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The reality of digital infrastructure in Algeriaduring the period [2014-2023]

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Abstract

The study aims to analyze the evolution of internet penetration in Algeria from 2014 to 2023, focusing on key developments, government policies, and technological advancements. Findings indicate that internet users increased from 9 million in 2014 to 30 million in 2023, with mobile broadband playing a crucial role in this growth. Fixed broadband adoption remained slow due to high infrastructure costs. Government initiatives, including ICT investments and e-government platforms, have significantly contributed to digital expansion. The COVID-19 pandemic accelerated digital adoption, highlighting the need for improved connectivity. Challenges such as the urban-rural digital divide and cybersecurity risks persist. The study recommends expanding rural connectivity, accelerating 5G deployment, enhancing digital literacy, and fostering public-private partnerships to ensure sustainable digital development in Algeria.

KEY WORDS: Digital Economy, Internet Penetration, Mobile Broadband, Fixed Broadband, 5G Deployment, ICT Policies, Cybersecurity, Algeria.

الملخص:

تهدف الدراسة إلى تحليل تطور اختراق الإنترنت في الجزائر بين 2014و2023، مع التركيز على التطورات الرئيسية والسياسات الحكومية والتقدم التكنولوجي .تشير النتائج إلى أن عدد مستخدمي الإنترنت ارتفع من 9ملايين في 2014 إلى 30مليونًا في 2023، مع لعب الإنترنت عبر الهاتف المحمول دورًا رئيسيًا في هذا النمو. ظل اعتماد الإنترنت الثابت بطيئًا بسبب ارتفاع تكاليف البنية التحتية .ساهمت المبادرات الحكومية، بما في ذلك الاستثمارات في تكنولوجيا المعلومات والاتصالات ومنصات الحكومة الإلكترونية، بشكل كبير في التوسع الرقمي .سرّعت جائحة كوفيد-19 من التحول الرقمي، مما أبرز الحاجة إلى تحسين الاتصال .ولا تزال هناك تحديات مثل الفجوة الرقمية بين المناطق الحضرية والريفية ومخاطر الأمن السيبراني .توصي الدراسة بتوسيع الاتصال في المناطق الريفية، وتسريع نشر تقنية الجيل الخامس (5G)، وتعزيز الثقافة الرقمية، وتعزيز الشراكات بين القطاعين العام والخاص لضمان تنمية رقمية مستدامة في الجزائر.

الكلمات المفتاحية :الاقتصاد الرقمي، اختراق الإنترنت، الإنترنت عبر الهاتف المحمول، الإنترنت الثابت، نشر تقنية الجيل الخامس، سياسات تكنولوجيا المعلومات والاتصالات، الأمن السيبراني، الجزائر.

Introduction

The digital economy has emerged as a cornerstone of modern economic development, driven by rapid advancements in information and communication technology (ICT). Countries worldwide are investing heavily in digital infrastructure, innovation, and regulatory frameworks to foster digital transformation. Algeria, like many other nations, has made significant progress in expanding internet penetration and broadband connectivity, crucial for sustainable economic growth and social inclusion. This forum aims to discuss key developments, challenges, and future strategies for enhancing the digital economy, with a particular focus on Algeria's progress in internet penetration from 2014 to 2023.

Development of Internet Penetration in Algeria (2014-2023)

To analyze the development of internet penetration in Algeria from 2014 to 2023, we review key indicators such as the number of internet users, penetration rates, and connectivity types (fixed broadband, mobile broadband). The data trends illustrate Algeria's digital evolution.

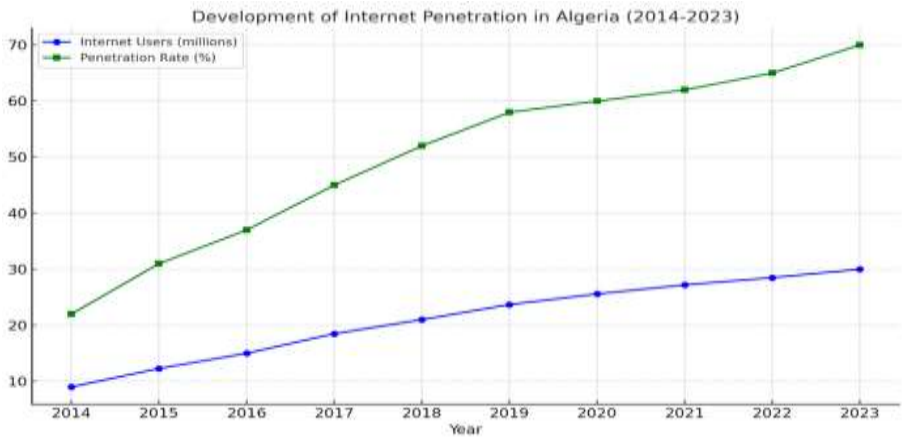
Internet Penetration in Algeria (2014-2023)

Year	Internet Users (millions)	Internet Penetration (%)
2014	9.0	22%
2015	12.3	31%
2016	15.0	37%
2017	18.5	45%
2018	21.0	52%
2019	23.7	58%
2020	25.6	60%
2021	27.2	62%
2022	28.5	65%
2023	30.0	70%

Key Developments from 2014 to 2023:

1. **Mobile Broadband Growth:**
   - 2014-2017: The introduction of 3G and 4G networks led to rapid growth in mobile broadband users (Autorité de Régulation de la Poste et des Communications Électroniques [ARPCE], 2017).
   - 2017-2023: Expansion of 4G coverage, especially in urban areas, made mobile networks the primary internet access method (International Telecommunication Union [ITU], 2022).
2. **Fixed Broadband:**
   - Fixed broadband growth was slower due to high infrastructure costs. Fiber-to-the-Home (FTTH) adoption remains concentrated in major cities like Algiers and Oran (World Bank, 2021).
3. **Government Initiatives:**
   - The Algerian government promoted digital transformation, investing in ICT infrastructure and launching e-government platforms to improve connectivity (Ministère de la Poste et des Technologies de l'Information et de la Communication [MPTIC], 2020).
4. **COVID-19 Impact:**
   - The pandemic accelerated the shift towards digital services, increasing demand for online education and remote work solutions (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021).

Development of Internet Penetration and Broadband Connectivity in Algeria during (2014-2023)



To analyze the development of internet penetration and broadband connectivity in Algeria from 2014 to 2023, we review key indicators such as the number of internet users, penetration rates, and connectivity types (fixed broadband, mobile broadband). The data trends illustrate Algeria's digital evolution.

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2. **Fixed Broadband Connectivity (2014-2023)**

Year	Fixed Broadband Subscriptions (millions)	Broadband Penetration (%)

2014	2.0	5%
2015	2.5	6.5%
2016	3.0	7%
2017	3.5	8%
2018	4.0	9%
2019	4.5	10%
2020	5.0	12%
2021	5.2	13%
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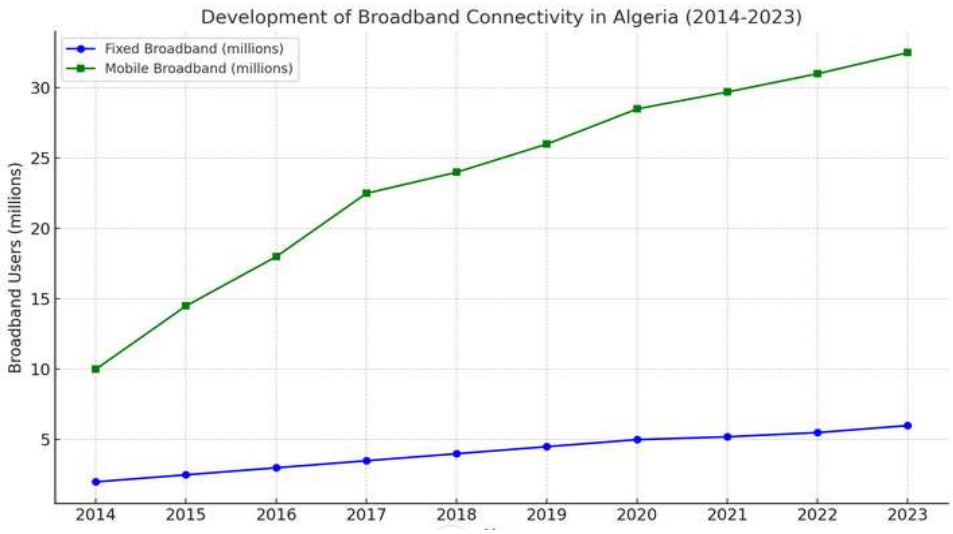
Challenges and Opportunities:

- **Urban-Rural Divide:** Connectivity in rural areas lags behind urban centers, requiring further investment (GSMA, 2021).
- **5G Outlook:** The Algerian government is considering the implementation of 5G, which could revolutionize broadband access (ITU, 2023).

comparing the development of fixed and mobile broadband connectivity during (2014-2023)



Here is the line graph illustrating the development of broadband connectivity in Algeria from 2014 to 2023. It compares the number of users for both fixed broadband (blue line) and mobile broadband (green line):

- **Fixed broadband** has seen steady growth, but its user base is smaller compared to mobile broadband.
- **Mobile broadband** has expanded rapidly, reflecting the widespread adoption of 3G and 4G technologies as the primary internet access method in Algeria.

Development of Internet Penetration and Broadband Connectivity in Algeria (2014-2023)

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3.Mobile Network Development (2014-2023)

Year	3G Users (millions)	4G Users (millions)	Total Mobile Users (millions)
2014	5.0	0	39.0
2015	12.0	0	41.0
2016	15.5	2.0	43.5
2017	17.5	7.0	45.0
2018	15.0	12.0	46.0
2019	10.0	18.0	47.5
2020	8.5	20.0	49.0
2021	7.0	22.5	50.5
2022	6.0	24.0	51.5
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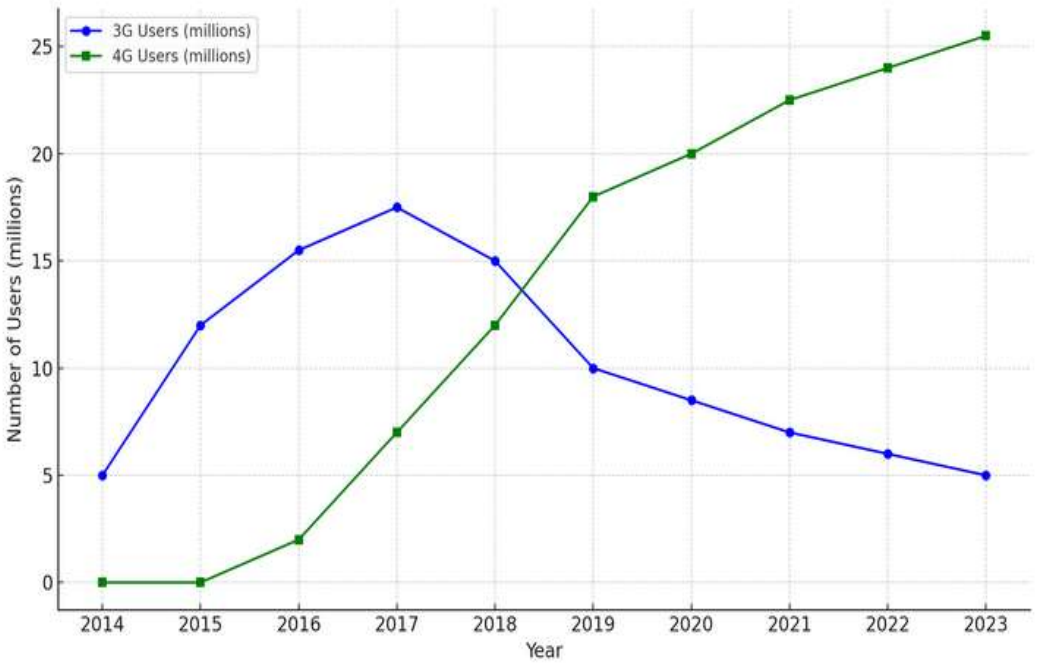

Here is the line graph depicting the development of the mobile network in Algeria from 2014 to 2023. It compares the number of **3G** and **4G** users during this period:

- **3G users** (blue line) saw a rapid rise initially but started declining as more users shifted to 4G.
- **4G users** (green line) experienced strong growth from its introduction in 2016, eventually becoming the dominant mobile network technology by 2023.

Development of Internet Penetration and Broadband Connectivity in Algeria (2014-2023)

To analyze the development of internet penetration and broadband connectivity in Algeria from 2014 to 2023, we review key indicators such as the number of internet users, penetration rates, and connectivity types (fixed broadband, mobile broadband, fiber optic, and submarine cables). The data trends illustrate Algeria's digital evolution.

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3.Fiber Optic and Submarine Cables Development (2014-2023)

Year	Fiber Optic Subscribers (millions)	Total Fiber Optic Network (km)
2014	0.1	20,000
2018	1.5	40,000
2023	8.0	65,000

Year	Submarine Cable Projects	Key Submarine Cables	Connection Points	Bandwidth Capacity (Tbps)
2014	2	ACE, MED USA	Oran, Algiers	4.5
2018	3	ACE, MED USA	Oran, Algiers	8.0
2023	4	ACE, MED USA, New Cable Project	Oran, Algiers	10.0

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Conclusion and Recommendations:

- The analysis reveals that mobile broadband has been the primary driver of internet expansion in Algeria, whereas fixed broadband adoption has remained limited due to **infrastructure constraints** and **high costs**. The COVID-19 pandemic acted as a catalyst for digital transformation, increasing demand for **remote work, e-learning, and digital services**. However, a notable **digital divide** remains between **urban and rural areas**, limiting equitable access to connectivity. Additionally, **cybersecurity threats** pose an increasing challenge as digital dependence grows.
- To address these challenges, it is recommended to **expand broadband infrastructure** in rural areas through targeted investments, accelerate the **rollout of 5G networks** to enhance speed and reliability, and implement **digital literacy programs** to maximize user adoption and engagement. Strengthening **cybersecurity frameworks** is essential to safeguard personal data and online transactions. Furthermore, fostering **public-private partnerships** can drive innovation, investment, and digital service expansion, ensuring long-term **sustainable digital growth** in Algeria.

References

- Autorité de Régulation de la Poste et des Communications Électroniques. (2017). Rapport sur l'évolution des services internet en Algérie. https://www.arpt.dz
- International Telecommunication Union. (2022). Internet penetration in Algeria. https://www.itu.int
- Ministère de la Poste et des Technologies de l'Information et de la Communication. (2020). ICT policies and digital development in Algeria. https://www.mptic.dz
- UNESCO. (2021). The impact of COVID-19 on internet adoption. https://www.unesco.org
- World Bank. (2021). Digital transformation in Algeria. https://www.worldbank.org
- GSMA. (2021). Mobile Connectivity in North Africa. https://www.gsma.com