Journal of Management Science Research Review
https://jmsrr.com/index.php/Journal/about

Volume. 4 Issue No. 3 (2025)

Online ISSN: 3006-2047
Print ISSN: 3006-2039

# ANALYZING CHALLENGES FACED BY THE TELECOM INDUSTRY IN PAKISTAN AND THEIR IMPACT ON GROWTH

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**ABSTRACT**
This research focuses on systematically evaluating the various connected obstacles that affect the growth rate of Pakistan's telecom industry. This study identifies the main regulatory, infrastructural, economic, technological, and governance obstacles that affect Pakistan's telecom industry performance. This study evaluates the direct and indirect effects of these challenges on leading performance indicators, including investment patterns, technological uptake, service standards, and digital access measures (Majid and Farooq, 2024a). This study uses successful strategies from telecommunications markets in India, Bangladesh, and Sri Lanka to draw strategic insights. This research develops fact-based policy suggestions to reduce recognized obstacles while supporting the enduring telecom sector growth in Pakistan. These objectives generate essential findings, along with applicable methods that enhance industry strength and digital equality, thereby boosting Pakistan's economic performance level.

**KEYWORDS:** *Telecom Industry Pakistan, Regulatory Challenges, Infrastructure Development, Economic Instability, Foreign Direct Investment, 5G Deployment, Digital Inclusion, Internet Governance, Policy Reforms*

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## INTRODUCTION

This study demonstrates the importance of the telecom industry as Pakistan advances economically while undergoing digital change and social integration. Sarangi and Pradhan (2020) established that technological progress in ICT infrastructure enhances economic growth and optimizes resource efficiency. The authors stress that digital technology maximization requires suitable policies with sufficient budgetary support, alongside an innovative ecosystem. The **Figure 1** below depicts the growth of total telecom subscribers over the year in millions as reported in the annual report by PTA (2024).

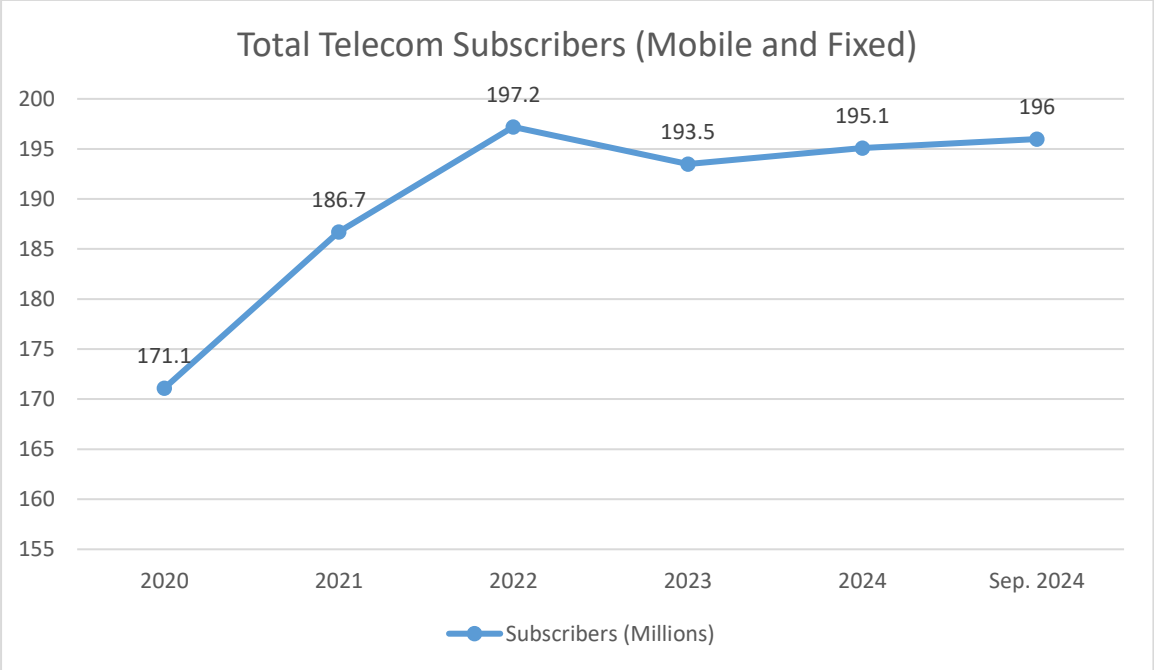


**Figure 1** *Total Telecom Subscribers (Mobile and Fixed)*

The telecommunications sector of Pakistan maintains several integrated obstacles while recording notable achievements (Rehman et al., 2020, 2018). Regulatory inconsistencies and unpredictability deter potential investors and impede sustainable growth (Ma et al., 2025). The industry faces significant hurdles because of regular policy changes together with complicated licensing protocols and tax rates that reach high levels, which create operational uncertainties and budget increases and minimize the potential for new investments and business innovation (GSMA, 2022; International Bar Association, 2024). Pakistan trails its competitors in the region when it comes to essential telecom infrastructure because of its insufficient fiber-optic networks and unreliable power supply system. The combination of low fiber-optic network coverage and continuous electricity disruptions blocks network system

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expansion, which affects rural and low-income nations. Inadequate infrastructure prevents equal access to telecom services for all regions of Pakistan, according to the Pakistan Telecommunication Authority (2023) and Samaa TV (2025).

The industry faces development challenges because of economic instability, which manifests as continuous currency value reduction and substantial decreases in foreign direct investment (FDI). Between 2023 and 2024 foreign direct investment in the telecom sector fell by 20%, severely limiting operators' ability to develop networks as well as technological innovation (Geo TV, 2024; Business Recorder, 2024). The delayed rollout of advanced technology, specifically 5G, is the main cause for slowing technological adoption rates. Pakistan holds a lower position than its regional neighbors, India and Bangladesh, since these countries rapidly accelerated their 5G deployment. These factors result in diminished digital economic competitiveness and expanded technological disparities, because Pakistan shows both low smartphone ownership and limited digital knowledge (PwC, 2025; Aziz, 2020). The economic and social impacts of frequent Internet disruptions, along with poor data protection standards, are the main governance issues that affect the Internet (Salam et al., 2025). Internet service disruptions coupled with strict rules have generated major economic problems along with a decrease in user trust, which has reduced digital adoption in various Pakistani sectors (Kathuria et al., 2018; Reuters, 2024; Tribune, 2025).

## LITERATURE REVIEW

Telecom sector development, along with stability, is shaped by regulatory frameworks. The GSMA (2022) reported that Pakistan faces high telecom taxation rates that damage operational efficiency while driving away potential investors. The Pakistan Telecommunication Authority (2023) reported that sudden and unpredictable regulatory changes from officials produce negative effects on investors' trust in Pakistan's telecom industry. The International Bar Association (2024) established that unstable regulatory environments and unpredictable licensing rules increase operational risks that prevent continuing international investments and domestic businesses. Sawadogo (2022) examines how taxation combines trade practices with mobile money solutions in the telecommunications industries of developing countries. Well-structured tax policies, together with favorable trade conditions, play a key role in expanding and making telecommunications services accessible to people; however, the adoption of mobile money leads to increased financial inclusion and stimulates economic growth (Farooq and Salam, 2025). The research by Katz and Jung (2023) identified that high telecom-specific taxation directly reduces affordability, limits digital adoption, and deters investor interest. Gachigo (2024) emphasizes that high taxes can reduce financial performance of telecom firms significantly and suggested adopting a more balanced tax framework can boost digital adoption and long-term investment. Bilal (2025) analyzed multiple times in his work on the damaging effects of recurring policy modifications that generate unstable market dynamics (Farooq and Radovic-Markovic, 2017). The World Bank's latest report (2022) showed Pakistan's poor regulatory system in contrast to its nearby neighbor India, which indicates that Pakistan should implement standardized policies together with open licensing

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procedures. Research investigating the long-term market-entry effects of regulatory modifications and their influence on investor conduct is still insufficient.

**INFRASTRUCTURE CHALLENGES**

Telecom infrastructure plays an indispensable role in ensuring digital inclusion together with the advancement of economic growth. Imtiaz et al. (2015) revealed fundamental weaknesses in Pakistan's telecom infrastructure through its restricted fiber-optic network extensions and persistent power outages. Unstable electricity supply causes a major rise in telecom operators' running costs, which blocks sustainable industrial development according to McKinsey (2024). The PTA (2023) evaluation indicated that rural regions lack proper infrastructure support, which causes underdevelopment throughout the region. An analysis of Asia's digital development shows that China achieved rural telecom infrastructure expansion through government-led coordinated investment policies and universal service provisions, which differs from Pakistan's slower progress because of conflicting policy support and deficient funding (Sharma, 2008). The identification of infrastructure deficits by studies has received limited attention from researchers who have performed few quantitative investigations of their direct impact on sectoral growth rates in Pakistan (Radović-Marković et al., 2024).

**ECONOMIC AND FINANCIAL CHALLENGES**

The telecom industry's financial success, along with potential growth, directly depends on economic stability. Many studies from Geo TV (2024) and Business Recorder (2024) show how the reduction of FDI resulted in severe effects on network expansion prospects. The sustained weakening of Pakistani currency contributes to increased expenses for telecom infrastructure purchases according to Reuters (2025). In his 2021 work, Awwad dissected how worldwide trends driven by rising over-the-top (OTT) service competition create financial problems for telecom providers. Younas et al. (2021) conducted a thorough case analysis of the financial issues affecting telecom operators in Pakistan. Current research does not adequately link macroeconomic instability to the operational effects for Pakistan's telecom operators.

**TECHNOLOGICAL ADOPTION AND DIGITAL INCLUSION**

The implementation of modern technological solutions strongly affects industrial operational competitiveness and economic productivity rates. According to PwC's Global Telecom Outlook (2025), Pakistan lags behind regional countries in both 5G deployment and total technological adoption because of delayed spectrum auctions combined with restricted smartphone market accessibility. In his research, Aziz (2020) examined digital inclusion problems, including ongoing digital discrepancies between rural areas and women and problems with digital literacy in Pakistan (Salam et al., 2025). DigitalDefynd (2025) conducted worldwide research on successful digital transformation examples that presented adjustable strategies for Pakistan's circumstances. Insufficient research exists on policy interventions that would both eliminate technological obstacles and boost digital inclusion in Pakistan. Shair et al.

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(2023) showed that Pakistan faces significant challenges to ICT adoption because digital literacy, awareness issues, and economic limitations primarily affect non-urban and marginalized areas of the country.

**INTERNET GOVERNANCE AND CONTENT RESTRICTIONS**

Effective governance of Internet infrastructure determines how much economic participation occurs, along with the extent to which consumer trust exists. Internet outages lead to significant economic damage, in accordance with the research by Kathuria et al. (2018), with additional validation by Reuters (2024). Tribune (2025) reported that Pakistan suffered its worst-ever period of Internet disruptions, which severely damaged digital economic activities and consumer confidence levels. Samaa TV (2025) reported on weak data protection systems that give consumers serious privacy concerns regarding identifiable information protection. Few studies have examined the complete social impact of Pakistan's tight internet management framework, although scholars need to investigate these effects in more detail among different nations (Kabir et al., 2024). According to Jamil (2021), Pakistan's state government uses surveillance measures alongside censorship practices and legal restrictions that place the country among the bottom ranks globally. Manipulative practices guard against both democratic norms and open communication among countries.

**METHODOLOGY AND ANALYSIS**

According to PTA annual reports between 2022 and 2023, and the GSMA report in 2022, Pakistan is one of the countries with the highest telecommunications taxation worldwide, significantly increasing operational costs for operators. The combination of the three main taxes under GST, WHT, and PTA fees reduces profitability and investment interest in the telecom sector. Operational unpredictability, combined with regulatory changes and bureaucratic complexities, has been recorded by both the International Bar Association (2024) and Bilal (2025), discouraging sustained investment from stakeholders. Studies have verified that spectrum management is expensive to manage while maintaining restrictions that hinder both 4G and 5G advancement (The News International, 2025). Internet shutdowns conducted for security reasons during times of social unrest severely interrupt telecom services and economic operations, according to Reuters (2024) and Tribune (2025). Regulatory challenges form a high-risk environment that both restrain sector expansion and prevent investment. The process of 5G spectrum auction has been delayed due to delay in review by Commission of Competition of Pakistan (CCP) of the Telenor-PTCL merger although PTA completed technical preparations (Profit, 2025). The merger deadlock, compounded by a delayed advisory committee and broader geopolitical uncertainties, illustrates how industry consolidation can directly slow down technological progress. This distinct example of regulatory indecision underscores the fact that even when technical readiness is achieved, market structure and policy uncertainty can stall major digital initiatives, delaying the launch of 5G beyond the planned 2025 timeline (Profit, 2025; PTA, 2024).

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**INFRASTRUCTURE CHALLENGES**

The telecom sector faces growth challenges because of insufficient infrastructure, which affects poorly served rural areas. The PTA Annual Report (2023) indicates that Pakistan presently uses only 150,000 km of fiber-optic networks across the country. The comparison with India demonstrates Pakistan's large deficit in infrastructure investments because India currently operates over 2.8 million km of fiber optic networks. According to McKinsey (2024), power outages continue to disrupt network reliability while increasing operational costs. Telecom companies face heavy financial pressure because they must dedicate substantial budget resources to deploy backups using diesel generators (Majid and Farooq, 2024b). The infrastructure deficiencies mentioned by Imtiaz et al. (2015) pose major challenges in creating fair digital access because they obstruct network penetration and cause reliability concerns in rural areas. 4.3 Economic and Financial Challenges The telecom sector suffers from major financial setbacks due to the economic instability that emerges in the market. Between 2023 and 2024, FDI within Pakistan's telecom sector experienced a 20% decrease, limiting operators from upgrading their networks properly and expanding their infrastructure (Geo TV, 2024; Business Recorder, 2024).

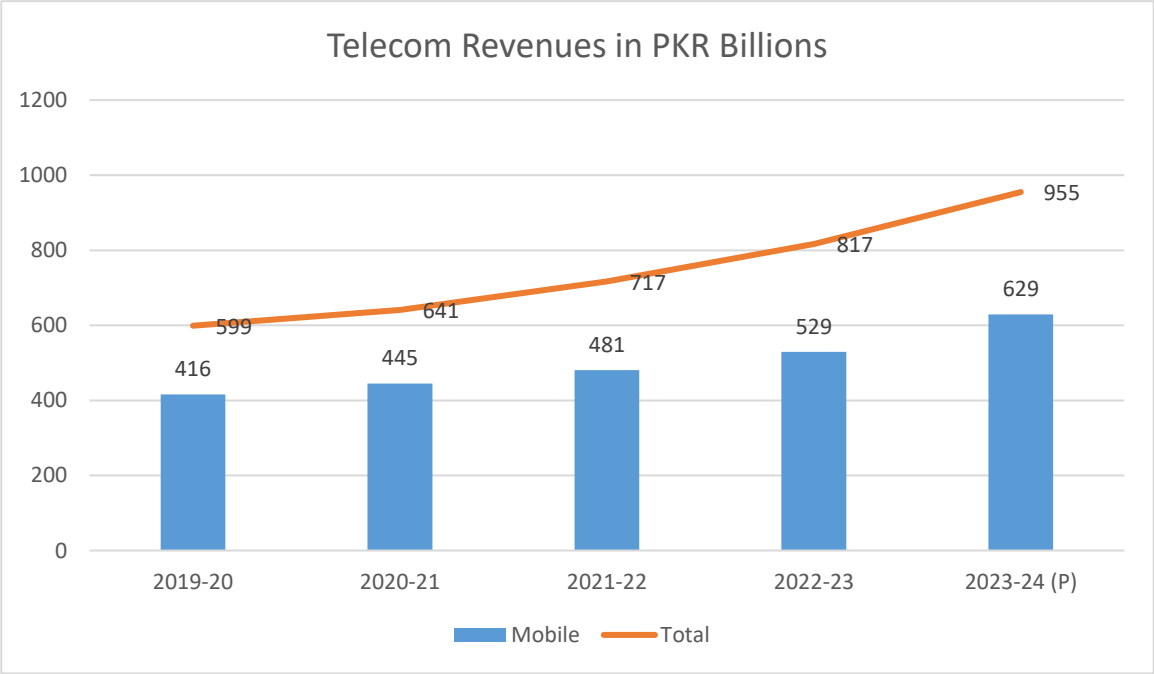


**Figure 2** *Telecom Revenues in PKR Billions*

The continuous depreciation of the currency caused telecom operators to face amplified financial challenges because imported telecom equipment costs surged

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(Reuters, 2025; Radović-Marković et al., 2017). The financial crisis has worsened because of decreasing Average Revenue Per User due to competition from Over-The-Top (OTT) service providers (Rehman et al., 2020, 2018). Awwad (2021) provides evidence on how OTT services (WhatsApp and Skype) affect traditional telecom revenue streams (Kabir et al., 2024), which generates serious financial trouble for operators (Radović-Marković et al., 2024; Salam et al., 2025). Financial weakness in the industry reduces its capacity to develop new solutions and provide consistent services that harm future expansion opportunities (Farooq and Radovic-Markovic, 2016). The **Figure 2** above shows revenue trends of telecom sector in Pakistan as reported by PTA (2024) indicate continued role of telecom sector in economic growth despite economic and financial challenges including exchange rate volatility and lack of fiscal incentive and yet the sector has consistently generated substantial revenues (Radović-Marković et al., 2024; Rehman et al., 2020). The telecom sector additionally supports the economy through its tax contributions which are reflected in **Figure 3** below as reported by PTA (2024), and reflects its ongoing fiscal significance amid persistent regulatory and investment challenges.

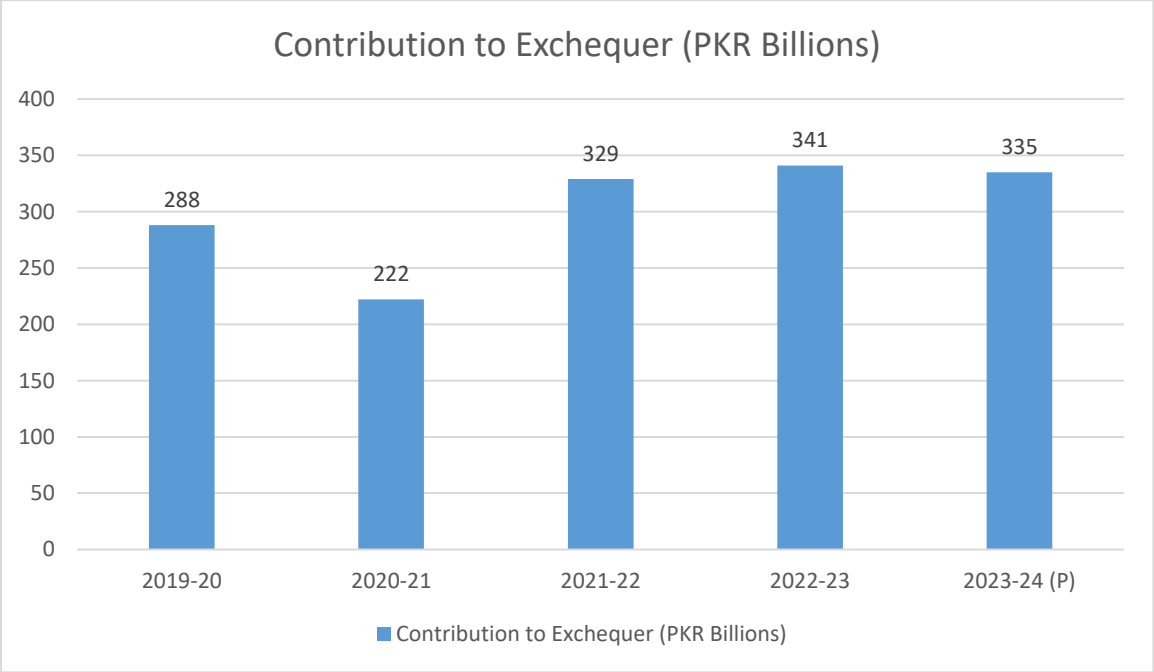


**Figure 3** *Telecom Sector's Contribution to Exchequer*

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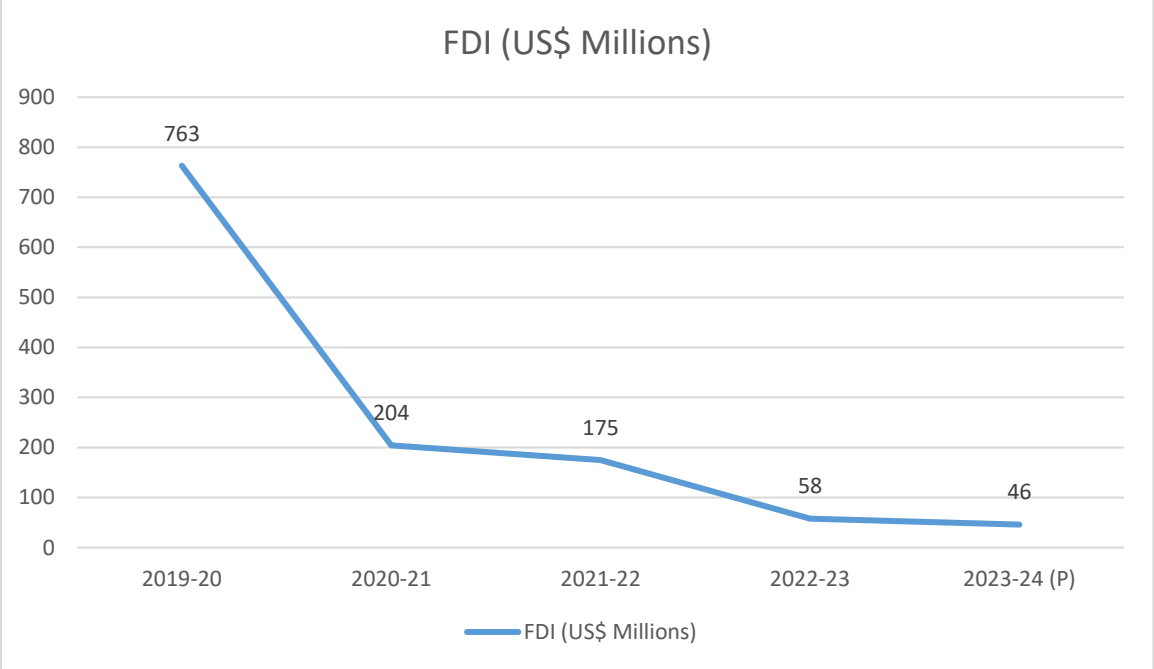


**Figure 4** *FDI in Telecom (Inflows)*

As shown in **Figure 4** above FDI inflows have significantly dropped over the years not only reflecting broader macroeconomic instability, regulatory, challenges, lack of interest from investors, and shifting market dynamics as well as halt in technological advancements in the sector due to delay in 5G launch (PAT 2024) as FDI inflows can be regarded as a crucial indicator of investor confidence in the telecom or any other sector. The recent trend of mergers and acquisitions (M&As) in Pakistan's telecom sector including the Warid-Jazz merger and PTCL's proposed acquisition of Telenor assets, highlights a deeper structural transformation. Rather than simply responding to market gaps left by exits, these M&As reveal a broader industry shift towards consolidation in the face of high operational costs, regulatory burdens, and declining financial returns (Express Tribune, 2025; PTA, 2024). This trend suggests that only larger, better-capitalized operators can sustain operations in such a challenging economic climate, potentially improving efficiency but risking reduced competition and consumer choice if not balanced by supportive policies. These insights are critical for crafting policy reforms that encourage innovation, investment, and consumer protection in Pakistan's evolving telecom market. **Table 1** below further explains the taxation structure of Pakistan's telecom industry and compares it with selected regional countries and international markets. It can be noted that Southern African countries face extremely high tax burdens (30 to 60%) while countries like UAE, Qatar, and Singapore imposes minimal industry specific taxation that positively contribute to competitive pricing and fosters investment friendly environment.

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**Table 1** *Tax Burden in Telecom Industry and Its Impact*

| Country / Region | Telecom-Specific Tax Rate | Outcome & Impact | Reference |
|---|---|---|---|
| Pakistan | ~30–35% (incl. WHT, GST, regulatory fees) | High costs, reduced affordability and investment; significant but burdensome sector contribution to Exchequer | PTA (2024); GSMA (2022) |
| Bangladesh | ~10–15% | Lower consumer costs; supportive of inclusive growth | GSMA (2022); BTRC |
| Sri Lanka | ~15–20% | Moderate pricing; balanced service adoption | GSMA (2022); SL Telecom Commission |
| Southern African Countries | 30–60% (range, incl. excise, spectrum, customs, etc.) | High burden increases costs, reduces investment and slows network expansion | MPOFU et al. (2025) |
| UAE / Qatar / Singapore | 0% telecom-specific taxes; only VAT/GST applies | High telecom competition, low consumer prices, sustained investment and digital maturity | UAE TRA; GSMA (2023); IMDA Singapore |

## TECHNOLOGICAL ADOPTION AND DIGITAL INCLUSION

The Pakistani telecom sector is struggling to implement advanced networks starting from 4G and progressing to 5G technology. According to Latif et al. (2023), the launch of 5G networks in Pakistan faces four essential barriers: inadequate spectrum management, regulatory support difficulties, street access problems, and small cell installation complications. The nation requires proper solutions for these elements to increase the 5G deployment speed and establish full digital accessibility. The smartphone penetration rate in Pakistan remains underdeveloped compared to neighboring countries because many households face high purchasing costs, while the availability of local content is restricted (Aziz 2020). Telecom infrastructure generates minimal economic benefits because numerous individuals, especially those living in rural areas, and women remain unable to effectively utilize digital services because of their lack of digital literacy. Research conducted by DigitalDefynd (2025) demonstrates the benefits of using targeted digital literacy programs, which shows that Pakistan could achieve similar results through similar initiatives. Khan et al. (2024) revealed distinct technology inequality between Pakistani urban and rural districts, which brings socio-economic challenges to people excluded from digital access. As depicted in **Figure 5** (PTA 2024), broadband penetration in Pakistan has consistently and steadily increased despite infrastructural challenges that demonstrate

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progress in digital inclusion which highlights the potential and capacity of the telecom sector in providing access and improving connectivity.

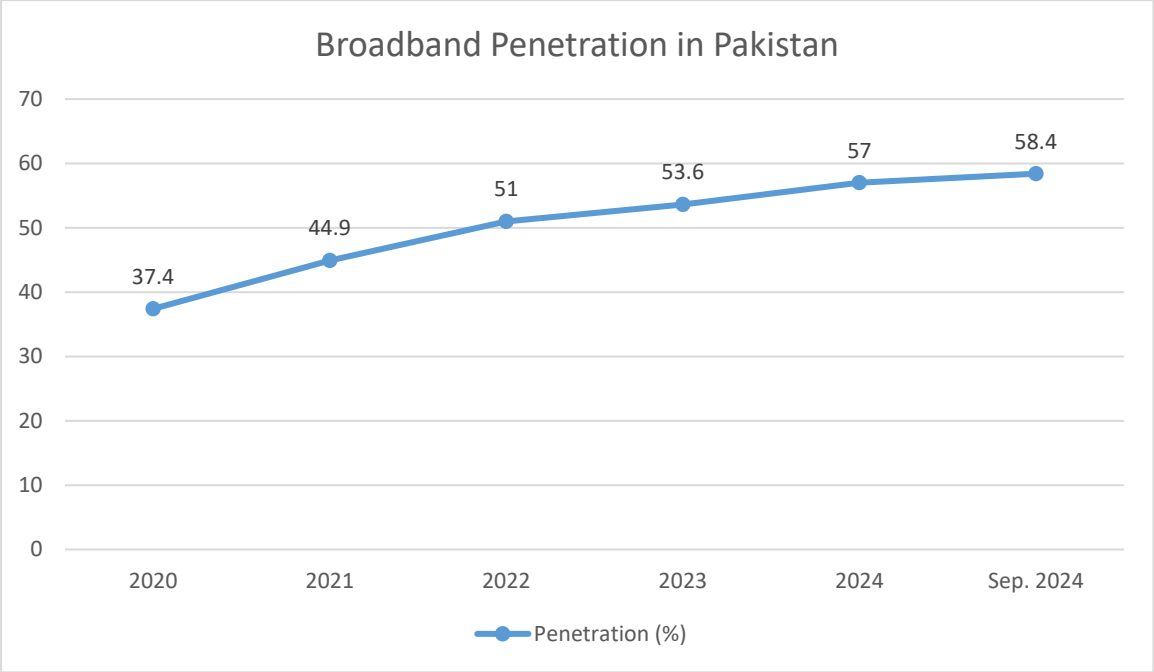


**Figure 5** *Broadband Penetration in Pakistan*

## INTERNET GOVERNANCE AND CONTENT RESTRICTIONS

Internet governance reforms, which involve both service outages and insufficient data security standards, have limited Pakistan's digital economic growth and led to lower consumer confidence. Internet shutdowns in Pakistan result in yearly economic losses, which Reuters (2024) and Kathuria et al. (2018) estimated to be approximately $300 million. Public closures generally occur when big political events occur and social instability exists, which negatively affects businesses needing a steady Internet connection. Tribune (2025) recently noted that Pakistan faced expanding Internet blackouts that delivered detrimental consequences to digital operations while shrinking customer faith (Farooq and Salam, 2024). Data privacy laws that are insufficient in strength allow user trust to diminish, thus restricting digital engagement and the adoption of online services (Samaa TV 2025). Weak governance in Pakistan's digital sector creates major threats to customer trust and endures developmental growth in the digital economy (Reuters, 2024).

## COMPARATIVE REGIONAL ANALYSIS

Research that analyzed the telecom industries of India, Bangladesh, and Sri Lanka delivered essential knowledge applicable to the Pakistani context. BharatNet undertook large-scale infrastructure development and partnered with private entities

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to build rural connectivity, thus enhancing digital access across the country (PWC, 2025). Kujore et al. (2021) shows Value Added Tax (VAT) has a positive impact on Nigerian telecommunications sector growth, indicating that appropriately designed tax policies can drive economic sector development. Educational and policy-based digital literacy pushes by Bangladesh have highly boosted digital inclusion and produced major economic advantages, according to Aziz (2020). Sri Lanka achieved industry growth stimulation from well-adjusted telecom taxation despite no negative impact on government revenue, which provides Pakistan with useful policy insights (DigitalDefynd, 2025).

## DISCUSSION

The study discovered fundamental connections between regulatory factors, infrastructural issues, economic constraints, technological barriers, and governance problems that impact Pakistan's telecom industry. The sector is disrupted by regulatory instability, which combines varied licensing principles with constant policy changes and high tax rates, leading investors to doubt completely while dealers possess a reduced capacity to invest in infrastructure (GSMA, 2022; International Bar Association, 2024). The limited fiber deployment and recurring power failures from infrastructure deficiencies damage service stability and reliability, which then decreases digital access rates and subscriber acquisition potential (PTA, 2023; Ikram et al., 2025). The depreciation of the currency, together with declining foreign direct investment (FDI), puts additional financial strain on telecommunications operators who struggle to finance the investment needed for advanced infrastructure (Geo TV, 2024; Reuters, 2025). The delayed technological advancements resulting from insufficient spectrum resources and weak network upgrade spending create major economic performance hurdles for Pakistan while reducing competitive regional rankings and telecom market economic growth potential (PwC, 2025). Unfavorable Internet management approaches that include regular blackout policies, along with insufficient data protection rules, create additional challenges for these problems. Disruptions negatively affect consumer trust and digital engagement, while creating worsening economic effects that affect businesses, which depend on dependable connectivity (Kathuria et al., 2018; Tribune, 2025). Several problems in Pakistan's telecom domain maintain a recurring relationship that imposes limitations on investment and degenerates service quality while blocking technical progress and economic productivity. Jeon et al. (2022) demonstrated that 5G policy statements made by the government and 5G implementation by firms had adverse effects on Chinese telecommunications operators' market performance because investors questioned the stability of 5G technology.

## INSIGHTS FROM REGIONAL COMPARATIVE ANALYSIS

The telecom sectors in India, Bangladesh, and Sri Lanka provide tactical information that Pakistan can use for strategic purposes. Through the BharatNet project, India demonstrated how public-private partnerships advance Internet connectivity. The collaborative program enables Internet connectivity in numerous rural regions, thus

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closing the digital gap between city and rural areas in India. A PwC (2025) analysis showed that digital network expansion occurred successfully across underserved locations. By implementing strategic digital literacy and affordability plans, Bangladesh managed to close gaps in technical adoption, specifically among rural areas and excluded populations, thereby validating target-oriented educational and policy measures (Aziz 2020). Ahmad et al. (2024) evaluated 5G deployment techniques between African and USA territories by studying particular obstacles and prospects across both areas. Their analysis demonstrates why specific solutions that recognize the local regulatory environment, economic situation, and technological infrastructure need to be developed. The telecom taxation policy in Sri Lanka serves as an effective model because it maintains a proper tax balance to support industrial development without affecting government financial targets (DigitalDefynd, 2025). The success of the telecom sector expansion in Pakistan requires wise regulatory systems combined with strategic infrastructure development and monetary perks as well as tailored digital inclusion programs and proper governance systems.

## RECOMMENDATIONS

This study generates evidence-based recommendations from its research and regional findings. Such as, the implementation of transparent, simplified, and predictable regulations, along with licensing frameworks, should become mandatory. The telecom industry requires synchronized taxation with nearby market levels to reduce business risks and extend investment periods. The investment in telecom infrastructure should be increased substantially by deploying public-private partnership models that emulate successful programs such as BharatNet from India, especially for fiber-optic networks. Sustainable energy solutions that improve the power reliability will boost the network uptime and operational efficiency of the system. Public measures for economic stabilization, along with targeted financial benefits for domestic and international investors, should be introduced to support telecom infrastructure development in the country. Generous investments increase when the sector reduces currency risk and establishes financial stability programs. The sector needs strategic implementation of spectrum distribution and network improvement for the rapid deployment of cutting-edge technologies, including 5G. Targeted digital literacy education and affordable device initiatives should receive funding from the government to eliminate the digital access differences mostly faced by rural and marginalized communities. Internet governance needs strengthening through measures to lower Internet shutdown occurrences both during and outside politically sensitive times. Data protection and privacy legislation should be established to restore trust among users of digital platforms while increasing their participation in the overall economic sectors.

## CONCLUSION

The development of telecommunications in Pakistan depends on four critical elements: market demand strength combined with a technologically ready population base, established infrastructure foundations, and practical insights obtained from local

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operations and similar neighboring nations (Rasheed et al., 2025). The combination of Pakistan's built-in assets and strategic strategies against recognized challenges will enhance digital development, which will spur economic growth while generating social advantages. This study proves that telecommunications expansion requires complete strategic approaches that transcend the standard financial systems (Salam et al., 2025). Telecom policy development needs to match digital economy planning and national development strategies, because digital technologies have increased their importance in economic operations and social programs. This study shows that authorities must bring sectors together to coordinate their efforts because separate departmental actions are inadequate (Rehman et al., 2018). Future advancements require a combination of sound evidence analysis and innovative breakthroughs (Farooq and Radovic-Markovic, 2016). The telecommunications sector of Pakistan underwent radical transformation through liberalization policies, which led to mobile connectivity reaching almost 200 million users during the last two decades. The subsequent stage of digital development in Pakistan relies on a forward-thinking strategy paired with proof-driven policies and arena-based execution to establish beneficial collaborations that will propel digital advancement.

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