for-child-online-protection/>

786 Ambassador, N. (2024, June 26). The Evolution of Internet Governance: Shaping Pakistan's Digital future – Nawal Munir Ahmad – NetMission.Asia. <https://netmission.asia/2024/06/27/the-evolution-of-internet-governance-shaping-pakistans-digital-future-nawal-munir-ahmad/>

787 DAWN.COM. (2024, July 27). Project aiming to enhance youth digital literacy launched. DAWN.COM. <https://www.dawn.com/news/1848235/project-aiming-to-enhance-youth-digital-literacy-launched>

788 Zong 4G Pakistan – press releases. (n.d.). <https://www.zong.com.pk/press-release/zong-expands-its-data-network-with-the-addition-of-400-new-4g-sites-in-h1-2024> Correspondent, O. (2024, July 21). Rs75b investment planned for 4G network. The Express Tribune. <https://tribune.com.pk/story/2481406/rs75b-investment-planned-for-4g-network>

789 Arham, M. (2024, December 17). 4G services now accessible to 81% of Pakistan's population: PTA. Envision Pakistan. <https://envisionpakistan.com/4g-services-now-accessible-to-81-of-pakistans-population-pta/>

790 PTA highlights progress on 2Africa Submarine cable system in Pakistan. (2024, December 29). <https://www.pta.gov.pk/category/pta-highlights-progress-on-2africa-submarine-cable-system-in-pakistan-134564199-2024-12-29>

791 Hanif, U. (2020, November 5). Government unveils Rolling Spectrum Strategy 2020 23. The Express Tribune. <https://tribune.com.pk/story/2271055/government-unveils-rolling-spectrum-strategy-2020-23>

Recommendation # 4: Increase Affordability

Status: In Progress (2025)

Notes: USF's core mission is to make Information and Communication Technologies (ICT) accessible to Pakistan's un-served and under-served communities, striving to ensure affordable and widespread broadband availability.⁷⁹² Ignite-National Technology Fund (Ignite) does not focus on affordability but on ecosystem development initiatives to fulfill its mission of creating a knowledge economy in Pakistan.

Recommendation # 5: Auction At Reduced Prices For Infrastructure Development

Status: In Progress (2024-2025)

Notes: The Pakistani government is reforming its spectrum auction policy to speed up 5G deployment. Instead of demanding high upfront fees, it plans to delay spectrum payments, making it easier for telecom companies to invest in infrastructure.⁷⁹³

The government will ensure fair PKR-based spectrum auctions, simplify regulations, and publish a clear roadmap for 5G. It will promote public-private partnerships for infrastructure rollout and collaborate with manufacturers to provide affordable 5G devices for mass adoption.⁷⁹⁴

Recommendation # 6: Allocate More Spectrums For Internet Usage

Status: Implemented (2024-2025)

Notes: The government has released 567 MHz of new spectrum and hired NERA to ensure fair, investment-friendly auction policies. It's addressing legal challenges to keep the 5G rollout and telecom reforms on track.⁷⁹⁵

PTA has opened the 6 GHz band for unlicensed Wi-Fi (Wi-Fi 6E) use, making Pakistan the 10th country in Asia Pacific to do so. This move aims to reduce network congestion and improve internet speed.⁷⁹⁶

PTA's new framework allows free use of 2.4GHz, 5GHz, and 6GHz bands to boost wireless connectivity, support innovation, and align Pakistan with global trends in Wi-Fi and IoT expansion.⁷⁹⁷

Recommendation # 7: Installation Of More Submarine Cables For Growing Demand

Status: In Progress (2023-2026)

Notes: PTCL has landed the 10,000 km Africa-1 submarine cable in Karachi, enhancing Pakistan's connectivity with key global hubs like Saudi Arabia and the UAE. Set to be operational by early 2026, the cable will boost internet capacity and support Pakistan's Digital Vision 2030.⁷⁹⁸ Since 2022, Pakistan has added over 20 Tbps of international bandwidth through new submarine cables. Expansion plans in 2025 include Africa-2 (10 Tbps, landed Dec 2024), SMW6 (6 Tbps, under construction), PEACE (2 Tbps, operational), and MGG-1 (2 Tbps, announced 2023).⁷⁹⁹

792 Universal Service Fund (USF) Annual Report 2023-2024 IoI.cdr

793 Shery, S. (2025, April 10). Govt Considers Zero-Cost Spectrum for 5G Rollout to Fast-Track Pakistan's Digital Future - TEC Spectrum. <https://tecspectrum.com/happenings/govt-considers-zero-cost-spectrum-5g-pakistan/>

794 Hayat, A. (2024, December 30). 5G spectrum auction path towards digital transformation. The Express Tribune. <https://tribune.com.pk/story/2518954/5g-spectrum-auction-path-towards-digital-transformation>

795 ProPakistani. (2025, April 9). Pakistan's average mobile data usage surges ahead of spectrum auction. <https://propakistani.pk/2025/04/09/pakistans-average-mobile-data-usage-surges-ahead-of-spectrum-auction/>

796 PTA announces unlicensed RLAN operation (Wi-Fi 6E) in 6 GHz band in Pakistan. (2024, July 4). <https://www.pta.gov.pk/category/pta-announces-unlicensed-rlan-operation-wi-fi-6e-in-6-ghz-band-in-pakistan-461078335-2024-07-04>

797 Sarfraz, S. (2024, September 25). 'Framework for WLAN-2024 facilitates more accessible connectivity in line with global standards' Breccorder. <https://www.breccorder.com/news/40323777/framework-for-wlan-2024-facilitates-more-accessible-connectivity-in-line-with-global-standards>

798 Khan, N. (2025, February 22). PTCL lands Africa-1 submarine cable in Karachi, enhancing connectivity with Saudi Arabia, other countries. Arab News. <https://www.arabnews.com/node/2591210/pakistan>

799 Mustafa, O. (2025, February 14). Govt plans to expand submarine cable systems - will it be sufficient to meet growing demand? PhoneWorld. <https://www.phoneworld.com.pk/govt-plans-to-expand-submarine-cable-systems-will-it-be-sufficient-to-meet-growing-demand/>

Recommendation # 8: Introduction Of Strict Policies And Penalties For Protecting Underwater Cables Status: Not Implemented

Notes: Pakistan has not introduced any formal, concrete policies specifically aimed at protecting underwater submarine cables, despite their growing strategic and economic importance.

Data Centers

Recommendation # 1: Incentivize Investment In Data Centers

Status: In Progress (2025)

Notes: It also plans tax breaks, customs relief, and other incentives to attract investment in blockchain and AI infrastructure.⁸⁰⁰

Recommendation # 2: Task Force To Facilitate Setting Data Centers

Status: Not Implemented

Notes: No dedicated task force or one-window facilitation for data center development. Cloud First Policy 2022 encourages local cloud infrastructure but lacks a dedicated data center task force.

Recommendation # 3: Development Of Skilled Labor Workforce

Status: Implemented (2025)

Notes: Under the PM Youth Skill Development Program, Virtual University is offering 3-month training courses to computing students, equipping them with practical skills and real-world tech industry exposure.⁸⁰¹

NAVTTTC's course on Networking and Cloud Computing offers structured, industry-focused training under the government's skill development drive.⁸⁰²

Recommendation # 4: Increasing Cyber-security Of Data Centers

Status: Implemented (2023)

Notes: In December 2023, PTA launched its Cyber Security Strategy to protect critical telecom infrastructure and counter emerging threats.⁸⁰³

PTA's Cyber Security Framework under CTDISR mandates licensees and auditors to report data breaches and cybercrimes, strengthening cybersecurity risk management. The National Telecom Security Operations Centre (NTSOC) enhances telecom infrastructure security by coordinating with operators and emergency teams to counter cyber threats.⁸⁰⁴

Chapter 3: E-Governance And Private Sector Initiatives

E-Governance

Recommendation # 1: Improve The Efficiency And Efficacy Of E-government Services By Investing In Human Capital

Status: In Progress

Notes: The government has approved the Digital Nation Pakistan Act 2024 to establish the autonomous Pakistan Digital Authority, aimed at advancing digitization and e-governance under the "Digital Pakistan" initiative.⁸⁰⁵ Digital Nation Pakistan Act 2025 provides budgetary allocations for IT projects in PSDP FY2025-26.⁸⁰⁶ Initiatives like e-Office and e-Filing and Office Automation System (e- FOAS) aim for paperless environments.

⁸⁰⁰ Pakistan govt allocates 2,000MW power for Bitcoin mining, AI data centres

⁸⁰¹ TRAINING OPPORTUNITIES UNDER THE PRIME MINISTER'S YOUTH SKILL DEVELOPMENT PROGRAM ⁸⁰² NetworkandcloudcomputingHourlyCourseoutlines.pdf

⁸⁰³ Cyber security Pakistan Telecommunication Authority (PTA) - Ideal Solutions Cyber Security Company

⁸⁰⁴ The developing cybersecurity framework in Pakistan | International Bar Association

⁸⁰⁵ Govt to dissolve National IT Board, set up new body

⁸⁰⁶ 1738057563_368.pdf

Recommendation # 2: Improve Consumer Access To E-government Services

Status: Implemented

Notes: Increased collaboration between local system integrators and global cloud platforms. Government engages industry stakeholders to encourage infrastructure investment. OICCI continues engagement.^{807,808}

While AI integration is growing in businesses, there is no specific mention of speech-to-text for public service translation.⁸⁰⁹

Recommendation # 3: Provide Sufficient Funds To Develop Infrastructure, Whilst Keeping Prices Of Services Affordable.

Status: In Progress

Notes: Despite programs like Sehat Sahulat, Ehsaas subsidies, and free public education, access remains uneven due to limited coverage, funding gaps, and quality concerns, especially in rural areas. The initiative remains in progress as of 2025.⁸¹⁰

In Pakistan, platforms like NADRA, FBR's IRIS, and PSCA support digital services, with NADRA aiding identity verification and FBR enabling online tax filing. However, many initiatives still operate in silos, lacking integration. As of 2025, implementation is ongoing and requires stronger coordination for full effectiveness.^{811,812}

Recommendation # 4: Ensure Stable Access To The Internet, Whilst Promoting Effective Cyber-Security Measures

Status: In Progress (Dec 2024 to onwards)

Notes: Pakistan is set to establish a National Cyber Security Authority by 2025 to streamline and enhance cybersecurity governance across sectors.⁸¹³ These structured training programs are currently being implemented, covering core public institutions. While there's strong momentum, regular mandatory training for all employees isn't yet universal.⁸¹⁴

Recommendation # 5: Create A Centrally Connected And Capable Network Infrastructure

Status: In Progress

Notes: Under its Cloud First Policy approved in February 2022, Pakistan introduced cloud computing to centralize data and improve public service delivery. A dedicated Cloud.⁸¹⁵ NTC in Pakistan offers shared intranet and cloud services to government bodies. It supports inter-ministerial digital communication and data centralization.⁸¹⁶

807 Pakistan Cloud First Policy - TechJuice

808 Tech Destination Pakistan | GITEX GLOBAL 2025

809 Pakistan Drives Digital Growth with New AI and Cloud Policies

810 <https://profit.pakistantoday.com.pk/2025/06/30/confusion-deepens-over-sehat-card-as-punjab-halts-uhi-in-public-hospitals-but-says-health-coverage-continues/#:~:text=Conflicting%20signals%20have%20emerged%20from%20the%20Punjab,across%20the%20province%20from%20June%2030%2C%202025.&text=The%20programme%20will%2C%20however%2C%20remain%20in%20effect%20at%20empaneled%20private%20hospitals.>

811 NADRA's digital solutions empowering Pakistan's e-government initiatives | Biometric Update 812 Govt proposes Rs13.5 bn for IT projects in PSDP 2025-26 - Profit by Pakistan Today

813 'Cyber security authority to be set up by 2025' - Pakistan - Business Recorder

814 PKCERT - The National CERT of Pakistan

815 Pakistan Drives Digital Growth with New AI and Cloud Policies

816 Govt depts told to shift websites to NTC to avoid possible cyber attacks - Pakistan - DAWN.COM

Digital Financial Services And Fintech

Recommendation # 1: Tax Incentives For Merchants To Adopt Electronic Payments

Status: In Progress

Notes: The Finance Act 2025 introduces withholding tax on digital transactions, aiming to formalize digital payments rather than offer direct tax breaks. The NFIS 2024–28 supports this by promoting secure digital services like Raast merchant payments and QR codes.^{817,818}

Recommendation # 2: Improved Regulatory Framework

Status: In Progress (2024 – 2028)

Notes: SBP plans major regulatory reforms in 2025 for fintech, shifting towards flexible, data-centric guidelines.⁸¹⁹ NFIS 2024–28 includes plans for open banking framework, digital banks, and enhanced regulatory coordination.⁸²⁰

Recommendation # 3: Creating An Environment For Fintech To Work Independently

Status: In Progress (2021 – 2025)

Notes: E-Commerce Policy 2.0 and broader Raast participation aims to enable independent fintech operations.⁸²¹

SBP's Raast Participation Criteria facilitate broader integration of non-bank financial institutions.⁸²² NADRA is modernizing identity verification, crucial for digital KYC. While direct "relaxed requirements" are not specified, improved systems can facilitate fintech access.⁸²³

Recommendation # 4: Expedite Establishing Fintech Facilitation Center

Status: In Progress (2024 – 2028)

Notes: SBP plans an Innovation and Fintech Hub in Karachi. Existing incubation centers and tech parks also provide support.^{824, 825} SBP's active regulation and the new NFIS 2024–28 demonstrate ongoing engagement and collaboration with fintech.⁸²⁶

Recommendation # 5: Incentivize Financial Inclusion

Status: In Progress (2024 – 2028)

Notes: SBP launched NFIS 2024–28 to increase financial inclusion to 75% by 2028, leveraging digitalization.⁸²⁷ Government policies aim to foster economic growth and attract investment. NFIS 2024–28 encourages partnerships with FinTech, and broad tax reforms may indirectly benefit the sector.^{828,829}

817 download1.fbr.gov.pk/Docs/2025629106147620FinanceAct2025.pdf

818 SBP sets 75% financial inclusion target under National Strategy 2024–28 – Profit by Pakistan Today 819 Digital Business Laws and Regulations Report 2025 Pakistan

820 SBP sets 75% financial inclusion target under National Strategy 2024–28 – Profit by Pakistan Today 821 draft-e-Commerce-Policy-2025-30-for-stakeholders.pdf

822 External Relations Department

823 New NADRA ID card rules redefine biometrics, mandate birth registration with Union Councils | Biometric Update

824 2025 Startup Grants & Loans in Pakistan: What You Need to Know Now |

825 SBP sets 75% financial inclusion target under National Strategy 2024–28 – Profit by Pakistan Today

826 SBP sets 75% financial inclusion target under National Strategy 2024–28 – Profit by Pakistan Today

827 SBP aims to achieve 75% financial inclusion by 2028 – Business & Finance – Business Recorder

828 download1.fbr.gov.pk/Docs/2025629106147620FinanceAct2025.pdf

829 SBP sets 75% financial inclusion target under National Strategy 2024–28 – Profit by Pakistan Today

Agri Tech

Recommendation # 1: Farmers Digital Education Program

Status: In Progress

Notes: Government efforts prioritize rural development, education, and skills training. National Rural Support Program are involved in human resource development and IT for poverty alleviation in rural areas. Private companies also engage in farmer education.⁸³⁰ Climate Smart Projects (2020–2025) are empowering rural farmers through mobile training units, promoting on-site learning of sustainable practices like soil health improvement and water conservation in cotton farming.⁸³¹

Recommendation # 2: Incorporating Agri-entrepreneurship Courses In Agricultural Education

Status: Implemented

Notes: Pakistani agricultural universities, such as the University of Agriculture, Peshawar, offer Agribusiness Management degree programs. The University of Agriculture Faisalabad (UAF) actively fosters entrepreneurship among its students across various agricultural disciplines. The Higher Education Commission (HEC) has also endorsed new Food Systems Transformation-related courses to equip graduates with interdisciplinary skills relevant to agricultural innovation and problem-solving.^{832,833,834}

Recommendation # 3: Launching Low-Interest Loans For Farmers

Status: In Progress

Notes: The Prime Minister's Youth Business and Agriculture Loan Scheme (PMYB and ALS) is actively providing low-interest and zero- mark-up loans for agricultural ventures as of 2025. This scheme offers interest-free loans up to PKR 500,000 (Tier 1) and subsidized rates (5–7% for Tiers 2 and 3) for larger amounts, specifically targeting farmers. The State Bank of Pakistan's circulars for 2025 confirm the ongoing inclusion and active status of this scheme.^{835, 836}

Recommendation # 4: Dedicated Cell For AgriTech Startups

Status: In Progress

Notes: National bodies like Ignite support AgriTech through incubators, innovation grants, and international exposure. Government programs also provide grants and subsidies to boost agricultural innovation.^{837,838}

830 PID

831 Wheels of Change: How Climate-smart mobile Training is reaching farmers in Pakistan - WWF and IKEA partnership 832 The University of Agriculture, Peshawar

833 <https://www.hec.gov.pk/english/scholarshipsgrants/TAG/Pages/Objectives.aspx>

834 <https://www.hec.gov.pk/english/services/universities/RevisedCurricula/Documents/2013-2014/agronomy.pdf>

835 How to Get 500000 Loan for Business in July with Easy Installment & Zero Markup

836 State Bank of Pakistan

837 Agriculture Startup Funding & Agritech Funding 2025

838 Ignite Showcases 10 Promising Pakistani Startups at LEAP 2025 | Ignite | National Technology Fund

Recommendation # 5: Building Incubation Support For Rural Pakistan

Status: In Progress

Notes: Pakistan's startup ecosystem supports AgriTech through incubation centers like NICs, Plan9, and The Nest I/O, offering mentorship, funding, and networking. Though city-based, they back ventures impacting rural agriculture, aligning with the government's push to modernize farming.^{839,840}

EdTech

Recommendation # 1: Phased-Wise Digitization Of The Education Sector

Status: In Progress

Notes: Efforts are underway to digitize the education sector, including digital learning initiatives and infrastructure development. Organizations are engaging EdTech partners to create child-friendly digital content, especially for rural learners, to bridge learning gaps and make content more engaging.^{841,842}

Recommendation # 2: Awareness Campaigns

Status: In Progress

Notes: Pakistan is developing its first National Media and Information Literacy Strategy, aiming to raise awareness about digital literacy. NGOs and community-level efforts contribute to mindset change regarding digital learning, especially in rural areas.^{843,844}

Recommendation # 3: Capacity Building

Status: In Progress

Notes: Teacher training in digital tools and e-learning technologies is a recognized need and is being implemented by organizations. There's also an emphasis on upgrading computer labs in government institutions and promoting public-private partnerships for such investments to improve ICT infrastructure.⁸⁴⁵

Recommendation # 4: Financial Support

Status: In Progress

Notes: Pakistan's growing tech industry is attracting investment and government-led programs support startups, including in EdTech. National Incubation Centers (NICs) provide local funding and support to innovative EdTech startups. Tax incentives, such as those provided for IT exports and startups, can also encourage the growth of the EdTech sector.^{846,847}

839 Pakistan Budget 2025-26: What's New for Agriculture?

840 Transforming Agriculture Startups in Pakistan | The Agricultural Economist

841 Education in Pakistan | Where We Work | Global Partnership for Education

842 Digital Literacy Programme (DLP) - The Citizens Foundation (TCF)

843 Digital Literacy Programme (DLP) - The Citizens Foundation (TCF)

844 UNESCO Engages Policymakers to Shape Pakistan's First National Media

845 <https://www.hec.gov.pk/english/NAHE/CDP/Pages/Online-Teaching-Level-1.aspx>

846 Pakistan's Tech Industry Enters a New Era of Innovation and Growth

847 Govt proposes Rs13.5 bn for IT projects in PSDP 2025-26 - Profit by Pakistan Today

Health Tech

Recommendation # 1: Leadership And Prioritization By The Government

Status: In Progress

Notes: The Pakistani government is actively progressing in digital health prioritization, evidenced by the National Health Vision 2025 and the broader Digital Sector Roadmap 2025–2035, which also incorporates AI integration into healthcare.

E-health departments and a national E-Health regulatory authority are not explicitly established.^{848,849}

Recommendation # 2: Phase-Wise Approach

Status: In Progress (2022–2030)

Notes: Telemedicine services are seeing significant growth such as EZ Shifa's "Digital Clinic" initiative, supported by the Federal Minister for Health. Pakistan's healthcare sector is adopting digital workforce tools like telemedicine and virtual training, enhancing service delivery through remote collaboration.^{850,851}

Recommendation # 3: National Electronic Health Record With Better Data Security

Status: In Progress

Notes: Pakistan has launched a National Digital Health Records System under the "One Patient One ID" initiative, using CNICs as permanent medical record numbers to unify healthcare data. The rollout has begun in Islamabad hospitals, aligning with OICCI's recommendation for national electronic health records.⁸⁵²

Cloud

Recommendation # 1: Focus on Whole-of-Government Policies And Practices

Status: In Progress (2022–2025)

Notes: A Cloud Office has been set up under MoITT to implement the Pakistan Cloud First Policy, including accrediting Cloud Service Providers (CSPs) for public sector use. The accreditation ensures CSPs meet international standards for security, reliability, and compliance to protect government data.⁸⁵³

848 Unlocking potential: legal and regulatory dynamics in Pakistan's digital health industry | International Bar Association

849 Pakistan Television Official Web Portal

850 EZ Shifa's telemedicine initiative set for nationwide rollout - Profit by Pakistan Today

851 7 Digital Transformation Trends Reshaping Pakistan's IT Landscape in 2025 - Averox Pakistan

852 Pakistan Launches National Digital Health Records System and Enhanced Biometric ID App

853 Govt formulates accreditation criteria for cloud service providers - Pakistan - Business Recorder

Recommendation # 2: Building A Smart Nations Platform And Increasing Public Trust

Status: Smart Nations Platform: Not Implemented
Data Governance Framework: In Progress

Notes: Pakistan has launched smart city projects like Safe City in major cities, but a unified Smart Nation Platform is not yet in place. However, progress in data governance includes the Personal Data Protection Bill and the planned National Cyber Security Authority to improve data security and public trust.^{854,855}

Recommendation # 3: Data Portability And Consistency

Status: In Progress

Notes: Pakistan is aligning with global standards through the National Digital Health Framework 2022–2030, though regulatory gaps remain due to varying provincial laws like the Sindh Telemedicine Act 2021. Still, sensitive sectors are adopting cloud security that meets both local and international norms.⁸⁵⁶

Recommendation # 4: Support Local Cloud Service Providers

Status: In Progress

Notes: Pakistan's cloud ecosystem is expanding with initiatives like Zong's "Z SAIS Cloud" launched in May 2025 and a rise in local cloud consulting firms. However, the Finance Bill 2025–26 lacks clear provisions on subsidies or tax incentives for local cloud providers to strengthen data protection and cybersecurity.^{857,858}

Recommendation # 5: Integration Of Government Databases

Status: In Progress

Notes: Pakistan's Cloud First Policy is driving database integration to boost e-governance. With support from data protection laws and a planned Cyber Security Authority, key agencies like NADRA and FBR are being prioritized, NADRA's data is already used in the National Digital Health Records System.^{859,860}

E-Commerce

Recommendation # 1: Encourage International E-Commerce Companies To Set Up Regional Offices In Pakistan

Status: In Progress

Notes: Amazon and Alibaba operate in Pakistan, aiding digital commerce growth. The government has recently implemented the Digital Foreign Direct Investment Initiative to promote foreign investment. Further events like DFDI Forum 2025 and ITCN Asia are being hosted to attract international e-commerce players.^{861,862}

854 Rs4.9 billion approved for Gwadar Safe City Project (Phase-1)

855 CYBER SECURITY ADVISORY CIRCULAR 10 of 2025 – SECP

856 Unlocking potential: legal and regulatory dynamics in Pakistan's digital health industry | International Bar Association 857 Zong launches local cloud platform - Business - DAWN.COM

858 Finance Bill Tax Commentary 2025-26

859 <https://www.egov4dev.org/success/case/nadra.shtml>

860 <https://tribune.com.pk/story/1820521/centralised-database-system-critical-step-towards-digital-pakistan>

861 ITCN ASIA

862 Pakistan to Host the Digital Foreign Direct Investment (DFDI) Forum 2025 on April 29-30 - Pakistan Tech Destination Of The Year

Recommendation # 2: Support And Incentivize E-Commerce

Status: In Progress

Notes: Government-backed incubators like the National Incubation Center support e-commerce startups, while programs like Kamyab Jawan offer loans and training. Though specific tax subsidies for Amazon sellers are not detailed, various public and private initiatives promote digital skills and support e-commerce entrepreneurs.^{863,864}

Recommendation # 3: Support Startups And Initiatives Aimed At Digitizing SMEs

Status: In Progress

Notes: The government, with private partners like Alibaba, is supporting SME digitalization through training programs (like the recent "SMElevate") to help SMEs gain skills to compete in the global marketplace.⁸⁶⁵

Further, a recent e-Commerce Policy 2.0 (2025–2030) emphasizes streamlined onboarding for MSMEs, including assistance with digital payments, logistics, and platform access.⁸⁶⁶

While direct offerings like subsidized hosting or website templates are not clearly detailed, efforts to boost SME e-commerce adoption through partnerships and training are ongoing.

Recommendation # 4: Enhance Cybersecurity And Increase Digital And Financial Literacy

Status: In Progress (2021- onwards)

Notes: Pakistan has made meaningful progress on cybersecurity in 2025, although key elements of the national framework are still evolving. Notably, a National Cyber security authority is set to launch by 2025.⁸⁶⁷ Government agencies are rolling out a National Cybersecurity Strategy with AI-driven threat detection, mandatory cybersecurity training for officials, and regular cyber drills.⁸⁶⁸

Digital and financial literacy efforts are active, though their long-term impact depends on consistent efforts and outreach beyond national events.

Recommendation # 5: Improve Internet Infrastructure To Expand Access And Lower Costs

Status: In Progress

Notes: Pakistan is expanding internet services in rural areas through the Universal Service Fund initiatives⁸⁶⁹ and National Financial Inclusion Strategy are aiming to lower costs and improve access via partnerships.⁸⁷⁰

Export Of IT And IT-Enabled Services

Recommendation # 1: Training And Capacity Building

Status: In Progress (2022-2025)

Notes: Pakistan promotes digital skills through programs like the PM Youth Skills and PITB Freelance Training. IT incubators support startups in major universities, and short-term tech courses are growing. However, tech parks in remote areas remain limited.⁸⁷¹

863 Ignite-Sponsored Startups Showcase Innovation at Expand North Star GITEX 2024 Dubai | Ignite | National Technology Fund

864 NFTP | National Freelance Training Program

865 (14) Post | LinkedIn

866 draft-e-Commerce-Policy-2025-30-for-stakeholders.pdf

867 Pakistan to Establish National Cyber Security Authority by 2025 - CSO Pakistan

868 PSS6.pdf

869 USF | Universal Service Fund Pakistan

870 sbp.org.pk/spd/Strategicic.pdf

871 Prime Minister's Youth Skill Development Program (PMYSDP) - NAVTTC

Recommendation # 2: Reduce Custom And Import Duties On Computers And Laptops

Status: In Progress (2025)

Notes: Pakistan Customs has issued Valuation Ruling No. 2000/2025 to reduce duty and tax rates on old and used computers and laptops, aligning them with current market trends. However, duties on new computers remain high, meaning broader digital-access affordability goals remain partially fulfilled, rather than fully.^{872,873}

Recommendation # 3: International PR

Status: In Progress

Notes: At present, PR and branding efforts are fragmented and event based. While Pakistan launched a centralized portal to register freelancers and IT companies, there is no evidence of a comprehensive, regularly updated public database actively marketed on social media between 2023 and 2025. Promotion efforts have remained limited to official platforms like PSEB, TDAP and MoITT.

Recommendation # 4: Innovation Grants And Other Incentives

Status: In Progress (2025)

Notes: Pakistan is boosting research and development in AI, machine learning, big data, blockchain, and software through initiatives such as the Special Technology Zones Authority (STZA), Ignite funding programs, and the National Centre of Artificial Intelligence (NCAI). These efforts offer tax benefits, research grants, and tech incubators. Policies like the Digital Pakistan Policy aim to showcase Pakistani talent globally.⁸⁷⁴

Recommendation # 5: Promote The Role Of Women In Export

Status: In Progress (2022-2025)

Notes: Key initiatives are underway to promote women inclusion in IT, but broader scale and structured rollouts are still needed. Pakistan launched initiatives like the USF "Girls in ICT" program and MoITT-backed scholarships to train and empower thousands of women in digital skills and ICT. These efforts provided labs, training, and awareness campaigns to boost female participation in tech education and entrepreneurship.^{875,876}

Overall Start-up Ecosystem And The Role Of Accelerators And Incubation Programs

Recommendation # 1: Regulatory and Tax Framework For Startups

Status: In Progress

Notes: Pakistan has taken steps to address the 2022 recommendations for startup-friendly regulation and tax support: IT startups registered with the Pakistan Software Export Board (PSEB) now have a three-year income tax exemption under the Income Tax Ordinance.⁸⁷⁷ Though there has been implementation of tax relief for early-stage and PSEB-certified startups, broader regulatory hurdles especially around M and A, remittance, and KYC remain unresolved.

872 Pakistan sets new customs valuation for used computers, laptops

873 Customs Valuation Directorate reduces import duties on used computers, accessories - Profit by Pakistan Today

874 Ahsan Iqbal launches national AI fund, unveils 10-year roadmap for tech-driven development - Profit by Pakistan Today 875 Digitalisation & Women in Pakistan - NCSW Report 2023 FINAL 15-05-2023.cdr

876 IT experts stress on empowering w2omen

877 Startup Taxes & Compliance in Pakistan 2025 | PakAccountant Guide

Recommendation # 2: Partner Local Banks With Foreign Investors

Status: Not Implemented

Notes: While foreign banks operate in Pakistan and the State Bank of Pakistan (SBP) plays a role in facilitating foreign investment in the financial sector, there is no explicit public policy or initiative encouraging local banks to open operations with HoldCo's foreign banks with relaxed regulatory requirements after a single SBP approval for smooth fund flow.

Recommendation # 3: A Sustainable Model To Encourage Private Investment From Expats

Status: In Progress

Notes: The NIC supports local startups, and SBP enables overseas investments via Roshan Digital Account. While this model primarily supports personal banking and investments, a dedicated NIC portal for expat startup investment is not yet available, and SBP coordination or KYC simplification specific to startup funding remains undeveloped.⁸⁷⁸

Recommendation # 4: Create A One-Window Operation

Status: In Progress

Notes: Pakistan Single Window (PSW) is a digital platform streamlining cross-border trade by enabling traders to submit all regulatory documents through a single-entry point, reducing time, cost, and reliance on manual processes.⁸⁷⁹

Recommendation # 5: Promote Female Startups And Bridge The Gender Gap.

Status: In Progress

Notes: Ignite and NICs female entrepreneurs and efforts are underway to boost women's IT education. However, formal diversity training for VCs and exclusive government incubators or grants for women founders are not yet widespread or clearly defined.⁸⁸⁰ IFC's investment in Pakistan's first female-led venture capital fund aims to boost early-stage startups and drive innovation amid ongoing economic and political challenges. Funds like i2i Ventures play a key role in closing the financing gap through early investment and support.⁸⁸¹

Recommendation # 6: Creating Sector-Specific Programs

Status: In Progress

Notes: Pakistan is advancing techsectors like Fintech, Blockchain, and AI through targeted policies and funds. While separate government-run incubators for each sector are not common, existing incubators offer specialized support. Industry-academia collaboration is growing, led by HEC, SECP, and NIC to align research with industry needs.⁸⁸²

878 <https://www.sbp.org.pk/rda/index.html>

879 Pakistan Single Window

880 <https://www.pasha.org.pk/publications/bridging-the-gender-gap-in-entrepreneurship/> 881 The Pioneering Women Shaping Pakistan's Startup Ecosystem

882 MoITT to Formulate Pakistan's First Blockchain Policy

Chapter 4: Web 3.0

Block Chain

Recommendation # 1: Government Policy

Status: In Progress

Notes: A draft regulatory framework for virtual assets was initiated in June 2025 to align with FATF guidelines. In July 2025, the federal cabinet approved the Pakistan Virtual Assets Regulatory Authority (PVARA) to license and oversee VASPs nationwide.^{883,884}

Recommendation # 2: Talent Nourishment

Status: Implemented

Notes: A large scale blockchain education initiative was launched in 2025 to train 80,000 students and 300 faculty across 20+ universities. Institutions like UMT (through a Binance MoU) and High-Impact IT Institutes are offering certifications, hackathons, and bootcamps to bridge academic-industry gaps and build the country's largest blockchain talent pipeline.^{885,886,887}

Recommendation # 3: Awareness Campaigns

Status: Not Implemented

Notes: No large-scale awareness campaigns were led for Blockchain, especially to SMEs.

Recommendation # 4: Investments In Blockchain Startups

Status: Not Implemented

Notes: No significant investment in Blockchain Startups.

Recommendation # 5: Research And Development (R&D)

Status: Not Implemented

Notes: No grants are being issued for R&D blockchain.

Recommendation # 6: Taxation

Status: Not Implemented

Notes: No specific exemptions for Blockchain Projects.

883 PR No. 06 Finance Minister Chairs Meeting of Pakistan Crypto Council Islamabad

884 Cabinet formally approves summary of PVARA - Pakistan - Business Recorder

885 Binance Academy, IT Ministry partner to advance blockchain education in universities

886 IT ministry, Binance Academy launch nationwide blockchain education drive | The Express Tribune

887 IT Ministry to launch Data Science, AI and Blockchain courses at Islamabad colleges

Digital Currencies

Recommendation # 1: Development Of Regulatory Framework

Status: In Progress

Notes: To strengthen oversight of the crypto sector, Pakistan established the Pakistan Virtual Assets Regulatory Authority (PVARA) in 2025. Once operational, PVARA will license and regulate Virtual Asset Service Providers (VASPs), enforce anti-money laundering (AML) protocols, address cybersecurity risks, and ensure compliance with FATF and international standards.⁸⁸⁸

Recommendation # 2: National Cryptocurrency Policy

Status: In Progress

Notes: As of March 2025, Pakistan is actively developing a national cryptocurrency strategy under the Pakistan Crypto Council. To regulate cryptocurrency.⁸⁸⁹

Recommendation # 3: Taxation

Status: In Progress

Notes: Capital Gains Tax is set at 15% on crypto profits in 2025, as pressed by the IMF and PCC.⁸⁹⁰ In 2025, the FBR was stricter in regulations, using blockchain tools and exchanges KYC to track crypto trades

Recommendation # 4: Provide A Conducive Environment To Encourage Foreign Investments

Status: Not Implemented

Notes: No major exchanges like Binance or Coinbase has been officially invited or licensed in Pakistan. While the Crypto Council's creation is a foundation, no formal licensing framework or foreign-exchange partnership has been launched.

Recommendation # 5: Awareness Campaigns

Status: In Progress

Notes: Crypto awareness in Pakistan has primarily remained limited to small-scale and university-level initiatives. Most efforts have been led by academic institutions in partnership with private sector players like Binance, focusing on student training, workshops, and blockchain literacy, rather than large-scale public awareness campaign.⁸⁹¹

888 <https://cointelegraph.com/news/pakistan-launches-crypto-regulator-digital-assets>

889 <https://www.dawn.com/news/1897964/govt-formally-announces-council-to-regulate-cryptocurrency>

890 <https://coinformania.com/crypto-taxation-in-pakistan-a-complete-guide/>

891 <https://cryptorank.io/news/feed/a8257-binance-pakistan-partner-blockchain-education>

Artificial Intelligence, Non-Fungible Tokens And the Metaverse

Recommendation # 1: Introduce Regulations For NFTs.

Status: In Progress

Notes: Pakistan is advancing virtual asset regulation with licensing and AML efforts and drafting a framework but has not set specific advertising rules for NFTs yet. The Pakistan Crypto Council is working on a framework to regulate NFTs, including licensing, AML compliance, and creating an independent regulator to ensure transparency and innovation.⁸⁹² The regulations specifically NFTs, AI etc. are still in the initial drafting process.

Recommendation # 2: Create An AI Policy To Supplement Human Development And Decision Making With The Help Of Advanced Algorithms.

Status: Implemented

Notes: Pakistan's AI policy aims to create a hybrid intelligence ecosystem that values human intelligence alongside AI, promoting responsible, transparent, and equitable use. It emphasizes empowering public servants with AI tools for decision support, prioritizes upskilling, education integration, innovation, and ethical AI development with strong data privacy and transparency safeguards.⁸⁹³

Recommendation # 3: Create Metaverse Standards.

Status: Not Implemented

Notes: Pakistan has not yet established formal metaverse standards. Current efforts are mainly exploratory and focus on developing preliminary frameworks for understanding metaverse use, remaining largely experimental rather than official regulations.

Chapter 5: Digital Regulations

Digital Regulations

Recommendation # 1: Promote Greater Awareness Surrounding The Existence Of Laws Such As PECA

Status: In progress

Notes: Pakistan's PECA 2016 combats cybercrimes and protects digital rights. In March 2025, the first major online harassment conviction under PECA resulted in an 11-year prison sentence, highlighting Pakistan's strong action against digital abuse.⁸⁹⁴ There is still plenty of room to grow in raising the awareness of citizens' online rights currently in Pakistan.

892 Government of Pakistan, Ministry of Finance. (2025, June 2). Press Release titled: Pakistan Crypto Council Meeting on Draft Regulatory Framework for Digital Assets. Retrieved from https://www.finance.gov.pk/press_releases.html

893 Government of Pakistan, Ministry of IT & Telecom. National Artificial Intelligence Policy: Consultation Draft V1. Islamabad, 2024. Available online: <https://moitt.gov.pk/SiteImage/Misc/files/National%20AI%20Policy%20Consultation%20Draft%20V1.pdf>

894 <https://www.samaa.tv/2087330981-first-major-conviction-under-peca-eleven-year-sentence-for-online-harassment>

Recommendation # 2: Improved Regulatory Frameworks For Fintech.

Status: Not Implemented

Notes: There are certain factors still hindering the full potential of fintech in Pakistan such as the absence of clear regulations around data privacy and security as evidenced by the delay in approving the Personal Data Protection Bill.⁸⁹⁵

Recommendation # 3: Ensure Coordination Amongst Regulators.

Status: Implemented

Notes: Recently approved Digital Nation Pakistan Act 2025 establishes the Pakistan Digital Authority and National Digital Commission, mandating collaboration across federal and provincial agencies to harmonize digital governance and infrastructure deployment.

895 <https://ipripak.org/wp-content/uploads/2024/07/fintech-updated-final-rc.pdf>

GLOSSARY

4G	Fourth Generation	DeFi	Decentralized Finance
3G	Third Generation	DEI	Diversity, Equity And Inclusion
A2I	Aspire To Innovate	DFAC	Digital Financing For Agriculture Challenge
ABL	Allied Bank Limited	DFDI	Digital Foreign Direct Investment
ADB	Asian Development Bank	DFS	Digital Finance Services
Agri-Tech	Agricultural Technology	DICT	The Department Of Information And Communications Technology
AHKNCRD	The Akhtar Hameed Khan National Center For Rural Development	DMV	Department Of Motor Vehicles
AI	Artificial Intelligence	DRPA	Digital Rights Protection Authority
AKDN	Aga Khan Development Network	DSL	Digital Subscriber Line
AML	Anti Money Laundering	DWP	Digital World Pakistan (Pvt.) Ltd
ATMs	Automated Teller Machine	EBSI	European Blockchain Services Infrastructure
AWS	Amazon Web Services	ECAC	Electronic Certification Accreditation Council
B2B	Business To Business	E-Commerce	Electronic Commerce
B2C	Business To Consumer	ED Tech	Educational Technology
BDO	Business Development Officer	e-FOAS	Electronic Filing And Office Automation System
BHU	Basic Health Units	EGDI	Electronic Government Development Index
BISP	Benazir Income Support Program	EMIs	Education Management Information System
BNPL	Buy Now Pay Later	ENISA	European Union Agency for Cybersecurity.
BSP	Bangko Sentral Ng Pilipinas	EODB	Ease of Doing Business
CAGR	Compound Annual Growth Rate	E - passport	Electronic Passport
CBAM	Carbon Border Adjustment Mechanism	ETO	Electronic Transactions Ordinance
CBDCs	Central Bank Digital Currencies	EY	Ernst and Young
CCPA	Central Consumer Protection Authority	FATF	Financial Action Task Force
CCTV	Closed -circuit Television	FAO	Food and Agriculture Organization
CEO	Chief Executive Officer	FBR	Federal Board Of Revenue
CFT	Combating The Financing Of Terrorism	FDE	Federal Directorate of Education
CKD	Completely Knocked Down	FDI	Foreign Direct Investment
CM	Chief Minister	FED	Federal Excise Duty
CMO	Cellular Mobile Operator	FEMA	Foreign Exchange Management Act
CNIC	Computerized National Identity Card	FIA	Federal Investigation Agency
COMSATS	Commission On Science And Technology For Sustainable Development In South	FHIR	Fast Healthcare Interoperability Resources
CPEC	China -Pakistan Economic Corridor		
CRC	Child Registration Certificate		
CRMD	The Cyber Risk Management Department		
CSL	Cybersecurity Law		
CTDISR	Critical Telecom Data And Infrastructure Security Regulation		
DAO	Decentralized Autonomous Organization		
DEEP	Digital Economy Enhancement Project		

Fintech	Financial Technology
FTTH	Fiber To The Home
FTTS	Fiber To The Site
FY	Fiscal Year
G2P	Government-to-Person.
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GDPR	General Data Protection Regulation
Gen Z	Generation Z
GEO	Geostationary Earth Orbit
GIS	Geographic information system
GPS	Global Positioning System
GPU	Graphics Processing Unit
GSMA	Groupe Spécial Mobile Association
GST	Goods And Services Tax
HBL	Habib Bank Limited
HealthTech	Healthcare Technology
HEC	Higher Education Commission
IBA	Institute Of Business Administration
IBM	International Business Machines
IC3	Integrated Command, Control, and Communication
ICCPR	International Covenant On Civil And Political Rights
ICT	Information And Communication Technology
IMF	International Monetary Fund
IoT	Internet Of Things
IPCC	Intergovernmental Panel on Climate Change
ISPs	Internet Service Providers
IT	Information Technology
ITCN	Information Technology Commerce Network Asia
ITes	Information Technology Enabled Services
ITU	International Telecommunication Union
JV	Joint Venture
K trade	Khadim Ali Shah Bukhari Securities Limited
KPI	Key Performance Indicator
KRW	South Korean Won
KSA	Knowledge Skills And Abilities
kWh	Kilowatt -Hour

KYC	Know Your Customer
LCR	Local Content Requirement
LDI	Long Distance International
LEO	Low Earth Orbit
Li-Ion	Lithium Ion
MBI	Malaysian Blockchain Infrastructure
Mbps	Megabits Per Second
MENA	Middle East and North Africa
MHz	Megahertz
MoITT	Ministry Of Information Technology And Telecommunication
MOU	Memorandum Of Understanding
NADRA	The National Database And Registration Authority
NAVTC	National Vocational And Technical Training Commission
NCCIA	National Cyber Crime Investigation Agency
NDRMF	National Disaster Risk Management Fund
NDVI	Normalized Difference Vegetation Index
NERA	National Economic Research Associates
NFC	Near Field Communications
NFI	National Forest Inventory
NFMS	National Forest Monitoring System
NFT	Non-Fungible Tokens
NGO	Non-Governmental Organization
NGO	Non-Governmental Organization
NIC	National Incubation Centers
NIFTAC	National Intelligence Fusion and Threat Assessment Centre
NITB	The National Information Technology Board
NOC	No Objection Certificate
NR3C	National Response Centre For Cyber Crime
NRI	Network Readiness Index
NSU	National Skills University
NUML	National University Of Modern Languages

NUST	National University Of Sciences and Technology	SMPRA	Social Media Protection And Regulatory Authority
OECD	Organization for Economic Co - operation and Development	SSST	Shanghai Spacecom Satellite Technology
OFC	Optical Fiber Cable	STZA	Special Technology Zones Authority
P@SHA	Pakistan Software Houses Association	SUPARCO	Space And Upper Atmosphere Research Commission
P2P	Peer-To-Peer	UTE	Startup Tax Exemption Scheme
PCB	Printed Circuit Board	Tbps	Terabits Per Second
PCC	Pakistan Crypto Council	TDAP	Trade Development Authority Of Pakistan
PDPB	Personal Data Protection Bill	U.S	United States Dollar
PECA	Prevention Of Electronic Crimes Act	UAE	United Arab Emirates
PIAIC	Presidential Initiative for Artificial Intelligence and Computing	UBL	United Bank Limited
PIPL	Personal Information Protection Law	UC	Union Council
PITB	Punjab Information Technology Board	UK	United Kingdom
PKI	Public Key Infrastructure	UMT	University Of Management and Technology
PKR	Pakistani Rupee	UN	United Nations
POS	Point Of Sale	UNDP	United Nations Development Program
PSARB	Pakistan Space Activities Regulatory Board	UNESCO	United Nations Educational, Scientific and Cultural Organization
PTA	Pakistan Telecommunication Authority	US	United States
PTCL	Pakistan Telecommunication Company Limited	USD	United States Dollar
PVARA	Pakistan Virtual Asset Regulatory Authority	USF	Universal Service Fund
QR	Quick Response	VC	Venture Capital
R&D	Research And Development	WDM System	Wavelength Division Multiplexing
RFID	Radio Frequency Identification	WeBOC	Web Based One Customs
ROI	Return On Investments	X road	Data Exchange Layer For Information System
SAI	South Korea's AI Framework Act	YoY	Year Over Year
SBP	State Bank Of Pakistan		
SECP	Securities And Exchange Commission Of Pakistan		
SIFC	Special Investment Facilitation Council		
SKD	Semi Knocked Down		
SLMS	Satellite Land Monitoring System		
SMBs	Small And Medium sized Businesses		
SMEs	Small And Medium Enterprise		
SMEDA	Small and Medium Enterprise Development Authority		



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Published in November 2020