

# Digital Demand vs. Network Capacity: A Review of Constraints in Philippine Telecommunications

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*Abstract- The Philippine telecommunications industry is navigating a dynamic and demanding market where ever-accelerating digital demand often outstrips infrastructure preparedness in ways that remain fragmented and inconsistent. Using recent policy papers, firm reports and institutional analyses, this integrative literature review evaluates the particular capacity constraints that impede the Philippine broadband development and transformation. It finds that although digital consumption is booming-supported by significant mobile penetration and sheer volume of data traffic-infrastructure development faces bottlenecks that stem from multiple, interplaying factors such as the archipelagic nature of the Philippines, uneven deployment of the backbone and tower, low fiber penetration, and fragmented mid-band spectrum. It also finds that traditional regulatory structures and market concentration have hindered competition and orderly investment. However, forward-looking legislation such as the Konektadong Pinoy Act paves promising routes toward equitable open access, infrastructure sharing and spectrum recapture. This literature review suggests that a consistent alignment of investment in physical infrastructure, judicious allocation of spectrum and sustained regulation is essential to bridge the Philippine digital gap by matching its rapid rise to a vibrant digital economy.*

*Index Terms- Philippine Telecommunications, Digital Demand, Infrastructure Readiness, Capacity Constraints, Integrative Literature Review, Broadband Policy*

## I. INTRODUCTION

The reorienting of the global economy into a digitally oriented network economy has put enormous pressure on national telecommunications networks. In the Philippines this transition represents a paradox: a highly digitally consuming public with infrastructure capacity that cannot keep up with demand. It is a country where growing demand for digital services is outstripping the availability of adequate infrastructure capacity due to a combination of physical, regulatory,

and market factors that include: the country's archipelagic geography, sparse backbone and tower density and uneven distribution, poor fiber depth, the shortage and fragmentation of spectrum, high market concentration, regulatory friction, and investment sequencing. In this seminar paper, a systematic review of the literature is conducted to trace these constraints and discuss possible regulatory and infrastructural strategies that can facilitate bridging the connectivity gap.

To better understand digital demand in the Philippines, baseline connectivity indicators in terms of cellular coverage and high speed fixed-line coverage reveal large mobile dependence and a widening gap in high-speed access. While the population coverage by mobile cellular, 3G, and 4G services in the Philippines were 99%, 96% and 80% in 2021 respectively, (International Telecommunication Union, n.d.), this masks significant inequalities in depth of access. In 2022, there were 70 active mobile-broadband subscriptions per 100 people, relative to just 8 fixed-broadband subscriptions per 100 people (International Telecommunication Union, n.d.). This heavy reliance on the mobile networks is paralleled by extraordinary use rates: average monthly mobile broadband traffic per subscription stood at 8,298 MB in 2021 (International Telecommunication Union, n.d.).

Notwithstanding this heavy use, according to the World Bank (2024), "the Philippines is lagging behind its ASEAN counterparts" in terms of speed, affordability, and coverage. The World Bank (2024) "suggests that inadequate policy framework and weak market competition are the main reasons behind poor broadband infrastructure and argues that connectivity to rural and peri-urban areas is important, yet remains underdeveloped." The development consequences of these gaps are substantial. As found by the Asian Development Bank (2025), the internet connection via

mobile technology improves household wealth in the Philippines, but this benefit is greater for those living in urban areas and therefore widens the gap if infrastructure continues to be primarily focused on the metropolitan centers.

## II. METHODOLOGY

The integrative literature review methodology is adopted for the purpose of the study, in an attempt to integrate various sources of evidence for the Philippines telecommunications industry. An integrative literature review is a unique research methodology used in the review, critique, and synthesis of representative literature on a topic in such a way that the review itself develops a new understanding or framework about the topic (Torraco, 2005). Based on the refined methodology used by Whitemore and Knafl (2005), empirical research literature alongside gray literature including policy notes, government acts, corporate reports, and institution reports are included in this review. This is a particularly apt method for research on telecommunications policy because it enables data like the network, quantifiable information (e.g., CAPEX of firms) and policy analysis (e.g., legislative structures, institutional reports) to be brought together. Focused research yielded nine critically relevant documents on digital demand and network capacity constraints, from organizations like the World Bank, ADB, GSMA, ITU, Philippine Government and key telecommunications providers.

## III. DISCUSSION

Three main themes emerged from the synthesis of the literature that frame the infrastructure readiness gap in the Philippines: geographical and physical deployment challenges, market dominance and regulatory friction, and spectrum allocation for next generation networks.

### *Geographical and Physical Deployment Hurdles*

Physical deployment of the telecom infrastructure in the Philippines is directly hindered by the geographical nature of the Philippines. The presence of more than 7000 islands adds to the cost and complexity of telco infrastructure roll-out (Asian Development Bank, 2025). Given that this country is an archipelago, it requires huge investment in

submarine cables and intricate microwave or satellite networks where fiber cannot be deployed. In response to these challenges, telco operators had invested extensively in Capex. In the first half of 2024, PLDT Inc. Spent P35.1 Billion in Capex (PLDT Inc, 2024). These investments resulted in expanding PLDT's fiber network by 1.15 million CKM and "homes passed" by 18.13 million, and extending PLDT's 4G/5G network coverage to 97% of the material population. However, this investment in Capex still fails to ensure equal digital readiness as described by the Department of Information and Communications Technology (n.d.) in their National Digital Connectivity Plan (NDCP), noting weak industry-wide infrastructure sharing and disparities in regional access.

### *Market Dominance and Regulatory Friction*

These geographical barriers are amplified by existing market and regulatory constraints. The stagnant expansion of broadband in the Philippines is a result of outdated policy and a saturated market that impedes the success of more competitively minded telecommunications companies (World Bank, 2024). Historically, telecom operators in the Philippines were required to obtain a legislative franchise to operate, posing a huge barrier to entry for smaller regional Internet Service Providers (ISPs). The Department of Information and Communications Technology (n.d.) agrees and identifies regulatory barriers and a duopoly legacy as a crucial gap. A non-existent open-access backbone logic forces duplication of costly networks in lucrative urban areas, at the expense of remote GIDAs (Geographically Isolated and Disadvantaged Areas) (Asian Development Bank, 2025).

### *Spectrum Management and Next-Generation Rollout*

Given the increasing reliance on high-capacity, low-latency applications, the deployment of 5G technologies is becoming increasingly necessary. Spectrum scarcity and fragmentation remain as impediments to high-speed connectivity, as while Philippines was quick in deploying 5G technologies, the extensive roll-out of high-quality 5G and 5G-Advanced throughout the country is hindered due to the lack of large continuous International Mobile Telecommunications (IMT) mid-band spectrum blocks required to exploit the spectral efficiencies necessary for handling massive volumes of data which

PLDT Inc (2024) claims were a total of 2,641 petabytes of data between their 40.5 million active data users within a six-month span. The convergence of these restrictions gives rise to the enduring gap between need and readiness, where a dependence on mobile services (70 active broadband subscriptions per 100 people) generates intensive mobile traffic (8,298 MB per user per month) and effectively overburdens the already-existing cell towers (International Telecommunication Union, n.d.). Efforts to resolve this, on the part of operators such as PLDT, primarily rely on massive fiber rollouts and the deployment of 5G technologies which however becomes difficult given the limitations in physical spectrum and contiguity (GSMA, 2026; PLDT Inc., 2024). The absence of a substantial infrastructure sharing mechanism for each operator also implies an isolated battle with the country's archipelagic geography, pushing up prices to the end-user and effectively limiting access to more peri-urban and rural regions. A more logic-centered approach such as an open-access backbone concept as posited by Asian Development Bank (2025) may serve to minimize redundant middle mile connections between islands. Table 1 summarizes the overarching themes, the evidence backing them up and the impact that these features entail.

These issues can only be rectified through broad policy reform. The NDCP (Department of Information and Communications Technology n.d.) set aggressive targets to fix these problems which included radical cost reductions, providing 130,000 Free Wi-Fi sites, connecting any outstanding GIDAs and rolling out further phases of the national fiber backbone. Importantly, legislative framework is rapidly evolving to meet these objectives; Republic Act No. 12234-the Konektadong Pinoy Act (Republic of the Philippines 2025)-directly addresses the frictions identified in this review; introduces an open-access policy by eliminating the outdated congressional franchise requirement, facilitating registration reform, enshrines infrastructure sharing and co-location, establishes a 'dig once' policy for civil works and imposes service levels and transparency requirements (Republic of the Philippines 2025); and finally includes powers for review and recall of spectrum to reclaim unused frequencies and thereby help fix mid-band spectrum fragmentation identified by GSMA (2026). The implications for future study include empirical quantification of post-enactment impact of the Konektadong Pinoy Act on broadband affordability and peri-urban growth, along with quantitative analysis that proves that reduced redundant capital expenditure from infrastructure sharing has been attained, to legitimize the World Bank (2024) and

Thematic Constraint	Key Evidence / Data Points	Implications for Sector Readiness
Geographical and Physical Deployment Hurdles	Over 7,000 islands increase rollout costs (ADB, 2025), 1.15 million km of fiber and 18.13 million homes passed but access is disparate regionally (PLDT Inc., 2024; DICT, n.d.)	Increases overall capital expenditure requirements, resulting in spatial inequalities that advantage urban wealth creation over rural access.
Market Dominance and Regulatory Friction	Policies are outmoded, and the sector faces poor competition (World Bank, 2024), but legislative franchise issues and limited infrastructure sharing remain barriers (DICT, n.d.).	Barriers market entry of small ISPs, leading to uneconomic infrastructure duplication in urban centers instead of over rural areas.
Spectrum Management and Next-Generation Rollout	5G on a nationwide scale is hindered by the lack of contiguous IMT mid-band spectrum (GSMA, 2026) over which 2,641PB of data traffic was generated in H12024 (PLDT Inc., 2024).	Caps network capacity and QoS, prohibiting 5G-Advanced and high-speed digital delivery for the expanding demand.

Table 1: Summary of Capacity Constraints and Sectoral Implications in Philippine Telecommunications Policy and Research Implications

ADB's (Asian Development Bank 2025) push for open access.

#### IV. CONCLUSION

The Philippines telecommunications market perfectly captures the dynamic tension between an infrastructure network confined to the physical and systematic constraints and a digitally inclined population. From the data of this integrative literature review, we can see the overwhelming digital demand (high mobile penetration and enormous mobile data traffic), but the preparedness to meet this demand are undermined by the nature of the Philippines being an archipelago, its short fiber depth, the dominance of two big players, and fragmentation of radio spectrum. Old regulatory framework was a great obstacle since it limited competition and resource-sharing. Fortunately, the recently passed Konektadong Pinoy Act and the ambitious goals of National Digital Connectivity Plan mark an important policy turn toward open access, shared infrastructure model. Through de-regulation of infrastructure, sharing and intelligent spectrum management, the country can surely move forward from infrastructure constraint to a thriving digital economy where nationwide inclusive digital demand can be attained.

#### REFERENCES

- [1] Asian Development Bank. (2025). Mobile internet connectivity and household wealth in the Philippines (ADB Economics Working Paper No. 818). <https://www.adb.org/sites/default/files/publication/1094556/ewp-818-mobile-internet-connectivity-philippines.pdf>
- [2] Department of Information and Communications Technology. (n.d.). National Digital Connectivity Plan 2024–2028. [https://cms-cdn.e.gov.ph/DICT/pdf/LATEST%20PUBLICATION%20NDCP\\_bda86f60-7dd4-4cf9-be58-c25275508074.pdf](https://cms-cdn.e.gov.ph/DICT/pdf/LATEST%20PUBLICATION%20NDCP_bda86f60-7dd4-4cf9-be58-c25275508074.pdf)
- [3] GSMA. (2026, April 17). Accelerating 5G and 5G-Advanced in the Philippines. [https://www.gsma.com/connectivity-for-good/spectrum/gsma\\_resources/accelerating-5g-and-5g-advanced-in-philippines/](https://www.gsma.com/connectivity-for-good/spectrum/gsma_resources/accelerating-5g-and-5g-advanced-in-philippines/)
- [4] International Telecommunication Union. (n.d.). Digital Development Dashboard: Philippines. [https://www.itu.int/en/ITU-D/Statistics/Documents/DDD/ddd\\_PHL.pdf](https://www.itu.int/en/ITU-D/Statistics/Documents/DDD/ddd_PHL.pdf)
- [5] PLDT Inc. (2024, August 13). Financial and operating results for the first half of 2024. [https://www.firstpacific.com/media/normal/17015\\_PLDT%201H24%20results.pdf](https://www.firstpacific.com/media/normal/17015_PLDT%201H24%20results.pdf)
- [6] Republic of the Philippines. (2025, August 24). Republic Act No. 12234: Konektadong Pinoy Act. [https://lawphil.net/statutes/repacts/ra2025/ra\\_12234\\_2025.html](https://lawphil.net/statutes/repacts/ra2025/ra_12234_2025.html)
- [7] Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review*, 4(3), 356–367. <https://doi.org/10.1177/1534484305278283>
- [8] Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of Advanced Nursing*, 52(5), 546–553. <https://doi.org/10.1111/j.1365-2648.2005.03621.x>
- [9] World Bank. (2024). Better internet for all Filipinos: Reforms promoting competition and increasing investments for broadband internet infrastructure. <http://hdl.handle.net/10986/40924>