

Digital Infrastructure as a Driver of National Digital Transformation in Algeria: An Analytical and Quantitative Study of Telecommunications and Internet Indicators (2013–2026)

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Abstract

This study examines the development of digital infrastructure in Algeria and its implications for the conditions underpinning national digital transformation over the 2013–2026 policy period. It extends the earlier policy-oriented focus on the E-Algérie 2013 project by providing a longitudinal, data-driven assessment of telecommunications and internet development. The empirical analysis combines annual World Bank indicators derived from International Telecommunication Union (ITU) statistics for 2014–2024 with recent sectoral evidence from the Autorité de Régulation de la Poste et des Communications Électroniques (ARPCE), Algérie Télécom, and Ookla Speedtest for 2024–2026. The study therefore distinguishes between the longer policy trajectory and the different statistical periods available from the underlying sources.

The findings indicate substantial growth in internet use, fixed broadband subscriptions, and fiber-to-the-home (FTTH) deployment, while mobile connectivity remains widespread. They also show increasing fixed-internet data traffic and comparatively strong network-performance results in the selected North African comparison. However, these indicators should be interpreted as evidence of infrastructure development and digital-readiness conditions rather than as direct measures of digital transformation outcomes. The study argues that the translation of connectivity into effective national digital transformation also depends on service quality, territorial equity, competition, cybersecurity, digital public services, institutional capacity, digital skills, and the ability to convert infrastructure into measurable socioeconomic value. The article contributes by integrating longitudinal infrastructure indicators with recent sectoral evidence and by clarifying the distinction between connectivity expansion and broader digital transformation.

Keywords: digital infrastructure; digital transformation; Algeria; digital readiness; internet; broadband; fiber-to-the-home; telecommunications; longitudinal analysis.

JEL Classification: O18; O33; L96; L86; H54

1. Introduction

Digital infrastructure has become a fundamental enabler of national digital transformation because it provides the technological foundation for e-government, digital commerce, online education, digital health, cloud computing, data-intensive business models, and cybersecurity. Contemporary research emphasizes that digital transformation extends beyond the adoption of digital technologies; it involves substantive changes in organizational processes, service delivery, and operating models enabled by those technologies (**Gong & Ribiere, 2021; OECD, 2019**). For this reason, infrastructure indicators are best understood as enabling conditions whose effects depend on complementary organizational, institutional, and human capabilities. In Algeria, the E-Algérie 2013 project marked an important policy milestone in the development of the information society and the modernization of telecommunications infrastructure. Subsequent developments—particularly the expansion of mobile internet, the deployment of fiber-optic networks, and the increasing availability of network-performance data—make it necessary to reassess Algeria’s digital trajectory using recent and measurable evidence (**High Commission for Digitalization, 2024; MPT, 2025**). In this article, 2013–2026 denotes the broader policy and analytical period, whereas the principal longitudinal World Bank/ITU series cover 2014–2024 and the complementary sectoral indicators cover 2024–2026.

Accordingly, this study adopts a data-driven structure in which the principal quantitative indicators are presented through tables and figures and interpreted using traceable sources. The analysis is deliberately descriptive and longitudinal. It identifies changes in access, technology composition, usage intensity, and measured network performance, but it does not claim to establish a causal relationship between infrastructure expansion and socioeconomic transformation. This distinction is central to the interpretation of the findings.

2. Research Problem and Hypotheses

The central research question is: To what extent has the development of digital infrastructure in Algeria during the 2013–2026 policy period strengthened the conditions for national digital transformation, and what limitations remain when access, technology composition, usage intensity, service performance, and regional comparison are considered together? The question is grounded in the distinction between the availability of digital networks and their capacity to generate institutional, economic, and social outcomes (**Mousavi et al., 2023; Pérez-Castro et al., 2021**).

The study advances the following research proposition: Algeria has experienced substantial quantitative progress in digital infrastructure, but the translation of this progress into effective national digital transformation remains conditional on complementary dimensions of service quality, fiber deployment, competition, digital services, governance, institutional readiness, digital skills, and cybersecurity. Because the empirical design is descriptive rather than causal,

this proposition is evaluated through convergent evidence across infrastructure and network-performance indicators rather than through a causal hypothesis test.

3. Methodology and Data Sources

The study employs a descriptive-analytical and longitudinal quantitative design. Annual indicators for 2014–2024 are drawn from World Bank databases based on ITU statistics. These are complemented by ARPCE quarterly market indicators, FTTH deployment milestones reported by Algérie Télécom and the Ministry of Post and Telecommunications, and country-level network-performance comparisons from Speedtest for the more recent period 2024–2026 (World Bank, 2026a, 2026b, 2026c; ARPCE, 2025a, 2025b; Algérie Télécom, 2025). The analysis is organized around four dimensions: (1) access and adoption, (2) infrastructure and technology transition, (3) usage intensity, and (4) network performance. The principal analytical techniques are trend comparison, index construction, technology-share analysis, and cross-country descriptive comparison. No causal estimation is undertaken.

APA 7th edition conventions are used for in-text citations and the reference list. Statistical claims are linked to their underlying sources, and each table is accompanied by a source note. The analysis also distinguishes between official statistical series, regulatory data, corporate infrastructure milestones, and third-party network-performance measurements. This distinction is important because the sources differ in purpose, coverage, and measurement methodology.

Data coverage and comparability. The main World Bank/ITU series are annual and extend through 2024, whereas ARPCE observations are quarterly and the FTTH and Speedtest evidence covers selected dates in 2024–2026. These sources are therefore used complementarily rather than merged into a single homogeneous time series. Comparisons across sources are interpreted as indicative of development patterns, with due attention to differences in definitions, observation periods, and measurement procedures.

4. Theoretical Framework and Study Variables

Digital infrastructure refers to the networks, systems, and technological resources that enable the production, transmission, storage, and processing of data. It encompasses fixed and mobile telecommunications, fixed and mobile internet, broadband networks, fiber-optic infrastructure, data centers, cloud-computing facilities, cybersecurity systems, and internet exchange points. Infrastructure is therefore a necessary, but not sufficient, condition for digital transformation (ITU, 2025; OECD, 2019).

National digital transformation refers to the substantive redesign of public services, economic processes, and institutional models through the strategic use of digital technologies. It is broader than digitization because it does not merely convert paper-based procedures into electronic formats; rather, it changes how services and processes are designed, delivered, managed, and evaluated (Gong & Ribiere, 2021).

Digital readiness can be viewed as an intermediate condition linking infrastructure development to transformation outcomes. It encompasses connection quality, digital skills,

cybersecurity, regulatory capacity, interoperability, and trust in digital services. Consequently, infrastructure may expand rapidly while a digital transformation gap persists if institutions, skills, and services do not develop at a comparable pace (Mousavi et al., 2023; Pérez-Castro et al., 2021).

5. Previous Studies and Research Gap

Wu et al. (2023) demonstrate that regional digital infrastructure can promote enterprise digital transformation, while also showing that its effects depend on organizational capabilities and mediating mechanisms. This perspective is relevant to Algeria because network deployment, by itself, does not guarantee transformation unless infrastructure is connected to institutional capacity and effective digital service delivery.

Gong and Ribiere (2021) develop a unified conceptualization of digital transformation centered on substantive organizational change. Their framework supports the distinction adopted in this study between the expansion of connectivity and the achievement of broader transformation outcomes.

Mousavi et al. (2023) examine the digital transformation gap in emerging economies and emphasize the importance of organizational culture, capabilities, and institutional readiness. Their findings reinforce the need to assess Algeria's progress in network indicators alongside governance, service integration, skills, and cybersecurity.

The research gap addressed by this study lies in integrating Algeria's historical digital-policy trajectory with annual infrastructure indicators, quarterly ARPCE data, technology-specific subscriber distributions, FTTH milestones, regional network-performance comparisons, and recent research on digital transformation. This integrated perspective extends analyses that focus primarily on E-Algérie 2013 or on individual telecommunications indicators by examining infrastructure development as a multidimensional and evolving process.

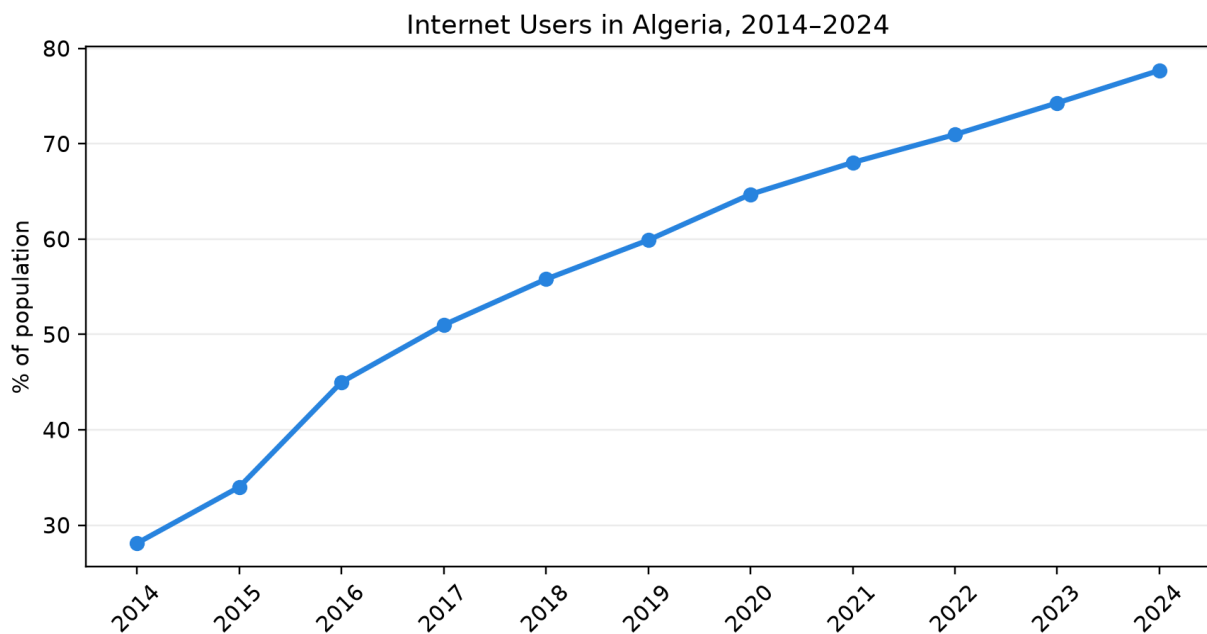
6. Quantitative Analysis of Algeria's Digital Network Indicators

The quantitative analysis is organized thematically around internet use, fixed broadband, mobile and fixed telephony, comparative growth, FTTH deployment, technology-specific fixed internet access, quarterly ARPCE indicators, fixed data traffic, and regional Speedtest comparisons. The purpose is not to infer causality from descriptive indicators, but to identify the direction, magnitude, and composition of infrastructure change and to assess what these changes imply for the conditions underlying digital transformation.

6.1 Internet Users

Year	Internet users (% of population)
2014	28.11
2015	34.0
2016	45.0
2017	51.0
2018	55.8

2019	59.9
2020	64.7
2021	68.04
2022	70.97
2023	74.29
2024	77.7

Table 1. Internet users in Algeria, 2014–2024. Source: World Bank/International Telecommunication Union (**World Bank, 2026a**).**Figure 1.** Internet users in Algeria, 2014–2024.

Internet use increased from 28.11% of the population in 2014 to 77.70% in 2024, representing a substantial expansion in the reach of internet connectivity. The trend indicates a transition from relatively limited internet diffusion toward widespread population-level access. Nevertheless, the indicator measures use rather than service quality or socioeconomic impact; it should therefore be interpreted alongside measures of speed, reliability, affordability, usage intensity, and digital-service outcomes (**World Bank, 2026a; Internet Society Pulse, 2026**).

6.2 Fixed Broadband

Year	Fixed broadband subscriptions per 100 inhabitants
2014	7.71
2015	8.59
2016	9.76
2017	10.96
2018	12.21
2019	14.68
2020	15.15
2021	15.77
2022	16.52
2023	17.71
2024	18.98

Table 2. Fixed broadband subscriptions in Algeria, 2014–2024. Source: World Bank/International Telecommunication Union (**World Bank, 2026b**).

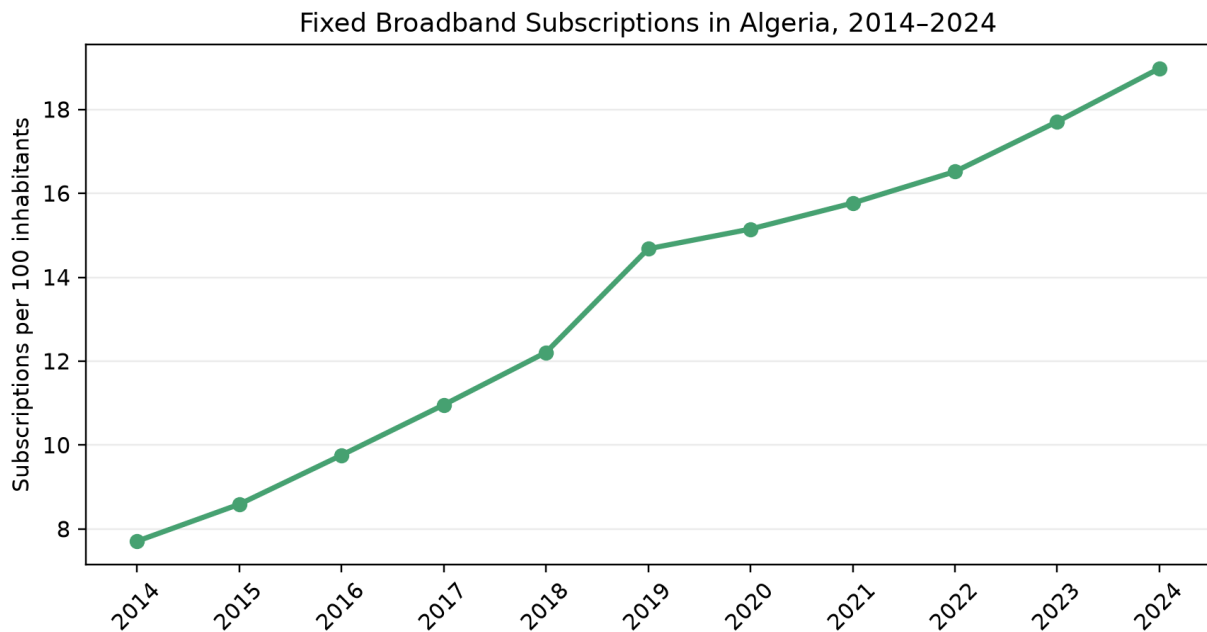


Figure 2. Fixed broadband subscriptions in Algeria, 2014–2024.

Fixed broadband subscriptions increased from 7.71 per 100 inhabitants in 2014 to 18.98 in 2024. The expansion is relevant to advanced digital activities such as cloud-based services, remote work, e-learning, and enterprise connectivity because these activities generally depend on stable and higher-capacity connections. However, the aggregate indicator masks important technological differences; ADSL, fixed 4G LTE, and FTTH do not provide equivalent performance or long-term infrastructure capabilities (**World Bank, 2026b; ARPCE, 2025a**).

6.3 Mobile and Fixed Telephony

Year	Mobile cellular subscriptions per 100 inhabitants	Fixed telephone subscriptions per 100 inhabitants
2014	115.05	24.1
2015	128.46	23.91
2016	138.25	24.01
2017	145.51	23.3
2018	152.57	22.43
2019	158.19	22.69
2020	142.33	22.83
2021	142.24	23.17
2022	145.15	23.15
2023	139.76	22.0
2024	131.22	21.87

Table 3. Mobile and fixed telephone subscriptions in Algeria, 2014–2024. Source: World Bank/International Telecommunication Union (**World Bank, 2026c**).

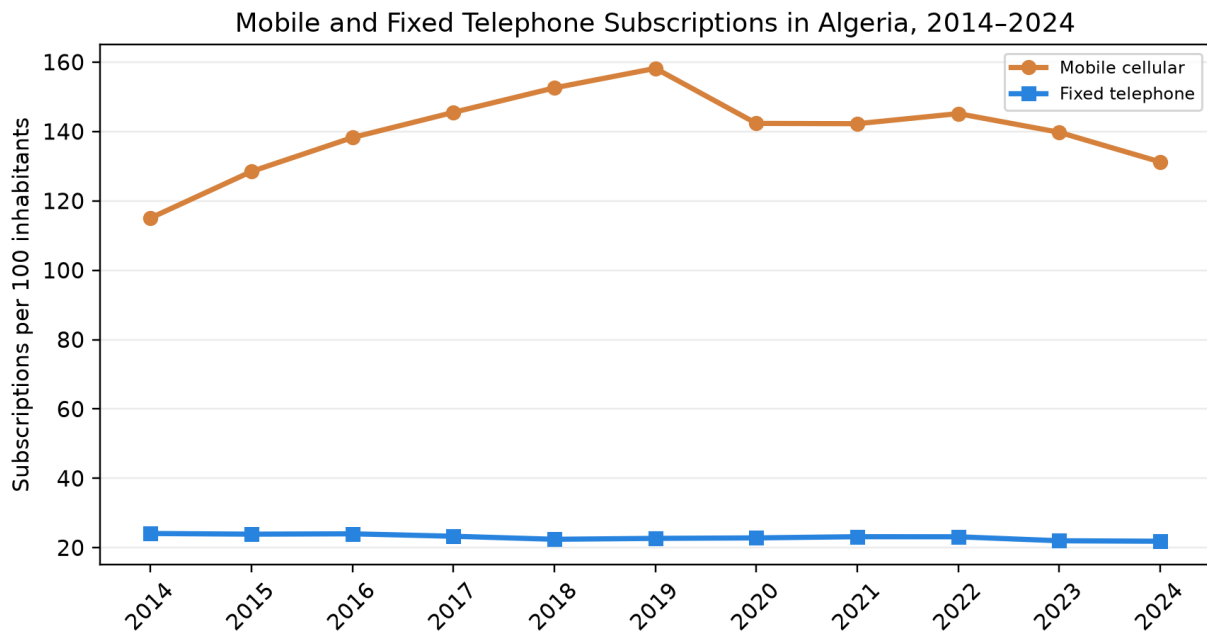


Figure 3. Mobile and fixed telephone subscriptions in Algeria, 2014–2024.

Mobile subscriptions remained above 100 per 100 inhabitants throughout the period, whereas fixed telephone subscriptions were comparatively stable before declining modestly toward the end of the period. The pattern is consistent with the growing importance of mobile connectivity as an access channel, while fixed-line infrastructure increasingly functions as a platform for fixed internet services rather than primarily for traditional voice communication (**World Bank, 2026c**).

6.4 Comparative Growth Index

Year	Internet users index	Fixed broadband index	Mobile index	Fixed telephone index
2014	100.0	100.0	100.0	100.0
2015	120.95	111.41	111.66	99.21
2016	160.09	126.59	120.17	99.63
2017	181.43	142.15	126.48	96.68
2018	198.51	158.37	132.61	93.07
2019	213.09	190.4	137.5	94.15
2020	230.17	196.5	123.71	94.73
2021	242.05	204.54	123.63	96.14
2022	252.47	214.27	126.16	96.06
2023	264.28	229.7	121.48	91.29
2024	276.41	246.17	114.05	90.75

Table 4. Comparative growth index of ICT indicators in Algeria, base year 2014 = 100.

Source: Author's calculations based on World Bank/ITU data (**World Bank, 2026a, 2026b, 2026c**).

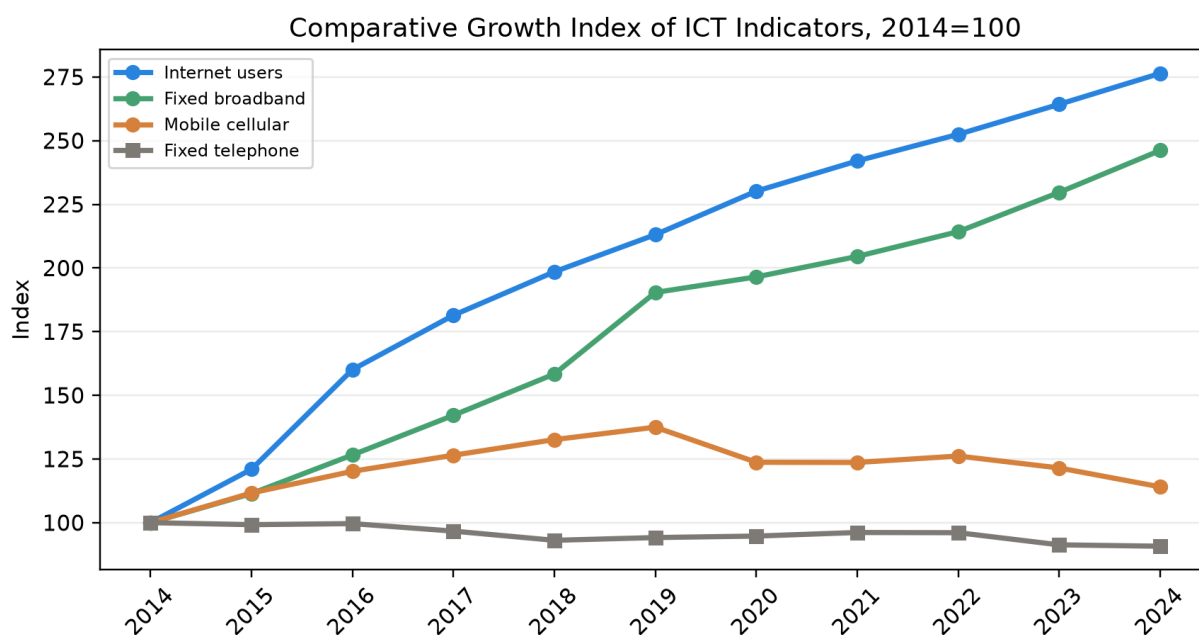


Figure 4. Comparative growth index of ICT indicators, 2014 = 100.

The index indicates that internet use and fixed broadband recorded the strongest relative growth over the period, whereas mobile subscriptions started from an already high base. Fixed telephony, by contrast, recorded a relative decline. Taken together, these movements point to a structural shift away from traditional voice-oriented connectivity toward more data-intensive forms of digital access (World Bank, 2026a, 2026b, 2026c).

6.5 FTTH Fiber Optics

Date	FTTH subscribers (million)
2020	0.053
Nov. 2023	1.0
Oct. 2024	1.5
Apr. 2025	2.0
Sep. 2025	2.5
Oct. 2025	2.6

Table 5. FTTH subscribers in Algeria. Source: Ministry of Post and Telecommunications, Algérie Télécom, and sectoral reports (MPT, 2025; Algérie Télécom, 2025; Ecofin Agency, 2025).

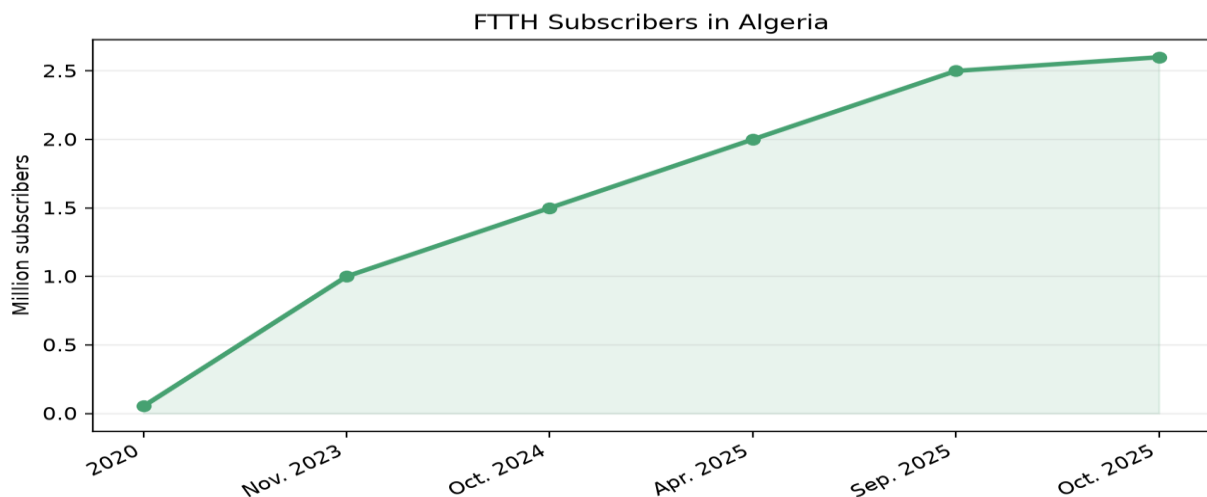


Figure 5. FTTH subscribers in Algeria.

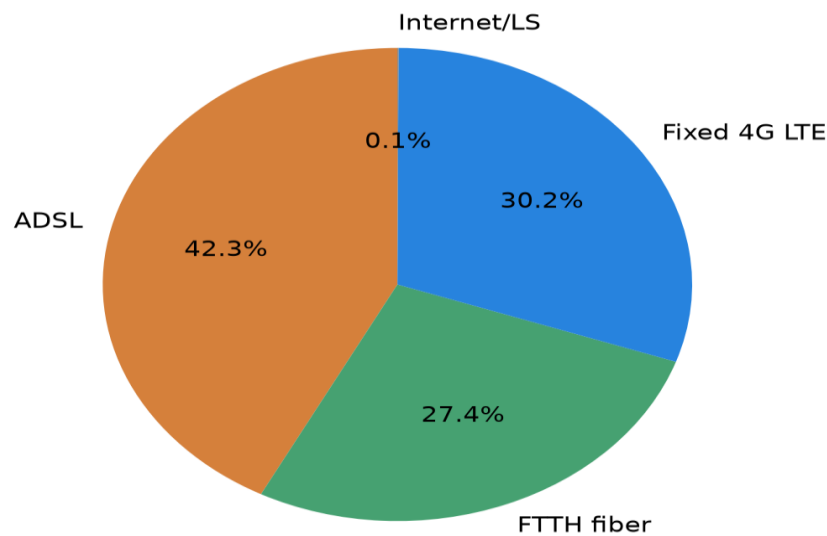
FTTH deployment represents a major component of the modernization of Algeria's fixed digital infrastructure. The number of FTTH subscribers increased from approximately 53,000 in 2020 to more than 2.5 million in 2025, while Algérie Télécom reported 2.6 million subscribers in October 2025. The scale and pace of this increase indicate a substantial transition from copper-based access toward fiber-based connectivity (Algérie Télécom, 2025; Ecofin Agency, 2025).

6.6 Fixed Internet Subscribers by Technology

Technology	Share in Q4 2024 (%)	Estimated subscribers out of 6,216,146
ADSL	42.34	2631290
FTTH fiber	27.36	1700722
Fixed 4G LTE	30.24	1878179
Internet/LS	0.06	3730

Table 6. Fixed internet subscriptions by technology in Q4 2024. Source: ARPCE Internet Market Observatory, Q4 2024 (ARPCE, 2025a).

Fixed Internet Subscribers by Technology, Q4 2024

**Figure 6.** Fixed internet subscribers by technology, Q4 2024.

In Q4 2024, ADSL accounted for 42.34% of fixed internet subscriptions, compared with 27.36% for FTTH and 30.24% for fixed 4G LTE. The distribution indicates that Algeria remains in a transitional phase: FTTH is expanding rapidly, but legacy fixed access and wireless fixed-access technologies continue to represent a substantial share of the market (ARPCE, 2025a).

6.7 ARPCE Quarterly Internet Market Data

Quarter	Fixed internet subscribers (million)	Mobile internet subscribers (million)
Q2 2024	5.73	49.27
Q3 2024	5.91	50.63
Q4 2024	6.22	51.32
Q1 2025	6.45	51.69
Q2 2025	6.67	52.42

Table 7. Fixed and mobile internet subscriptions by quarter, Q2 2024–Q2 2025. Source: ARPCE Internet Market Observatory, Q2 2025 (ARPCE, 2025b).

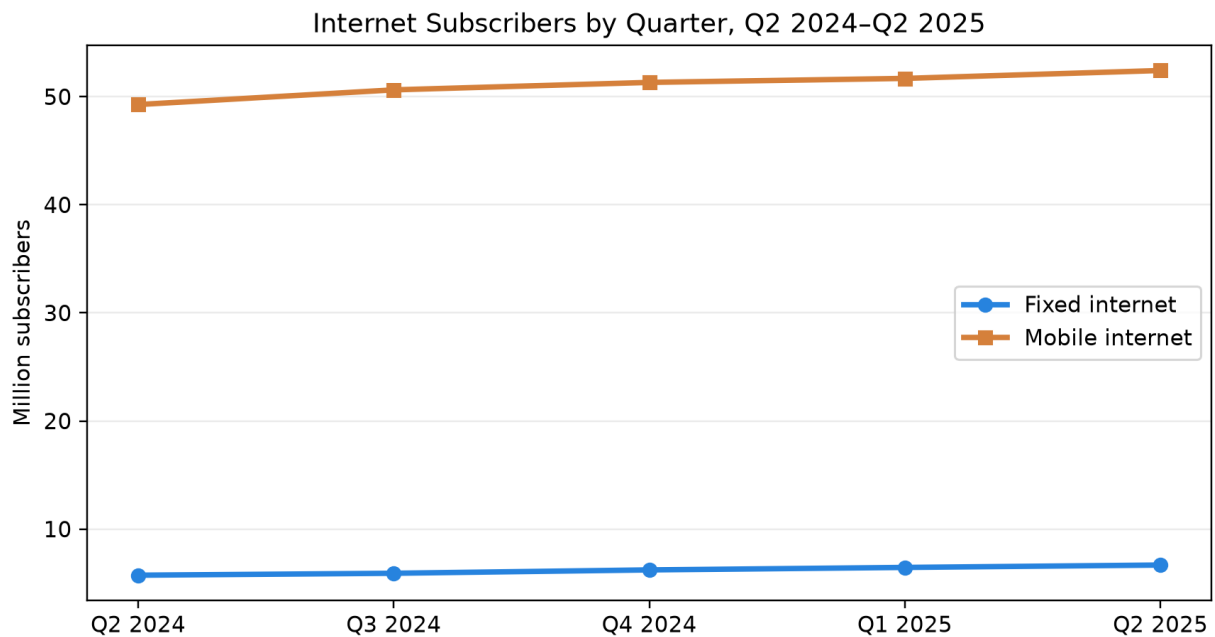


Figure 7. Fixed and mobile internet subscribers by quarter, Q2 2024–Q2 2025.

ARPCE quarterly data show that fixed internet subscriptions increased from 5.73 million in Q2 2024 to 6.67 million in Q2 2025, while mobile internet subscriptions increased from 49.27 million to 52.42 million over the same period. These changes indicate continued short-term expansion in both fixed and mobile internet access (ARPCE, 2025b).

6.8 Fixed internet data traffic by quarter, Q2 2024–Q2 2025

Quarter	Fixed internet data traffic (million GB)
Q2 2024	2706
Q3 2024	2728
Q4 2024	2734
Q1 2025	2984
Q2 2025	3291

Table 8. Fixed internet data traffic by quarter, Q2 2024–Q2 2025. Source: ARPCE Internet Market Observatory, Q2 2025 (ARPCE, 2025b).

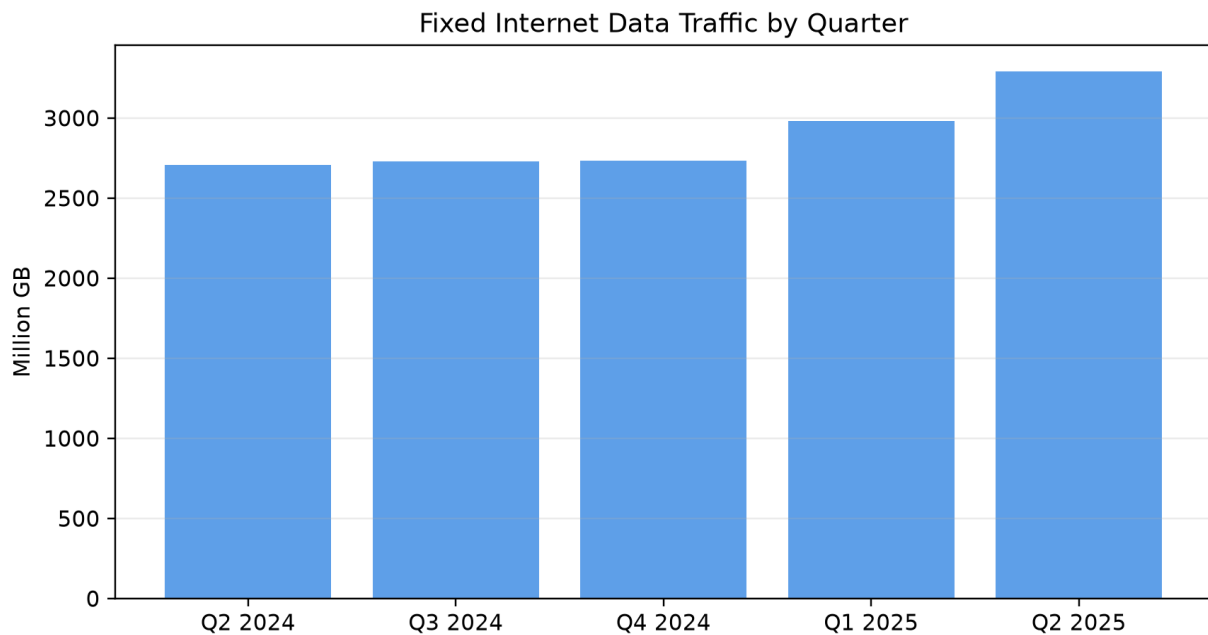


Figure 8. Fixed internet data traffic by quarter, Q2 2024–Q2 2025.

Growth is also evident in data consumption rather than subscriber numbers alone. Fixed internet data traffic increased from 2,706 million GB in Q2 2024 to 3,291 million GB in Q2 2025. This increase suggests greater data intensity and expanding use of bandwidth-intensive digital services, although traffic growth by itself does not establish the nature or quality of the underlying digital activities (ARPCE, 2025b).

6.9 Regional Speedtest Comparison

Country	Mobile rank	Mobile download (Mbps)	Mobile upload (Mbps)	Mobile latency (ms)	Fixed rank	Fixed download (Mbps)	Fixed upload (Mbps)	Fixed latency (ms)
Algeria	47	166.6	24.28	28	82	152.6	70.05	21
Morocco	56	143.54	24.66	29	114	80.7	72.89	23
Tunisia	75	101.22	19.4	24	146	29.95	18.03	30
Egypt	85	64.12	13.34	30	106	89.87	18.32	18

Table 9. Speedtest Global Index comparison: Algeria, Morocco, Tunisia, and Egypt, June 2026. Source: Ookla Speedtest Global Index country pages (Ookla, 2026).

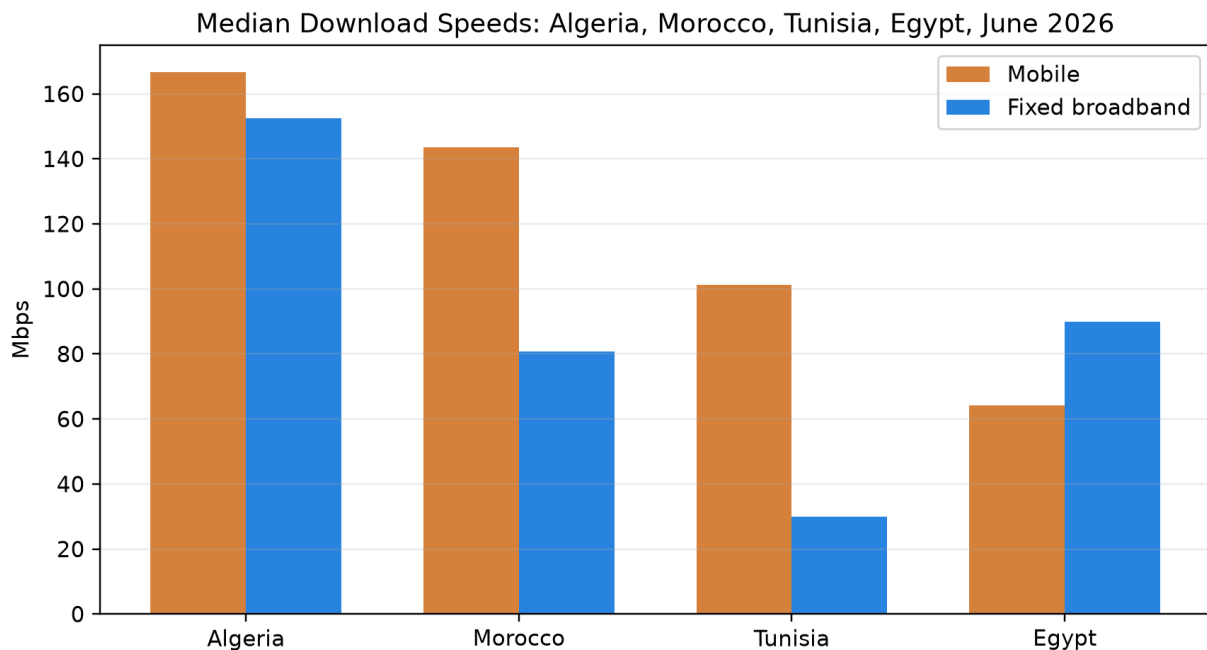


Figure 9. Median download speeds in Algeria, Morocco, Tunisia, and Egypt, June 2026.

In June 2026, Algeria ranked 47th globally for mobile internet, with a median download speed of 166.60 Mbps, and 82nd for fixed broadband, with a median download speed of 152.60 Mbps. Within the selected North African comparison, Algeria recorded the highest median mobile and fixed download speeds among Algeria, Morocco, Tunisia, and Egypt. These results provide useful evidence on network performance, although international speed rankings should be interpreted cautiously because they are measurement-based indicators and do not capture all dimensions of user experience or digital readiness (Ookla, 2026).

7. Discussion

Overall, the results indicate that Algeria's digital infrastructure is moving beyond a phase characterized primarily by basic access expansion toward a stage in which network performance, technology composition, and data intensity become increasingly important. Growth in internet adoption and fixed broadband demonstrates broader diffusion, while the rapid expansion of FTTH indicates a structural transition toward higher-capacity fixed infrastructure (World Bank, 2026a, 2026b; Algérie Télécom, 2025). These developments strengthen the technological base on which digital transformation can occur, but they should not be interpreted as direct evidence that transformation outcomes have already been achieved. The findings are broadly consistent with Wu et al. (2023), who argue that digital infrastructure can support digital transformation but that its effects depend on organizational capabilities and mediating mechanisms. In the Algerian context, the infrastructure indicators document substantial progress, but they do not by themselves demonstrate improvements in institutional performance or digital public-service outcomes. The remaining transformation challenge therefore concerns the extent to which infrastructure is integrated with governance, organizational capabilities, competition, skills, and effective digital services (Wu et al., 2023; Internet Society Pulse, 2026).

The results also reinforce Gong and Ribiere's (2021) argument that digital transformation is deeper than digitization. Algeria's rising internet and broadband indicators provide evidence of expanding digital access, while the FTTH transition indicates modernization of the underlying fixed-access platform. Yet broader transformation requires institutional redesign, interoperability, cybersecurity, digital skills, and user-centered services. The contribution of the present study is therefore to document the infrastructure trajectory and identify the conditions that need to be connected to it, rather than to equate infrastructure growth with transformation itself.

7.1 Theoretical Contribution

The study contributes to the digital transformation literature by conceptually separating infrastructure expansion from transformation outcomes and by positioning digital readiness as an intermediate condition between connectivity and transformation. Empirically, it demonstrates how longitudinal infrastructure indicators can be organized into an integrated framework that captures access, technology transition, usage intensity, and network performance. This framework can be adapted to other emerging economies where direct measures of digital transformation remain fragmented.

7.2 Policy Implications

The findings imply that infrastructure policy should increasingly move from coverage-oriented targets toward quality- and impact-oriented targets. FTTH expansion should be accompanied by measures of affordability, reliability, regional equity, service quality, digital skills, cybersecurity, interoperability, and the effective use of digital public services. Regulatory and statistical systems would also benefit from more granular regional and technology-specific reporting, enabling policymakers to identify gaps that aggregate subscriber indicators can conceal.

8. Conclusion

This study finds that Algeria made substantial progress in digital infrastructure over the period examined. Internet use expanded markedly, fixed broadband subscriptions increased, mobile connectivity remained widespread, FTTH deployment accelerated, and Algeria recorded comparatively strong network-performance results in the June 2026 Speedtest comparison (World Bank, 2026a, 2026b, 2026c; Algérie Télécom, 2025; Ookla, 2026).

At the same time, the evidence demonstrates the limits of assessing digital transformation through network indicators alone. The next stage of Algeria's digital development should therefore be evaluated in terms of how infrastructure improves public administration, supports the digital economy, reduces territorial disparities, strengthens digital trust, and enhances the quality and accessibility of digital services. The central policy challenge is to move from measuring connectivity toward measuring digital impact.

9. Limitations and Directions for Future Research

This study has several limitations. First, it relies primarily on secondary data produced for different statistical and regulatory purposes, which constrains perfect comparability across sources. Second, the principal longitudinal World Bank/ITU series end in 2024, while the more recent evidence is available only for selected quarters or dates in 2024–2026. Third, nationally aggregated infrastructure indicators provide limited insight into subnational disparities in access, affordability, quality, and digital skills. Fourth, the descriptive design does not permit causal inference regarding the effects of infrastructure on productivity, public-service performance, or socioeconomic outcomes. Future research should therefore combine infrastructure indicators with regional microdata, digital-skills measures, public-service performance indicators, affordability metrics, and firm- or household-level outcomes, and should consider longitudinal or panel methods capable of testing causal mechanisms.

10. Recommendations

The study recommends accelerating FTTH deployment beyond major urban centers, publishing more detailed quarterly statistics by technology and region, adopting comprehensive service-quality indicators, strengthening competition in fixed broadband markets, and linking infrastructure investment to measurable outcomes in e-government and the digital economy (ARPCE, 2025b; Internet Society Pulse, 2026).

It further recommends developing national data-center and sovereign-cloud capabilities, strengthening cybersecurity, and establishing a national digital-readiness dashboard covering access, quality, affordability, usage, regional equity, and socioeconomic impact. Such a dashboard would enable policymakers to assess digital transformation through a broader set of outcomes rather than relying primarily on subscriber counts and network-coverage measures (High Commission for Digitalization, 2024; Mousavi et al., 2023).

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