The state of telecommunication and Internet in Afghanistan and its impact on the country's socio-economic and digital development

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Abstract

This research examines the state of telecommunications, particularly Internet services, in Afghanistan and their impact on the country's socio-economic and digital development. Despite notable progress over the past two decades in expanding Internet access, Afghanistan faces challenges due to its geographic, political, and economic circumstances. Using a mixed-method approach, this study analyzes telecommunications data and incorporates insights from expert interviews to assess the state of the Internet and identify the factors affecting Internet cost and quality, including geographical constraints, lack of direct access to the sea, infrastructure issues, sparse population compared to land area, electrical power and Internet dependencies, regulatory challenges, and complex market dynamics. The study further reveals that over 90% of users are dissatisfied with the current state of Internet services, highlighting the interconnected challenges that hinder affordability and accessibility, particularly in rural areas. These barriers impede the country's digital growth and socio-economic progress. The study concludes with strategies and recommendations, including investment in infrastructure and electrical power, access to radio spectrum, capacity building, policy reforms, fostering market competition, and leveraging international partnerships. These strategies aim to reduce Internet costs, enhance service quality, and promote Afghanistan's broader socio-economic and digital development.

Keywords: Afghanistan, Connectivity, Digital-Development, Internet, Telecommunication

Introduction

Access to affordable and quality telecommunications services, particularly affordable and high-speed Internet is essential for economic development and social inclusion in every country. Digitalization has become an ever-more important feature of economies around the globe. Associated with this development are many opportunities, but also several challenges, not only for developed but also for developing countries (Leroch & Sirries, 2023). ICTs (Information & Communication Technologies) have an enormously important role to play in building the social capability to generate information and apply knowledge for sustainable development (Mansell & Wehn, 2024). Research shows that

telecommunications and the Internet play a vital role in enhancing literacy levels and expanding access to education. These technologies serve as critical tools for improving educational outcomes and fostering knowledge dissemination. Telecommunications significantly influence GDP (Gross Domestic Product) and play a crucial role in driving overall economic development. Additionally, mobile subscriptions have been shown to positively impact both GDP and GDP per capita in Afghanistan (Akhgar & Burinskienė, 2023). The telecommunication sector in Afghanistan has grown to become one of the largest revenue-generating sectors.

According to the Ministry of Communication and Information Technology-Afghanistan (MCIT) reports, in 2011, the sector had an annual average revenue of $139.6 million. By the end of 2018, the sector generated AFN 3,898,844,099 in revenue, primarily driven by the 10% tax on mobile credit cards (MCIT, 2018). In 2021, MCIT reported a total revenue of AFN 1,288,987,619. By 2024, the sector's financial growth was evident, with MCIT reporting a total revenue of $842 million from the five mobile network operators within a single year. Additionally, a spectrum auction in 2024 generated $98 million in revenue. That same year, the total investment in the telecom sector reached $2.8 billion (MCIT, 2024). Beyond financial contributions, the telecommunication sector has significantly impacted employment in Afghanistan. In 2006, it provided 40,000 direct and indirect jobs. By 2011, this number had grown to over 110,000. In 2024, MCIT reported a total of 186,000 jobs created within the sector. Given the extent that many societies have benefited economically and otherwise from ICTs, there is obvious interest in maintaining growth to the extent possible (Ayres & Williams, 2004), yet Afghanistan faces challenges in this regard, and there are long-standing structural, political and economic barriers to Internet connectivity (Shires & Wilkinson, 2024). The issue of high-cost and low-quality Internet has emerged as a significant concern among the public, frequently raised on various platforms. Despite ongoing discussions, there has been a lack of adequate technical explanations provided to the public, as well as insufficient scientific research to thoroughly examine the root causes of these challenges and propose effective solutions. Currently, Afghanistan's Internet services are characterized by relatively high costs and low quality, rendering them unaffordable for many citizens, particularly those in rural regions. This disparity not only limits access to digital resources but also hinders the country's broader integration into the global digital economy. Addressing these issues is critical to ensuring equitable access to digital infrastructure and fostering economic and social development. The issues in telecommunication and Internet are compounded by Afghanistan's unique geographical, political, and socio-economic conditions, which further present significant barriers to the development of effective infrastructure. Recent reports highlight that despite efforts to improve connectivity, Afghanistan's telecommunication and Internet services remain inferior to those of its neighbouring countries (World Bank & ITU, 2023). This research identifies the persistent challenges and issues in the telecommunication sector by analyzing the state of the Internet and the primary factors contributing to the cost and quality of Internet services in Afghanistan. It reveals issues such as geographical constraints, lack of direct access to the sea and sub-marine cable, inadequate telecommunication infrastructure, sparse population density compared to the country land area, electrical power dependencies, regulatory constraints, and market dynamics. The study employs a mixed-methods approach to provide a comprehensive understanding of these issues and offers actionable strategies for reforms. By investigating these issues, this research aims to contribute to the discourse on improving Afghanistan's digital infrastructure and reducing Internet services costs, ultimately supporting the country's broader economic and social development goals.

Historical Context and Early Development
Throughout the late 20th century, Afghanistan's telecommunications infrastructure remained among the least developed globally, primarily due to prolonged conflict and

underinvestment. During the Soviet occupation (1979–1989) and the ensuing civil wars, the sector experienced minimal investment, with teledensity never surpassing 0.2 lines per 100 inhabitants. By the 1990s, the nation relied on an outdated analog network, including 45-year-old electro-mechanical exchanges.

The Soviet Union had established a modest fixed-line system connecting Afghanistan's five major cities, however, this network, comprising only 40,000 lines, suffered from reliability and interconnection issues. In the late 1990s, the Afghan Wireless Communication Company (AWCC), a joint venture between the Taliban-controlled Ministry of Communications and a U.S.-based firm, introduced an advanced fixed-wireless network. Nevertheless, by 2001, AWCC served merely 9,000 lines, generating USD 1.8 million annually, primarily from government users. International communications were largely dependent on a satellite earth station in the capital, Kabul.

Post-2001 Reconstruction and Sector Growth
From 2001 onwards, international partners, such as the World Bank and NATO, supported various programs aimed at advancing the country's ICT sector and expanding Internet connectivity. Afghanistan telecommunications rapidly expanded from almost nonexistence in 2002 to all 34 provinces throughout the country and there was a continuous rise in teledensity, active mobile subscription and Internet users (Akhgar & Burinskienė, 2023). Following the establishment of the Islamic Transitional Government in 2002, the Ministry of Communications launched a telecommunications development strategy to modernize the sector. This strategy emphasized the development of fiber optic, wireless, and satellite infrastructure, as well as community telecenters. The re-launch of AWCC in 2002 and the entry of Roshan in 2003 marked the beginning of mobile telephony expansion. AWCC and Roshan enjoyed a three-year duopoly (2003–2006), after which additional operators, including MTN Afghanistan and Etisalat entered the market. Afghan Telecom (currently also known as Salaam), a government-owned company established in 2006, was tasked with operating the government's telecommunications networks, including the emerging fiber optic backbone. The total number of active users in Afghanistan's telecommunication market reached 25.3 million in 2024, illustrating a broad expansion of both mobile and Internet services (MCIT, 2024). By 2006, the telecommunication sector had become Afghanistan's largest legitimate revenue producer, generating over USD 100 million annually and employing more than 40,000 people. In 2024, MCIT reported a total of 186,000 jobs created within the sector with the total investment reached $2.8 billion (MCIT, 2024). ADSL services, introduced in 2011, remained expensive. The National Internet Exchange of Afghanistan (NIXA), proposed in 2011, aimed to centralize local traffic and reduce reliance on international gateways.

Fixed-Line and Mobile Telephony
Afghan Telecom, the national fixed-line operator, provided services in major cities and rural regions via CDMA (Code Division Multiple Access) networks. The mobile telephony market experienced exponential growth, with 23.6 million GSM subscribers by the end of 2014, covering 90% of the population. The introduction of 3G services in 2012 further boosted mobile broadband adoption, with 748,223 subscribers by September 2014. Major operators included Roshan, MTN Afghanistan, AWCC, and Etisalat, all of which invested in 3G and 4G LTE infrastructure. In 2024, the Ministry of Communications and Information Technology (MCIT) reported that Afghanistan had 6.7 million 3G users, 4.8 million 4G users, and a total of 25.3 million active users in the telecommunications market. This data highlights the significant penetration of telecommunications services in the country, with 3G users outnumbering 4G users, likely due to the affordability and broader coverage of 3G networks, especially in rural areas. The total number of active users indicates a growing market with potential for further expansion, particularly in 4G and future technologies like 5G, as infrastructure improves and costs decrease.

Internet and Broadband Development

Internet penetration in Afghanistan has grown significantly over the years. In 2003, there were fewer than 2,000 users. By 2012, the number had increased to an estimated 1.08 million (Hamdard, 2012). In 2013, the user base expanded further to 2.4 million, and by January 2024, the number of Internet users had increased to 7.88 million, reflecting a significant growth in Internet access (Data Reportal,2024). As of early 2024, Afghanistan had 27.67 million cellular mobile connections, which is equivalent to 64.6% of the country's total population. This indicates widespread mobile phone usage across the country. From January 2023 to January 2024, the number of Internet users in Afghanistan grew by +2.7%, raising the country's Internet penetration rate to 18.4% of the total population (Data Reportal,2024). The Ministry of Communications and Information Technology (MCIT) reported 12.9 million mobile Internet service users in 2024. However, publicly available data indicate that Internet penetration and usage rates in Afghanistan have stagnated since 2021(Kemp,2023). Other surveys indicate that only 15% of Afghans have access to the Internet, a figure (Figure 1) that has remained unchanged since 2016 (Nusratty & Crabtree, 2023). Among the 15% of Afghans with Internet access, the majority are men, and over 90 per cent of the country receives 2G mobile network coverage (Barton, 2022).
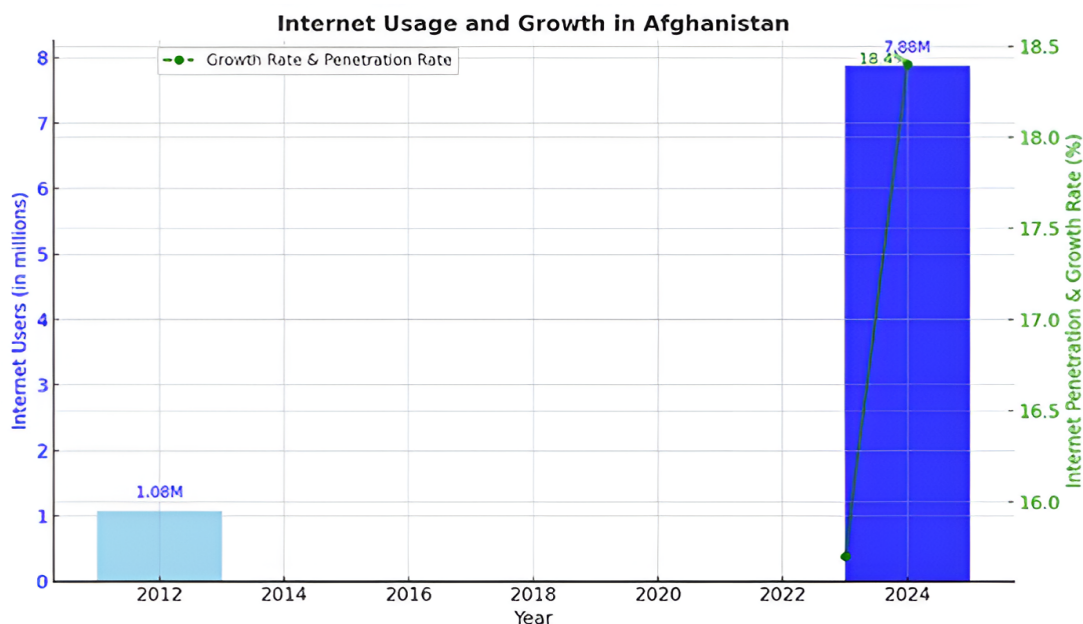

Figure 1. Internet Usage and growth in 2012 and 2024 (Data Reportal- Global Digital Reports, 2024)
Bar Chart (Blue): Represents the number of Internet users in Afghanistan for the years 2012 and 2024, showing a significant increase from 1.08 million to 7.88 million. **Green Line (Dashed):** Depicts the Internet penetration rate (18.4% in 2024) and the annual growth rate (+2.7% from 2023 to 2024))

Domestic and Regional Network Connectivity

The Afghan optical fiber network, initiated in 2007, spans 4,400 kilometers along the Ring Road and connects major provinces and neighboring countries (Pakistan, Iran, Turkmenistan, Uzbekistan, and Tajikistan). The network, governed by the Open Access Policy, ensures non-discriminatory access to high-speed fiber for retail providers. More than 1,000 km of the telecommunications backbone connectivity resulted in 3.5 million Internet users in 2017 (World Bank, 2021). In 2024, MCIT reported a total of 9138 KM fiber network thought the country. Afghan Telecom operates the fiber backbone, alongside the government communication network and the district communication network. International connectivity improved with the activation of terrestrial fiber links to neighboring countries, reducing reliance on costly satellite connections. Afghanistan's international Internet bandwidth grew

from 40 Mbps in 2004 to 15 Gbps in 2014, with prices dropping significantly from USD 4,000 per Mbps in 2004 to USD 35 per Mbps by 2014.
Key international links include connections to Pakistan (10 Gbps), Iran (200 Mbps), Tajikistan (2.5 Gbps), Turkmenistan (2.5 Gbps), and Uzbekistan (622 Mbps) (UN-ESCAP, 2016).

Global and Regional Perspectives on Internet Accessibility
Studies and reports from the relevant national, regional and international bodies shows that countries with advanced telecommunications and Internet infrastructure achieve higher economic growth and improved social outcomes. The digital divide, which highlights disparities between developed and developing nations, as well as within regions of the same country, has been a significant focus of research (Dewan & Riggins, 2005). Recent studies have further expanded on this concept, emphasizing the role of emerging technologies, policy interventions, and socio-economic factors in bridging or exacerbating these gaps. The rapid adoption of 5G technology and broadband infrastructure in developed nations has further widened the gap, while developing countries continue to struggle with basic connectivity and affordability. Efforts to address the digital divide now increasingly focus on public-private partnerships, universal service funds, and innovative solutions like satellite Internet and community networks. Challenges such as regulatory barriers, lack of investment, and socio-cultural factors continue to hinder progress, particularly in rural and marginalized communities. Conflict-affected developing countries, such as Afghanistan face substantial challenges in bridging this gap due to various technical, socio-economic and political factors, underscoring the importance of addressing these disparities to foster digital connectivity, economic development, and social inclusion.

Afghanistan's Telecommunications and Internet Landscape
Despite notable progress in the past two decades, Afghanistan's telecommunications sector has been heavily influenced by many years of conflict, political instability, and complex market dynamics (Altai Consulting, 2014). Reports from the national, regional and internationals bodies indicates that the country has faced challenges in developing a robust telecommunications infrastructure, including structural and operational difficulties (MCIT, 2011). Currently, the telecommunication market's concentration among private MNOs (Mobile Network Operators), ISPs (Internet Services Providers) and dependencies on the neighbour countries has further exacerbated these issues, stifling competition and contributing to high prices and inadequate service quality. The barriers to improving Internet access and affordability for all citizens, particularly in rural areas, can be categorized into technical and socio-economic factors. Technical barriers include destroyed or absent digital infrastructure, while socio-economic barriers involve the affordability of access, devices, and Internet connectivity (Shires & Wilkinson, 2024). These factors collectively hinder the necessary progress for Internet access.

Regulatory Framework
The Telecom Regulatory Board (TRB) was established in 2003, followed by the Afghanistan Telecommunications Regulatory Authority (ATRA) in 2006. The telecommunications services regulation act (2005) and the draft Information and Communications Technology (ICT) Law (2010) aimed to regulate e-government, e-commerce, and digital signatures. The government also inaugurated the Afghanistan National Data Centre in 2009, supporting its e-government initiatives.

Key Factors Affecting the Cost and Quality of Internet
The cost and quality structure of Internet services are influenced by multiple interconnect factors, including geographical constraints, market dynamics, no direct access to the sea and sub-marine cables, electrical power and Internet dependencies on neighbouring countries, regulatory challenges, and infrastructure deficiencies.

In Afghanistan, these challenges are intensified by the country's landlocked status, rugged terrain, years of conflict, and political instability, which impede the development and efficiency of telecommunications networks. Understanding these factors is crucial for developing strategies to reduce Internet costs and enhance service quality in such challenging environments.

Materials and Methods

This study employs a mixed-method approach, integrating both qualitative and quantitative data collection techniques to provide a comprehensive analysis of Afghanistan's telecommunication and Internet state, cost, quality, public satisfaction, and its impact on the country's socio-economic and digital development.

Data Collection

Primary data was obtained through semi-structured interviews with key stakeholders, including (7) former Afghan government officials, senior staff from (5) Mobile Network Operators (MNOs), (4) Internet Service Providers (ISPs), (10) industry experts and an online survey was conducted with 623 participants. These interviews aimed to capture insights into the operational challenges, regulatory issues, and market dynamics affecting Internet services in Afghanistan. Secondary data was sourced from reports and national, regional, and international bodies publications, including those from the International Telecommunication Union (ITU), World Bank, APT (Asia Pacific Telecommunity), Ministry of Telecommunication and Information Technology (MCIT)-Afghanistan, Afghanistan Telecommunication Regulatory Authority (ATRA) and other relevant industry sources. These documents provided context and additional information on telecommunications and Internet infrastructure, regulatory frameworks, and market trends.

Data Analysis

The collected data was analyzed using the thematic method. For qualitative data, thematic analysis was employed to identify recurring themes and patterns from semi-structured interviews. This approach allowed for the extraction of key insights into the contributing factors and challenges within Afghanistan's telecommunications sector and in particular the Internet. The results of quantitative data were compared to examine the access to Internet, market dynamics and satisfaction with telecommunication services in the country. By combining these analytical methods, the study aims to provide a nuanced understanding of the state of telecommunication and Internet in Afghanistan, particularly the factors influencing Internet access and affordability and its impact on socio-economic and digital development in the country.

Results and Discussions

The study's findings identify several interconnected factors influencing the cost and quality of Internet services in Afghanistan. These factors reflect deeper structural and infrastructural issues within the country's telecommunications and Internet sectors.

Geographic and Infrastructural Constraints

The analysis shows that Afghanistan's landlocked geography with no direct access to sea and rugged terrain are major factors contributing to internet costs (Figure 2).

The country's dependence on neighbouring nations for importing Internet and electrical power incurs additional expenses that are ultimately transferred to consumers. The mountainous landscape and rugged terrain further complicate the installation, maintenance, and expansion of telecommunications infrastructure, particularly in rural regions.

This situation aligns with recent findings that geographical challenges in similar contexts have similarly impeded infrastructure development (World Bank, 2023).

Figure 2. Afghanistan terrain map (SRTM, 2024) (**Indicators:** -Afghanistan is the 41st largest country in the world. -Afghanistan's terrain is approximately 75% mountainous and almost 50% of the country has an average elevation of 6,650 feet above sea level. -Afghanistan is the 37th most populated country in the world with a land area of 652,000 square kilometres.)

Market Dynamics

The Afghan telecommunications market is currently dominated by 5 key players (Mobile Network Operators): AFTEL (Salaam), AWCC, MTN, Roshan and Etisalat (Figure 3, 4). A critical observation is the lack of necessary market competition, which significantly drives up prices and leaves little incentive to lower prices or improve service quality. This absence of competitive pressure exacerbates the challenges of affordability and service standards in the sector. The limited market share of Afghan Telecom (Salaam) as a government-owned telecom company and the profit-driven focus of private companies further exacerbates this issue. This scenario is consistent with global trends where limited competition often leads to higher service costs (ITU, 2023). Internet service providers (ISPs) also made contributions to the sector. In previous years, key Internet service providers in Afghanistan included Afghan Telecom, NEDA, Io Global, CereTechs, INSTA, Rana, New Dunia, and Multiunit (Altai Consulting, 2014). The role of private sector actors is equally nuanced, as the private sector played a proactive role in Internet infrastructural development and improving connectivity in Afghanistan pre-2021, despite facing barriers and direct risks to their operations (Shires & Wilkinson, 2024). These challenges were exacerbated and amplified during active conflict. Post-2021, MTN and AWCC pursued new opportunities, exemplified by bidding to expand 4G nationwide (MCIT, 2023).
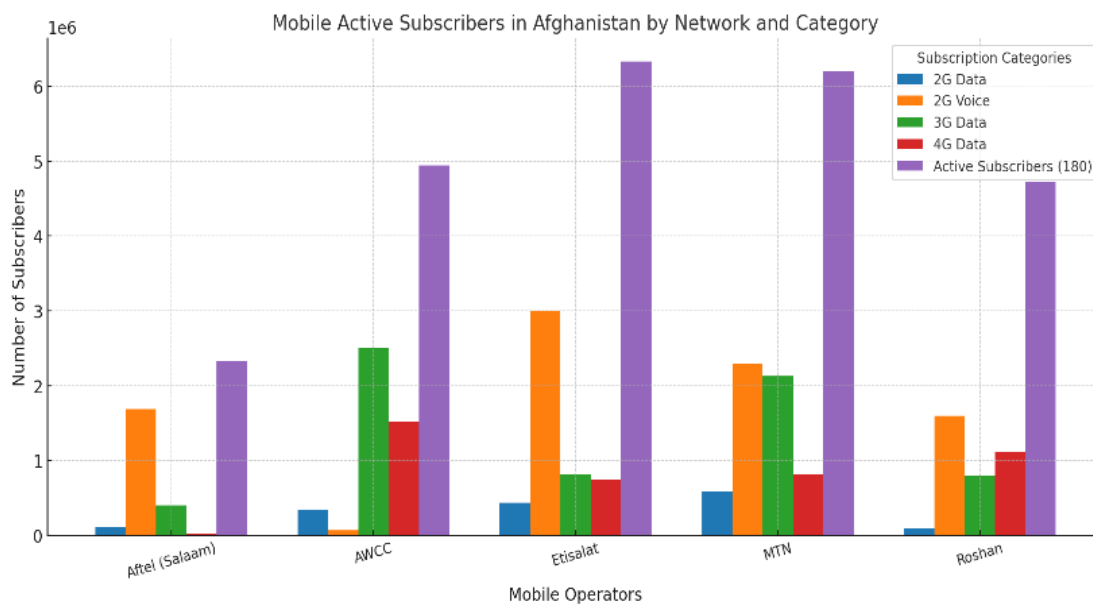
Figure 3. Mobile Active Subscribers as of 01.01.2025 (Source: ATRA)
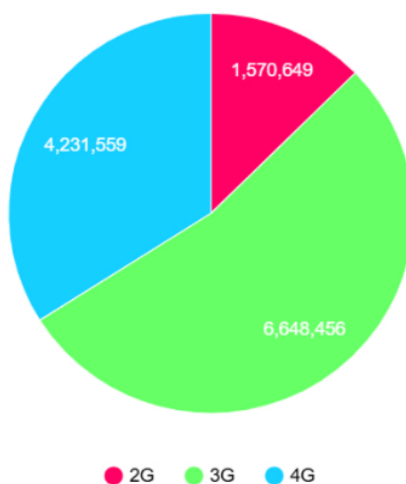

Figure 4. Telecom Statistics as of 4th Quarter 2024 (Data retrieved from ATRA Website)

Power Supply Issues

Another significant finding is the impact of unreliable and inconsistent power supply on operational costs. Reliable and affordable electricity is crucial for operating telecommunications infrastructure (Figure 5). Telecommunications companies in Afghanistan face operational expenses due to their reliance on imported electricity and fuel generators, and approximately only 30% of the country has access to electricity (Figure 6). This contributes to the elevated cost of Internet services. Similar challenges have been reported in other parts with unstable power supplies, highlighting a common issue that affects operational efficiency (Oyelaran-Oyeyinka & Lal, 2004).

Figure 5. TV Hill (Koh Asmayee) – Kabul Afghanistan (Photo retrieved from UNAMA, 2025)
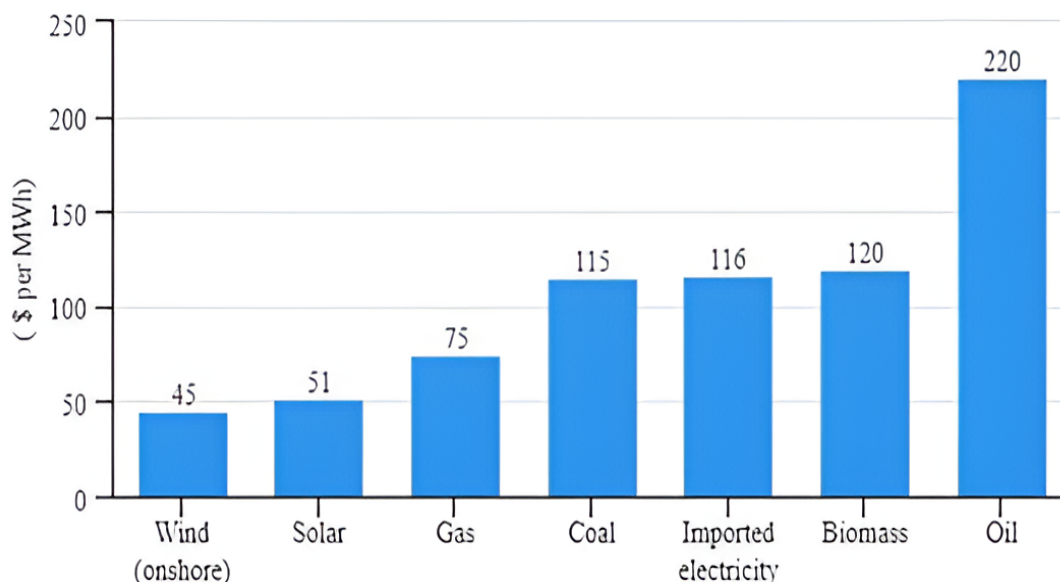

Figure 6. The average cost of Electricity by source in Afghanistan

(https://doi.org/10.1051/e3sconf/202123900012)

Population Density

On average 26.5 % of the population of Afghanistan is urban **(**11,320,521 people in 2024) while the population density in Afghanistan is 65 people per km², calculated on a total area of 652,860 km Square (Figure 7). There is a significant contrast in population density between urban and rural regions. Urban areas, especially Kabul, are densely populated, while rural areas have much lower population densities. Afghanistan's sparse population relative to its geographical size means there is less demand for Internet services. This lower demand does not encourage telecommunications companies (Mobile Network Operators) to invest heavily in telecommunication and Internet infrastructure, especially in rural and mountainous regions.

Table 1. Population Density in Large Cities

City	Population
Kabul	4,434,550
Herat	574,300
Mazar-e Sharif	523,300
Kandahar	523,300
Jalalabad	271,900

Figure 7. Urban vs Rural Population (*https://population.un.org/wup/countryprofiles?country=Afghanistan*)
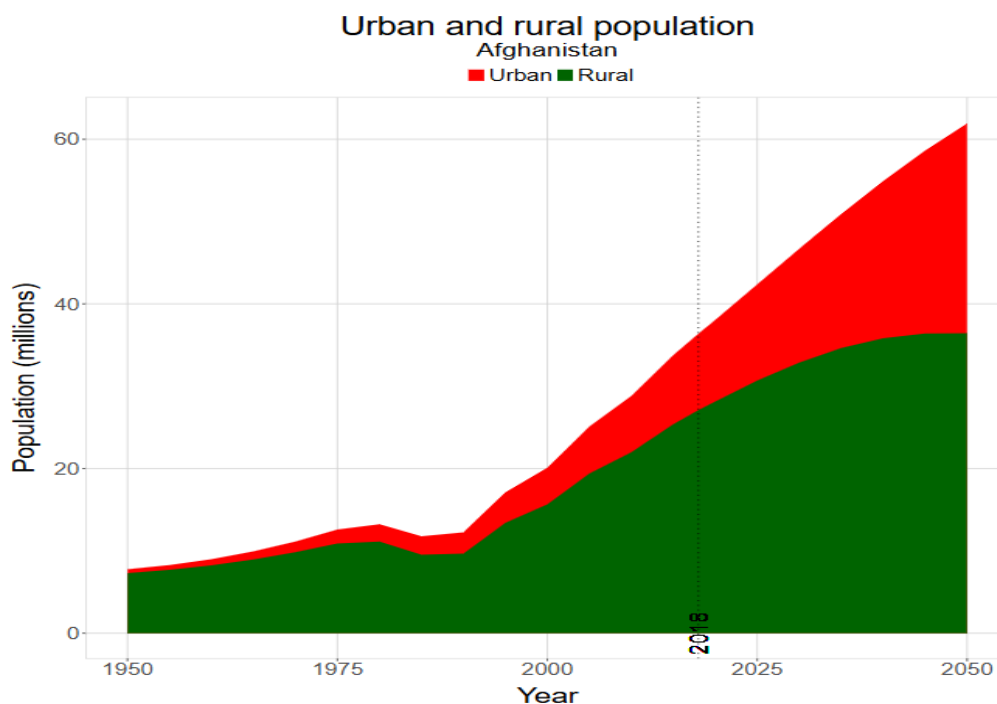
Regulatory and Policy Challenges

For the telecommunication sector to contribute effectively to sustainable economic growth, it requires joint efforts from both the government and the private sector. Collaborative action is essential to achieve better outcomes through proper policy formulation and implementation (Akhgar & Burinskienė, 2023).

The study findings highlight that outdated and inconsistent regulatory frameworks are substantial barriers to market improvement and even prior to 2021, Afghanistan's previous government did not necessarily have sufficient policies, processes and responses in place to ensure Internet resilience and safeguard digital rights (Shires & Wilkinson, 2024). The absence of new, updated policies and effective regulatory oversight has stymied the development of a competitive market. This situation is further compounded by frequent political and leadership changes and unavailability of advanced tools and software which results in inefficient radio spectrum management and monitoring, which has allowed service providers to operate with minimal pressure to enhance services. Studies underscores the importance of robust regulatory frameworks in fostering market competitiveness and improving service quality (Dewan & Riggins, 2005).

The Average Internet Cost in Afghanistan Compared to its Neighbouring Countries

Internet costs vary significantly over time across countries, influenced by factors such as infrastructure, market competition, and government policies. Retail price of Internet connectivity in Afghanistan was US$ 37 a month in 2017, down from US$ 450 a month in 2011(World Bank, 2021). According to techjury the monthly average cost of Internet in Afghanistan was $24.78 in 2024, still on average, Afghan consumers pay more for Internet services than their counterparts in neighbouring countries, both in terms of total monthly cost

and cost per Mbps. In 2016, the United Nations ESCAP department evaluated the typical monthly broadband subscription pricing in Afghanistan as prohibitively expensive, with a base package priced at USD 69 per Mbps.

Table 2. Average Monthly Broadband Cost (Data retrieved from World Population Review - Internet Cost by Country 2024)

Country	Cost (USD)
Afghanistan	$68.38
Iran	$8.20
Pakistan	$5.00
Tajikistan	$6.00
Turkmenistan	$58.68
Uzbekistan	$7.50

Table 3. Broadband Cost Per Mbps (Data retrieved from World Population Review - Internet Cost by Country 2024)

Country	Cost (USD)
Afghanistan	$2.07
Iran	$0.50
Pakistan	$0.30
Tajikistan	$1.50
Turkmenistan	$21.11
Uzbekistan	$0.80

The above values are approximate averages and vary based on specific service providers and mobile data plans. According to the Afghanistan Telecommunication Regulatory Authority (ATRA), as of January 1, 2025, the price cap for a 1GB Internet is set at AFN 95 (approximately 1.2 USD). This price remains still relatively higher compared to Afghanistan's neighbouring countries and other regions of the world (Figure 8). Telecommunication companies in Afghanistan provide different Internet prices in the country, according to Amu news, in 2023 the price of 8GB Internet on an MTN network is 720 Afghanis ($7.91), Roshan provides 10GB of Internet for 600 Afghanis ($6.59), Afghan Wireless (AWCC) sells 5 GB Internet for 500 Afghanis ($5.49) and Etisalat network provides 5 GB Internet for 550 Afghani ($6.04) while the Internet prices in neighbouring countries are lower compared to Afghanistan. In Pakistan, 50 GB Internet is sold for 300 Afghanis ($3.30), and in Iran, 10 GB of Internet is sold for 100 Afghanis ($1.10) (Amu News, 2023). Based on the data from the telecommunication companies' official pages, as of January 2025, figure 8 shows the monthly Internet prices per Gigabyte (GB), while table 4 shows the different mobile data plans for each Mobile Network Operator in Afghanistan.

Table 4. Mobile Data Monthly Plans

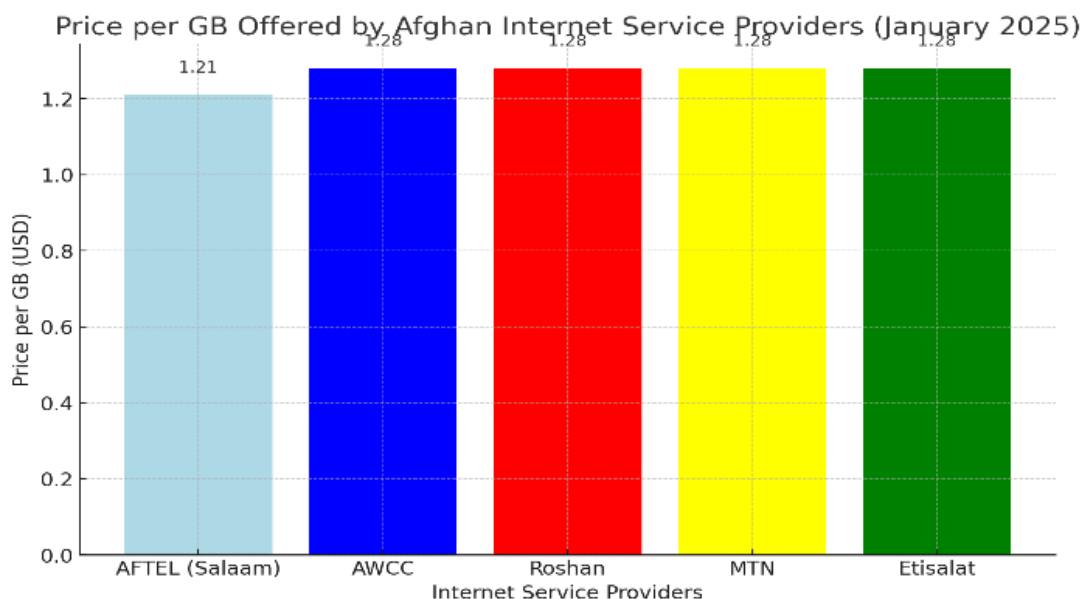| Provider	Data (GB)	Price (USD)
AFTEL (Salaam)	10	9.45
AWCC	6	5.50
Roshan	50	14.80
MTN	5	6.00
Etisalat	13.5	10.79

Figure 8. Prices Per Gigabyte (GB) (Mobile Network Operators Official Pages in Afghanistan)

As detailed in Table 4, mobile network operators in Afghanistan offer a variety of Internet packages with differing data volumes and plans, information sourced from their official marketing pages. For price calculations in USD, an exchange rate of 1 USD = 74 AFN was used, acknowledging significant fluctuations in the USD to AFN exchange rate. Afghanistan's Internet infrastructure relies on fiber optic networks from neighbouring countries, with domestic distribution managed by Afghan Telecom and private providers. In January 2025, the Taliban administration announced a reduction in Internet costs, setting the price of 1 GB of mobile data at 95 AFN (approximately $1.20). Despite this reduction, many Afghan citizens consider the cost high relative to the country's economic conditions, and concerns over poor service quality persist. While some users view the price cut as a positive step, others argue it does not sufficiently improve affordability or accessibility, especially in rural areas where connectivity remains unreliable. The demand for affordable and reliable connectivity is high, with many citizens calling for further price reductions and significant improvements in service quality, particularly in underserved regions.

Survey Results on Internet Service Satisfaction in Afghanistan
To evaluate public satisfaction with Internet services in Afghanistan, an online survey was conducted with 623 participants (Figure 9). Respondents were asked to rate their satisfaction with Internet services by selecting one of three options: "Yes" (satisfied), "No" (not satisfied), and "Partially Satisfied." The findings reveal that a significant majority of participants (over 90%) are dissatisfied with the current state of Internet services. The results are visually summarized in Figure 9, which shows the significant imbalance in user satisfaction levels.

The Impact of Telecommunication and Internet on Socio-economic and Digital Development
As illustrated in Figure 10 and supported by the study findings, four major factors significantly influence both the cost and quality of Internet services in Afghanistan: Geographic and Infrastructural Constraints, Market Dynamics, Power Supply Issues, and Regulatory and Policy Challenges, compounded by the country's overall complex socio-political and economic situation. These interconnected barriers hinder the affordability and accessibility of Internet services, particularly in rural regions, where connectivity remains limited. Affordable and high-quality Internet access is a critical enabler of socio-economic and digital development. It can bridge the digital divide, enhance educational opportunities, improve healthcare delivery, and foster economic growth by enabling access to global markets

and digital services. In rural areas, where infrastructure is often underdeveloped, reliable Internet connectivity can empower communities, support agricultural productivity, and facilitate access to government services.
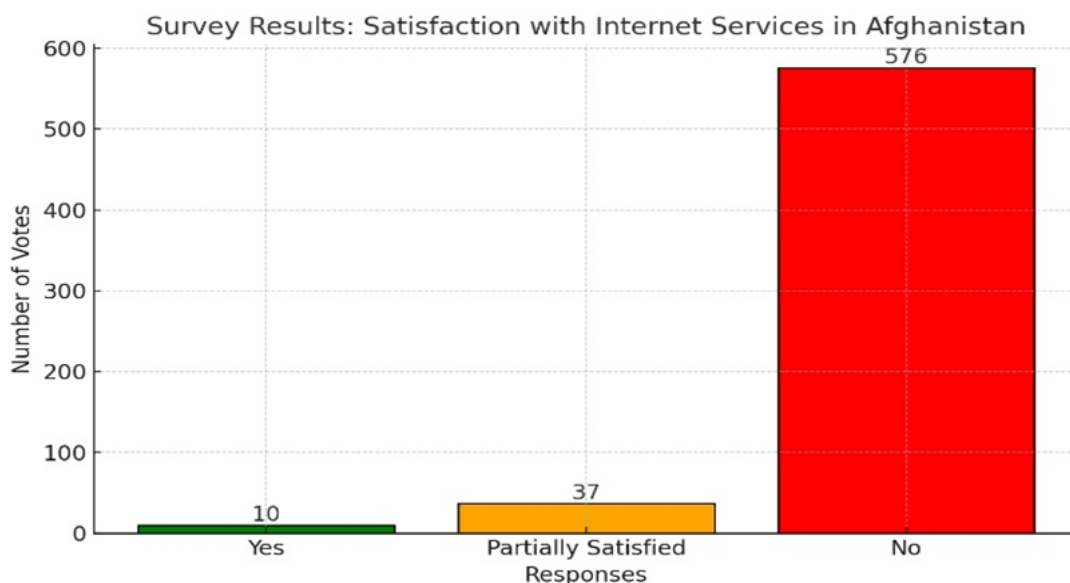

Figure 9. Satisfaction with Internet services (**Indicators:** 576 respondents (92.4%) reported dissatisfaction; 37 respondents (5.9%) indicated partial satisfaction; 10 respondents (1.6%) expressed satisfaction)
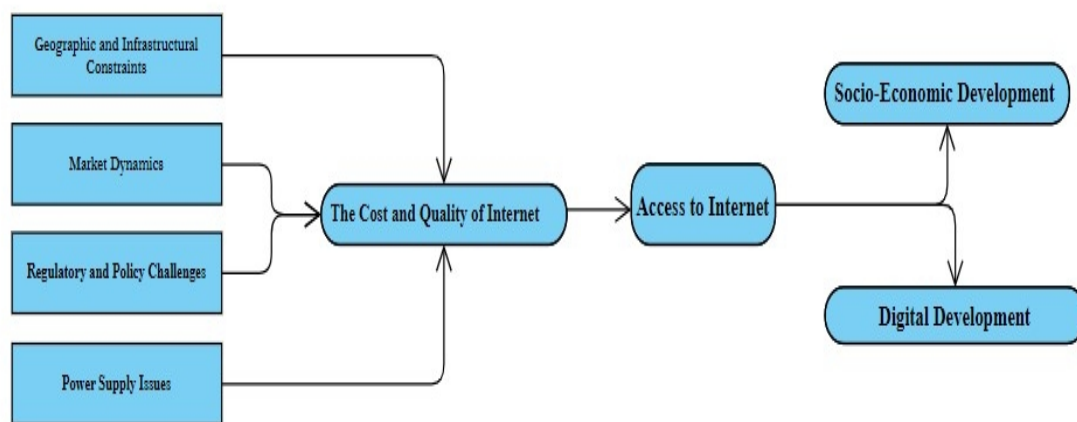

Figure 10. Factors Contributing to the Cost and Quality of Internet Services and its Effect on Socio-Economic and Digital Development

The overall findings of this study reveal that the cost and quality of telecommunications and Internet services in Afghanistan are influenced by a complex interplay of interrelated factors. These include geographic, political, and economic constraints, the lack of direct access to the sea and sub-marine cables, dependency on neighbouring countries for Internet connectivity, market dynamics, sparse population distribution relative to land area, regulatory challenges, and infrastructure and power supply challenges. Addressing these issues requires a comprehensive and multifaceted approach that not only focuses on fostering market competition and implementing regulatory reforms but also prioritizes infrastructure development, regional connectivity, and energy reliability. This study contributes to a deeper understanding of these challenges and factors, offering valuable insights for enhancing digital infrastructure in complex and resource-constrained environments. By doing so, it opens

avenues for further research and policy discussions aimed at improving connectivity and supporting socio-economic development in Afghanistan and similar contexts.

Potential Strategies and Recommendations for Telecommunication and Internet Services Improvement

Capacity Building and Technological Advancement

Investing in the training and development of technical staff can significantly improve the efficiency of the country's overall telecommunication and Internet services. Adopting new solutions, advanced tools, software, and technologies can help mitigate the identified issues and improve capabilities.

Policy Reforms and International Cooperation

In the previous year, efforts were made to undertake regulatory reforms and develop a roadmap. Key reforms included the adoption of the Open Access Policy in October 2016, the introduction of a cross-sector infrastructure sharing framework, and the allocation of additional spectrum to mobile operators (World Bank,2021). Strengthening the regulatory framework and ensuring its consistent implementation in all provinces is crucial. This includes updating policies to align with international telecommunication standards, reducing prices, and enhancing the QoS (Quality of Service). Engaging in international cooperation can provide access to best practices, technical support, and funding. Participating in global forums and partnerships can help Afghanistan leverage international expertise and resources.

Infrastructure Investment and Market Liberalization

Increasing investment in telecommunications and sustainable power infrastructure, particularly in rural and underserved areas, is essential. This includes expanding Fiber optic networks and enhancing the reliability of power supplies. Encouraging competition in the telecommunications market can lead to better services and lower prices. This can be achieved by reducing barriers to infrastructure expansion and fostering a competitive environment.

Access to Radio Spectrum and Consistent Monitoring

The equitable and efficient allocation of radio frequencies is complex and has often been used as an excuse by telecommunications companies to blame authorities for their shortcomings in Afghanistan. The limitation of advanced monitoring tools and technical expertise in all the provinces to ensure continuous oversight of telecommunications companies, Internet service providers and other frequency license holders on the country level impacts service quality and pricing in the country. Investing in advanced spectrum management and monitoring tools and technical expertise not only enhances the quality of services but also opens a way for reduced prices in the long run.

Research Limitation

The reliance on semi-structured interviews and limited available information as the primary data source can introduce bias. It is worth noting that accessing reliable and credible data related to Afghanistan remains a significant challenge. Additionally, the lack of sufficient scientific research on the state of telecommunications in Afghanistan, particularly on the Internet presents challenges for early researchers and restricts the depth of exploration. The rapidly changing political and economic environment in the country can significantly affect the applicability of the results over time. The study's focus on specific areas suggests that other contributing factors to the state of telecommunication and Internet in Afghanistan remain unexplored and warrant further investigation. Despite these limitations, this study's results are significant for understanding the underlying causes of Internet pricing and service quality issues in Afghanistan.

Conclusion

Afghanistan's telecommunications sector has undergone significant transformation since 2001, transitioning from a war-torn, underdeveloped infrastructure to a rapidly growing market with expanding mobile and Internet services. Despite Afghanistan's persistent political, security, and economic challenges, significant progress has been achieved in expanding telecommunication services and Internet access to its population over the past two decades. The country's telecommunications services and in particular Internet costs and quality are intricately linked to its geographic, political, and economic challenges. The research findings underscore the complexity of the issues, revealing that these challenges are not merely a result of market dynamics but are deeply embedded in the country's broader context. Addressing these challenges requires a multifaceted approach. Key strategies and actionable recommendations include capacity building, investment in telecommunication infrastructure, electrical power, advanced technology, policy reforms, market liberalization, and fostering international cooperation. By implementing these measures, Afghanistan can achieve further improvements in its telecommunication, ICT, and Internet infrastructure, reduce Internet costs, and enhance service quality. These advancements and access to affordable and quality Internet are crucial for fostering socio-economic development and enabling the country's full participation in the global digital economy.

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