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Navigating the Digital Shift: Social and Economic Challenges and Opportunities in Algeria

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Abstract:

Digital transformation in Algeria is a complex and multifaceted process, where its stakes extend beyond merely adopting technology as part of the national digital transformation strategy. This transformation aims to bring about profound changes in the economic and social spheres of the country. Economically, this transformation serves as a powerful lever for growth, diversification, and reducing reliance on imports. Socially, it holds the potential to enhance the well-being of citizens through digital public services and to adapt the labor market by promoting inclusivity.

There are significant challenges, particularly concerning infrastructure, regulatory frameworks, and human capital. The success of this transformation hinges on Algeria's ability to overcome these obstacles through flexible policies, strategic partnerships, and a comprehensive and in-depth approach.

Keywords: Digital Transition; ICT; Social Dimensions: Economic Dimensions.

Jel Classification Codes : O3, L86, O35, O10

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1. INTRODUCTION

Digital transformation is a global phenomenon that is redefining countries' economic and social structures. It is a process of adoption and implementation of digital technology by an organization to create new products, services and processes, or to modify existing information by translating business processes into digital format. It is also described as the integration of digital technologies (artificial intelligence, cloud, big data, Internet of Things) into organizational processes, models and strategies, aimed at increasing value through innovation, efficiency and user experience, while focusing on efficiency and costs. Marked by the increasing adoption of information and communication technologies (ICT), the digital transition is profoundly transforming societies and economies around the world.

In Algeria, this transformation has become a strategic priority, materialized by the implementation of the National Strategy for Digital Transformation (SNTN) planned for 2030. This ambitious initiative aims to modernize the administration, boost the economy and improve the well-being of citizens through the integration of information and communication technologies (ICT). However, digitization is not limited to the adoption of new technologies; it includes intricate aspects that influence economic dynamics, growth, and diversification, along with social realities such as access to services, employment, and inclusion.

1.1. Problem formulation:

This article aims to explore the social and economic aspects of the digital transition in Algeria, looking at the objectives and application of the SNTN 2030, the repercussions on the economy and society, as well as the challenges and prospects for inclusive and sustainable digital development by posing the following problem:

How can Algeria address structural digital divides and institutional constraints to transform its digital transition into a genuine lever for social inclusion, economic diversification, and international competitiveness?

To answer this problem, the following questions are asked:

- What are the objectives and strategic axes of the SNTN 2030 in Algeria, and how are they implemented?
- What economic impacts does the digital transition have in Algeria, particularly with regard to the growth, diversification and development of the digital economy?

- How does the digital transition influence social dimensions in Algeria, including access to services, employment, inclusion and cyber security?

- What are the main technical, regulatory and human challenges facing Algeria in its digital transition, and what prospects are emerging to overcome these obstacles?

1.2. Objectives of the study:

The objective of this study is to analyze the social and economic dimensions of the digital transition in Algeria, examining the objectives and implementation of the National Digital Transformation Strategy (SNTN) 2030, the impacts on the economy and society, as well as the challenges and prospects for inclusive and sustainable digital development. The study also explores how the digital transition can foster social inclusion, innovation and sustainable development, while taking into account Algerian cultural and socio-political specificities.

1.3. The importance of the study:

This research is of strategic importance, both for public authorities and for companies, investors and civil society. The importance of this topic comes from the fact that the digital transition in Algeria is a strategic and multidimensional process, having a profound impact on the economic and social areas of the country. Seizing these dimensions is essential to foster inclusive and sustainable development, enabling Algeria to diversify its economy, improve the well-being of its citizens and strengthen its digital sovereignty.

1.4. Methodology:

To analyze the socio-economic challenges and opportunities of the digital transition in Algeria, this study adopts a qualitative and interpretive approach. It relies on a methodology combining desk research with thematic content analysis. This approach is justified by the nature of the subject: the aim is to understand a complex, multidimensional phenomenon through a critical examination of discourses, statistical data, and existing analyses.

The study will be organized as follows:

- Context of the digital transition.
- Economic dimensions of the digital transition.
- Social dimensions of the digital transition.
- Outlook and Recommendations.

2. Theoretical Framework:

In order to understand the socio-economic challenges and opportunities presented by digital transformation in Algeria, this study relies on an integrative theoretical framework that is structured around three major currents in academic literature: the theory of innovation diffusion, the theory of the digital divide, and the frameworks of development economics in the digital age.

2.1. The Theory of Diffusion of Innovations:

The Theory of Diffusion of Innovations, formulated by Everett M. Rogers, serves as the foundational pillar of our analytical framework. In his seminal work, Rogers characterizes diffusion as "the process by which an innovation is communicated through certain channels within a social system over time." Five key elements govern this process: the innovation itself, communication channels, time, the social system, and the characteristics of adopters. He proposes a typology of adopters that categorizes them into five groups, ranging from innovators to laggards, with each group exhibiting distinct socio-economic profiles and adoption behaviors. This analytical framework facilitates an understanding of why certain segments of the population or specific economic sectors adopt digital technologies more swiftly than others (Rogers, 1962, pp. 37-50).

In the Algerian context, this theory provides valuable insights into the disparities in the adoption of digital services. It allows for an examination of how the characteristics of the innovation (complexity, compatibility, and relative advantage), communication networks, and social norms influence the speed and extent of digital diffusion across various regions and social categories within the country.

2.2. The theory of the digital divide:

The second theoretical pillar utilizes the conceptual framework of the digital divide as developed by Jan van Dijk. In his work, The Digital Divide (2020), van Dijk presents a multidimensional approach that transcends the simplistic dichotomy of 'connected' versus 'unconnected.' He identifies three levels of the digital divide: the first level pertains to physical access to infrastructure; the second level focuses on digital skills and the quality of usage; and the third level relates to disparities in outcomes and the actual benefits derived from digital engagement. According to van Dijk, digital inequalities cannot be understood as an isolated phenomenon. They reflect structural social inequalities, as access to and digital skills are contingent upon individuals' economic, educational, and social resources, while simultaneously acting as an active factor in their reinforcement. This is

evident as digital exclusion deprives already disadvantaged populations of access to economic opportunities and essential services. Thus, the appropriation of technologies is framed as a complex dynamic process, culminating in a usage that can either enhance or, conversely, deteriorate an individual's social standing (van Dijk, 2020, pp. 1-3).

Applying this framework to Algeria facilitates a detailed analysis of digital inequalities: it encourages us to go beyond merely noting the low Internet penetration rate, and to investigate regional disparities in access, the differences in digital skills among social groups, and the varied impact of digital technology on the economic and social opportunities available to citizens.

2.3. The Frameworks of Development Economics in the Digital Age:

The third theoretical pillar draws upon research in development economics that investigates the impact of digital transformation on development processes, particularly in emerging and developing countries.

Nagy K. Hanna, a digital transformation expert and former senior advisor at the World Bank, offers a holistic framework that enables economists and public policymakers to analyze and guide digital transformation. His approach emphasizes the institutional reforms and public policies necessary for digital technologies to serve as effective levers for development, while also addressing the vested interests that aim to preserve the status quo (Hanna Nagy. K, 2024).

Additionally, the World Bank's 2016 World Development Report, titled "Digital Dividends," provides complementary insights. This report differentiates between digital dividends—the benefits in terms of growth, employment, and enhancement of public services—and the digital risks associated with the spread of technologies. It highlights that digital technologies, when adopted in isolation, are insufficient to yield shared benefits; they must be accompanied by "analog complements": regulatory reforms, workforce skill adaptation, and institutional strengthening (world Bank, 2016, p. 5) .

This framework is especially relevant for analyzing the Algerian situation. It facilitates the assessment of how digital transformation genuinely contributes to economic diversification and the enhancement of living conditions, or whether it may instead exacerbate inequalities and generate new forms of exclusion.

The integration of these three theoretical frameworks provides a coherent and multidimensional analytical lens. Rogers' diffusion of innovations theory sheds light on the dynamics of digital technology adoption among various social groups. Van Dijk's digital divide theory allows for a layered analysis (access, skills and outcomes) unveiling the structural dimension of digital inequalities. Lastly, the development economics frameworks proposed by Hanna ground this reflection in a macroeconomic and political perspective, questioning the institutional and regulatory conditions that enable the transformation of digital adoption into a genuine lever for inclusive development.

3. Context and National Strategy for Digital Transformation in Algeria:

The digital transition in Algeria is part of a strong political will to modernize the country and diversify its economy, traditionally dependent on hydrocarbons. This ambition is concretized by the National Digital Transformation Strategy (SNTN) for 2030, unveiled by the High Commission for Digitization. SNTN 2030 is the first national reference that frames this transformation process, aimed at enhancing transparency, improving performance and concretizing national digital sovereignty.

Algeria, dependent on hydrocarbons representing about 93% of its exports (World Bank, 2025), has placed digitization at the heart of its priorities in order to diversify its economy and modernize its services. Since 2020, the country has intensified its efforts through initiatives such as the national strategy "Digital Algeria 2030". The latter is embodied in the National Strategy for Digital Transformation (SNTN) for 2030, unveiled by the High Commission for Digitization.

SNTN 2030 is the first national reference that frames this transformation process, aimed at enhancing transparency, improving performance and concretizing national digital sovereignty.

It is structured around five main axes: infrastructure, training, digital governance, digital economy and digital society.

3.1. Assessment of the current situation of the digital transition in Algeria:

Since 2020, Algeria has initiated a determined acceleration of its digital transformation, supported by clear political will, structural reforms and innovative institutional dynamics.

3.1.1. Infrastructure and connectivity:

Updating ICT critical infrastructures is the foundation for achieving the goals of digital transformation. This axis includes telecommunications networks, data centers as well as the equipment necessary to ensure robust

connectivity and equitable access to digital services. In addition, it stimulates innovation and fosters the development of digital technologies. Investment in critical infrastructure aims to promote the creation of an ecosystem conducive to economic competitiveness and to maximize the benefits of digital for users. Ensure quality connectivity for all (individuals and households). The goal to achieve is 100% access.

Algeria has significantly expanded its international bandwidth, from 1.5 Tbps in 2020 to 7.8 Tbps in 2023, which promotes improved connectivity(ARPCE, 2024). Telecommunications operators, such as Mobilis 22.1 million subscribers and Djezzy which reaches 17.8 million subscribers, play a critical role in expanding 4G coverage to over 95% in Q2 2025 (Djezzy, 2025). These advances facilitate the deployment of digital services, such as e-commerce and mobile payment platforms.

However, digital divides remain, especially between urban and rural areas. Geographical disparities and low levels of digital literacy in some regions restrict access to technologies and hinder the widespread adoption of ICTs.

3.1.2. Human Capital:

Algeria has opted to enshrine the principles of free education and the democratization of its educational system across all its facets, including the health sector. Algeria is now ranked among the "high human development countries", with a human development index (HDI) of 0.748, placing it 91st in the world among 189 countries and territories, according to the United Nations Development Programm (PNUD, 2020, p. 03).

According to the Ministry of Higher Education and Scientific Research, there is an average of 15,000 graduates each year in the field of information and communication technologies (ICT) in Algeria, including both universities and schools (MESRS, 2023). Nevertheless, 45% of companies encounter difficulties in recruiting qualified technical staff.

The Ministry highlighted the efforts of the sector, which is investing in the professions of the future, in particular through the creation of a school dedicated to artificial intelligence as well as the establishment of specialties in nanotechnology and robotics. The Algerian university is moving towards entrepreneurship and innovation, it is important to emphasize that a third of Algerians continue their studies in schools, universities and vocational training institutes.

3.1.3. Governance and public services:

Digitization of public services is a key priority to reduce bureaucracy and increase transparency. The national portal for digital services as well as the interoperability platform, launched as part of the initiative, digital Algeria 2030, aim to centralize administrative procedures and facilitate access to services for citizens, especially in remote areas. In 2021, the Algerian Community Port System (APCs) was set up to optimize customs clearance processes, which made it possible to reduce delays and improve the efficiency of trade with the establishment of platforms and portals such as the Portal of the Algerian Administration, the Single Window of Foreign Trade, as well as the online declaration and payment of taxes, and the request for administrative documents... These initiatives are designed to digitize administrative processes.

However, despite these advances, Algeria ranks 116th out of 193 countries in the United Nations e-Government Development Index in 2024 (with a score of 0.5956), which highlights the need to improve digital governance (UNIES, 2024, p. 263).

3.1.4. Digital economy:

The field of e-commerce in Algeria is showing impressive momentum. The number of e-merchants registered at the National Trade Register Centre (NRC) has grown by an average of 92% per year since 2020, reaching almost 4,000 operators by the end of March 2024. Simultaneously, the volume of online payments for goods and services tripled between 2020 and the end of 2024, approaching 13 million transactions. In 2023, the value of online sales between businesses and consumers reached a remarkable $1.9 billion, or 262 billion Algerian dinars, despite the fact that 78% of Algerians express distrust of online payments (JUST-INFO, 2025). According to the prospective analysis of Statista, a reputable statistics site, the population of online shoppers in Algeria is constantly increasing. This indicates that the hesitance of Algerians towards online shopping is slowly diminishing, and this method of purchasing is even starting to attract age demographics that we previously thought would not be persuaded by this mode of acquisition. (Statista).

3.1.5. The digital society:

Ensure quality connectivity for all (individuals and households). This goal is part of the drive to bridge the digital divide, ensuring that every individual and household can take full advantage of the opportunities offered by digital, while ensuring stable and effective connectivity. According to statistics from the International Telecommunication Union,

24% of the rural population does not have access to the Internet, while the Internet penetration rate reaches 72% in urban areas compared to 43% in rural areas(ARPCE, 2024).

Algeria has greatly expanded its fiber optic network, reaching over 200,000 km of fiber optic cabling. It also connected 5.74 million households to the fixed Internet, including more than 1.24 million through fiber-to-the-home (FTTH) technology. In addition, its international bandwidth capacity has been increased to 7.8 terabits per second, improving connectivity and enabling the deployment of digital services (Haut-Commissariat à la Numérisation, 2024).

The digitization of Algeria represents an unavoidable strategic choice, based on solid foundations. However, it requires improved coordination, rapid implementation and continuity of infrastructure and services in order to take full advantage of the digital potential for the economic and social modernisation of the country.

4. Economic Dimensions of the Digital Transition:

Digital transformation in Algeria is seen as a key driver of economic transformation and growth. It aims to diversify the national economy, stimulate innovation and create new jobs.

4.1. Impact on economic growth and diversification:

Digitalization represents a fundamental lever for economic growth in Algeria. By stimulating innovation and efficiency, it plays a key role in increasing digital Gross Domestic Product (GDP). Research indicates that an optimized digital model could reveal considerable growth potential, with an increase in digital GDP of more than 8% by 2030(CNUCED, 2024). In addition, digitization is essential to reduce the dependence on imports of Information and Communication Technologies (ICT) by 40%, which promotes economic diversification and the strengthening of national sovereignty (Banque Mondiale, 2024).

The field of information and communication technologies (ICT) plays a key role in economic diversification by supporting strategic sectors such as energy, health and transport. For example, the integration of IoT sensors and artificial intelligence in the oil sector optimizes efficiency while decreasing carbon emissions. In addition, the 2022 investment law, supported by the World Bank, promotes the attraction of foreign direct investment (FDI) in digital areas through tax incentives and simplified procedures via the Algerian Investment Promotion Agency (AAPI).

ICT, especially through e-commerce and digital platforms, offers Algerian companies the opportunity to access international markets. A recent study reveals that Algerian SMEs that have embarked on their digital transformation are four times more likely to export than those that have not, due to access to global markets (Mezouar Amel, 2020, p. 10).

4.2. Digital Economy Development:

Algeria is working to establish an ecosystem conducive to the evolution of the digital economy. This is manifested by supporting startups, encouraging e-commerce and promoting online services. These initiatives aim to foster wealth creation and provide new opportunities for young entrepreneurs. The development of national platforms is also a key objective to strengthen autonomy in cyberspace and boost the local economy.

The field of information and communication technologies constituted 3.2% of Algeria's GDP in 2023, compared to 1.8% in 2015. This data reveals a notable increase in the contribution of the ICT sector to the Algerian economy during this period (Ministère des Finances, 2024).

The digital economy accounts for about 2.5% of Algeria's GDP, a still modest but growing figure and nearly 16% of retail transactions were conducted online at the end of 2020(Mac Kinsey & company, 2020), a trend that was accelerated by the COVID-19 pandemic. Platforms such as Jumia and OuedKniss, as well as social commerce on Instagram and TikTok, illustrate the growth of e-commerce, especially among young people.

The amount of online payments for goods and services tripled between 2020 and the end of 2024, reaching nearly 13 million transactions. In 2023, the value of online sales between businesses and consumers amounted to $1.9 billion, or 262 billion Algerian dinars, despite the fact that 78% of Algerians are suspicious of online payments (JUST-INFO, 2025) .

Public policies aimed at anchoring entrepreneurship among young people and in academia are supported by a set of measures that promote the emergence of young energies in the entrepreneurial sector. These efforts aim to create an integrated ecosystem that benefits the continent's skills and talent, enacting legislation that incentivizes investment in knowledge and removing barriers for innovative youth. This was made clear at the first African Startup Conference, which took place in Algeria in 2022 (MESRS, 2023).

4.3. Business model transformation and innovation:

Digitalization exerts a considerable influence on Algerian companies, prompting them to revise their business models. The integration of digital technologies offers companies the opportunity to increase operational

efficiency, access new markets and develop innovative products and services. This is particularly evident in industries that have rapidly adopted digital tools to improve their processes and communicate with their customers. Process optimization and operational efficiency, making it easy to automate complex tasks, streamline workflows, and improve real-time data management. For example, the adoption of enterprise resource planning (ERP) systems allows companies to centralize information, coordinate services, and automate processes, increasing productivity and lowering costs. According to a study, the use of cloud-based ERPs, such as those offered by companies such as Pégase Informatique in Algeria, reduces the need for expensive IT infrastructure and promotes better access to data(Pegase, 2025).

Digitalization encourages the emergence of new business models and innovative services. For example, in the retail sector, digital transformation enables data to be leveraged to provide tailored services and loyalty programs, while improving supply chain efficiency. In addition, initiatives such as Siemens' MindSphere platform in Algeria are helping companies integrate the Internet of Things (IoT) to deliver cutting-edge solutions (Central digital, 2018).

4.4. Entrepreneurship and employment:

Algeria faces a structurally high unemployment rate, especially among young people (nearly 25% for 16-24 year olds) and higher education graduates. The public sector, which has historically provided jobs, is now saturated. This reality is a powerful driver for the search for alternatives, especially entrepreneurship (ONS, 2025).

With the emergence of a generation of startups, a new class, connected, graduated and often multilingual (French, English), is emerging. Frustrated by the lack of opportunities in the traditional system, she naturally turns to digital to create her own chances.

Digital has significantly lowered the barriers to entry for starting a business. Compared to a physical store, launching an online business requires less initial capital, less paperwork and allows immediate access to a national or even international market.

Social media provides a way for women entrepreneurs to manage their family and work responsibilities, allowing them to promote their products online. A study carried out in 2018 highlights that Algerian women

entrepreneurs, often young and graduated, use social networks to escape unemployment and develop their activities.

Nevertheless, the unemployment rate remains high, the year 2024 records a rate of 9.7% (ONS, 2025) and low digital literacy hinders the ability of institutions and companies to fully exploit information and communication technologies (ICT). It is therefore essential to train human capital to maximize the economic benefits of digitization (STITI Amina, 2025, p. 86).

4.5. Economic challenges:

Despite the progress made, the digital transition in Algeria faces many economic challenges. The digital divide, although decreasing, remains present, especially with regard to access and uses. Indeed, considerable investments in information and communication technology (ICT) infrastructures are essential to ensure quality and high-speed connectivity throughout the territory. In addition, the shortage of international bandwidth and the high cost of Internet access can hinder the development of the digital economy. We can cite major challenges such as(Fethi FERHANE, Elyas SALAH, Abdelkader DJEFLAT, , 2017):

- Access to finance: Entrepreneurs face difficulties in obtaining traditional bank loans, as digital business models are often misunderstood and collateral requirements are high.
- Logistics and delivery: The delivery system, including "last mile" logistics, remains expensive and unreliable outside large cities, which impacts profitability.
- Unclear legal framework: Many online activities evolve in a legal uncertainty with regard to taxation and the status of the company (auto-entrepreneur, etc.). Entrepreneurs often find themselves isolated to manage these complex issues.
- Digital divide: The quality and cost of internet access can be a barrier, and persistent distrust of online payments is holding back the development of e-commerce.

The Algerian digital paradox, characterized by significant investments but limited economic impact, highlights the need for better synergy between public policies and private initiatives in order to maximize the economic benefits of digitization.

5. Social Dimensions of the Digital Transition:

The digital transition in Algeria is not limited to economic dimensions; it also has significant repercussions on society, the well-being of citizens, employment, inclusion and security. It presents opportunities for social

inclusion, especially for marginalized groups. Digital services, such as mobile wallets and banking apps, simplify access to financial services.

5.1. Improving citizens' well-being:

One of the main objectives of the National Digital Transformation Strategy (NDTS) is to improve the well-being of citizens by facilitating and accelerating access to public services. The digitization of administration aims to make procedures more transparent and efficient, reducing delays and bureaucracy. Digital platforms are launched in different sectors such as higher education, education, interior, justice, health and social security, bringing services closer to citizens and improving their quality. This approach helps improve governance and increase user satisfaction (APS, 2025).

Similarly, digitalization is changing social practices, particularly in the fields of education and administration. Algerian universities are gradually adopting information and communication technologies (ICT), but their integration is still hampered by institutional and political constraints. Social networks, in particular, are transforming social and economic interactions, creating new opportunities for citizen expression and social innovation.

5.2. Impact on employment and skills:

Digitalization has a considerable influence on the labour market in Algeria. Although it can lead to the automation of certain repetitive tasks, it also generates new needs for digital skills as well as the creation of new jobs. The SNTN highlights the importance of human capital development and training to prepare the workforce for the challenges and opportunities of the digital economy. Training and retraining programmes are essential to facilitate this transition and avoid an increase in structural unemployment. The objective is to provide citizens with the skills required to adapt to an ever-changing professional environment.

5.3. Bridging the Digital Divide and Social Inclusion:

Reducing the digital divide is a crucial social issue in Algeria. Although the rate of Internet use has increased, reaching about 76.9% of the population in 2023 according to the World Bank, inequalities remain in terms of access, cost and digital skills (Banque Mondiale, 2024). The national strategy aims to generalize high-speed fiber optic infrastructure and improve connectivity for all, including in rural and remote areas. Digital inclusion is paramount to ensure that all segments of the population can reap the benefits of digitization, thereby fostering a more equitable and connected society.

5.4. Impact on education and health:

The transition is also transforming the education and health sectors. In the field of education, it makes it possible to develop online learning, access digital teaching resources and modernize teaching methods. In healthcare, digitization facilitates medical record management, telemedicine, and improved access to healthcare. These developments contribute to improving the quality of services and making them more accessible to all, even in remote areas.

5.5. Social challenges:

The digital divide in Algeria is not just about internet access. It reflects pre-existing social and geographical fractures that it may aggravate. Some of the major challenges include: (Banque mondiale, 2022) (HAUT-COMMISSARIAT A LA NUMERISATION, 2024) (World Economic Forum, 2020)

- Geographical disparity: Broadband (fiber optic) Internet access is mainly located in major coastal cities such as Algiers, Oran and Constantine. The inland and southern areas suffer from a slow, unstable and more expensive connection, thus accentuating the gap between urban centres and the countryside.
- Cost: Although there has been a relative decrease, the price of devices (smartphone, computer) and Internet subscriptions remains high for a large part of the population, especially in a context of declining purchasing power.
- Generational Gap: Seniors and a significant proportion of the unskilled workforce are excluded, as they have not received training on the use of online services (administrative procedures, e-banking, e-health).
- Automation and Job Disappearance: Low-skilled positions in administration, accounting, or production are at risk due to process automation and digitization.
- Training-Employment Mismatch: The digital labor market requires technical profiles (developers, data analysts, cybersecurity specialists) as well as interpersonal skills (creativity, problem-solving ability) that the traditional education system fails to provide in sufficient quantity. This leads to mass unemployment among young graduates, despite their level of education.
- Cash Economy: Algeria remains a cash-dominated society. A large proportion of the population, especially the elderly and those

working in the informal sector, are wary of electronic transactions or simply do not have access to basic banking services.

- Regulatory and Cultural Barriers: The development of fintechs (mobile payment, e-wallets) is hampered by a prudent regulatory framework and a cultural reluctance to share financial data or make payments online.
- Distrust of E-government: The digitalization of administrative services (e-government) is facing a historical distrust of citizens towards the administration. Fear of outages, data loss or the complexity of procedures discourages their use.
- Cybercrime and Misinformation: The lack of a cyber security culture leaves individuals and SMEs vulnerable to cyber attacks. The Algerian digital ecosystem is also highly vulnerable to misinformation and rumours (especially on WhatsApp and Facebook), which can disrupt the social fabric.

6. Algerian digital paradox:

The "Algerian digital paradox" should not be viewed as an isolated case. It aligns with what is identified in development economics literature as the digital productivity paradox. This notion, initially proposed by Robert Solow in the 1980s "We observe computers everywhere except in productivity metrics", has been revisited in the digital age to characterize economies that invest significantly in ICT without attaining the anticipated productivity enhancements.

The geographical analysis of the paradox unveils an additional dimension: the digital dividend is hindered by a spatial divide between urban centers and rural peripheries. This disparity transcends mere access issues (first-level divide, van Dijk, 2020) and extends to economic opportunities.

Digital infrastructures, no matter how extensive, yield transformative effects only through effective and widespread utilization by populations and businesses. However, in the absence of a dense and diverse economic fabric in rural areas, connectivity remains underutilized, perpetuating a vicious cycle: low demand → low supply of digital services → low value creation → minimal incentive to invest in innovation (Mostefaoui, 2026).

The Algerian digital strategy has favored physical infrastructure at the expense of human capital. Yet, as highlighted by van Dijk's theoretical framework (2020), digital skills (second-level divide) represent the missing

link between access and outcomes.

Perhaps the most profound paradox is this: the Algerian state is simultaneously the largest investor in digital technology and the primary obstacle to its development. On one hand, public investments are substantial: deployment of fiber optics, data centers, digitization of services. On the other hand, the dematerialization of administrative procedures remains partial and fragmented, hindered by bureaucratic practices inherited from a previous management model.

6. Conclusion:

The National Digital Transition Strategy (NDTS) 2030 is centered on three primary objectives: (i) the modernization of public administration through the digitization of services; (ii) the diversification of the economy beyond hydrocarbons by fostering the digital economy; and (iii) the universal access to digital infrastructure across the entire national territory. Regarding the implementation of the latter, our analysis indicates a structural gap between the stated ambitions and the on-ground reality. In terms of infrastructure, the advancements are undeniable: 4G coverage has reached 95% of the territory, a fiber optic network spans 48,000 km, and two data centers connect 80% of public administrations. However, from an operational perspective, critical analysis highlights a persistent institutional inertia. The digitization of administrative procedures remains fragmented, hindered by bureaucratic practices inherited from a previous management model. In other words, while the NDTS 2030 excels in infrastructure development, it partially fails in transforming usage and mindsets. The economic impacts of the digital transition in Algeria remain, to date, below the expectations and objectives set by the NDTS 2030. Our analysis leads to three major findings:

- Regarding growth: The counterintuitive finding from the econometric study by Mostefaoui et al. (2026) confirms the presence of an "Algerian digital paradox": an increase in connectivity does not necessarily lead to a rise in productivity.
- Regarding diversification: The digital sector's contribution to GDP remains modest. The Algerian economy remains trapped in hydrocarbon rent (93% of exports), which diminishes the incentive to invest sustainably in digital sectors with lower immediate profitability.
- Development of the digital economy: The contribution of e-commerce to Algeria's GDP is estimated to be between 0.8% and 1.2%. This lag can be attributed to the limited digital adoption among SMEs, which remains

stagnant at 45%, as well as the lack of an integrated ecosystem that connects innovation, production, and markets (Kaidi, 2026).

Thus, rather than serving as a catalyst for diversification, the digital transition in Algeria exemplifies a form of "leapfrogging"; while the infrastructure is present, it lacks productive integration within the national value chain.

The social impact of the digital transition is ambivalent and manifests in four contrasting dimensions:

- Access to services: Digitization has led to significant advancements in access to basic public services. However, this access remains geographically uneven: urban centers fully benefit, while rural peripheries experience a spatial divide (the first level of the digital divide, van Dijk, 2020) that restricts their effective access.
- Employment: The digital transition has generated job niches in digital professions (development, maintenance and cybersecurity). Nevertheless, these job creations are quantitatively modest and structurally constrained by a severe lack of digital skills (the second level of the digital divide): 60% of economic actors lack advanced skills in artificial intelligence and data analysis (CHETTAB, 2025).
- Social inclusion: Contrary to the official narrative surrounding an "inclusive" digital landscape, our critical analysis indicates that the digital divide exacerbates and amplifies existing social inequalities. Already disadvantaged populations (those with low education levels, modest incomes, and residing in rural areas) face a double disadvantage: they have limited access to infrastructure, and when they do gain access, they often lack the necessary skills to leverage it for economic benefits.
- Cybersecurity: The rise of digital technology is accompanied by an increasing vulnerability to cyberattacks. While initiatives have been implemented (regulatory frameworks, incident response centers), our analysis emphasizes that the cybersecurity aspect remains inadequately integrated into the national strategy, particularly concerning small and medium-sized enterprises (SMEs) and local administrations.

We identify three interdependent categories of challenges:

- Technical challenges: The underutilization of existing infrastructure represents a significant paradox. While 4G coverage is widespread, the quality and reliability of the service remain inconsistent. Thus, the technical

challenge has shifted from physical access to enhancing the quality and robustness of networks.

- Regulatory challenges: Bureaucratic burdens, a lack of interoperability among governmental systems, and the absence of unified governance for digital transition significantly hinder innovation. Although the legal framework is gradually being adapted, it is still characterized by a control-oriented logic inherited from a centralizing state, which discourages private initiative.
- Human challenges: This is the most critical challenge. The shortage of qualified human capital (engineers, data scientists, cybersecurity experts) constitutes a major bottleneck.

Our analysis identifies three priority action levers or Perspectives for overcoming these obstacles:

- Strategic rebalancing: As suggested by Hanna (2024), it is essential to shift from a focus on physical infrastructure to one centered on human capital and innovation. This necessitates substantial investment in continuous training and digital literacy.
- Regulatory simplification: Reducing administrative procedures, establishing digital one-stop shops, and relaxing the tax framework for technology startups are prerequisites for energizing the entrepreneurial ecosystem.
- Integrated governance: The establishment of a unique, inter-ministerial steering body, equipped with real resources and the capacity to coordinate sectoral policies, appears to be a sine qua non condition for breaking institutional inertia.

The "Algerian digital paradox" is not inevitability, but rather a symptom of strategic misalignment. There are opportunities for overcoming this challenge, yet they require a political will for change: a reallocation of budgets towards training and research, a significant simplification of the regulatory framework, and the opening of the digital ecosystem to genuine participation from the private sector and civil society. Without these measures, Algeria risks remaining trapped in an illusory modernization, characterized by top-tier infrastructure but unable to reap the anticipated socio-economic benefits.

7. Bibliography List:

1. APS. (2025, 05 12). Consulté le 08 03, 2025, sur https://www.aps.dz/sante-science-technologie/186576-la-strategie-nationale-de-transformation-numerique-2030-devoilee
2. ARPCE. (2024). Consulté le 07 08, 2025, sur https://www.arpce.dz/fr/indic/mobile
3. Banque mondiale. (2022). *À propos du Projet pour le capital humain*. Consulté le 08 10, 2025, sur https://www.banquemondiale.org/fr/publication/human-capital/brief/about-hcp#:~:text=Le%20capital%20humain%2C%20priorit%C3%A9%20num%C3%A9ro%20un&text=Le%20d%C3%A9veloppement%20du%20capital%20humain,et%20l'acc%C3%A8s%20aux%20emplois.
4. Banque Mondiale. (2024). *FONDATIONS POUR LE DEVELOPPEMENT DES TECHNOLOGIES DE L'INFORMATION ET DE LA COMMUNICATION EN ALGERIE*. Consulté le 07 11, 2025, sur https://documents1.worldbank.org/curated/en/696081468767408975/txt/258410FRENCH0Algerie0Note0TIC.txt
5. Central digital. (2018, 03 29). *Grande distribution en Algérie : quelle transformation digitale ?* Consulté le 07 31, 2025, sur Central digital: https://centraledigitale.com/grande-distribution-retail-quelle-transformation-digitale/
6. CHETTAB, N. (2025, 08 14). Le paradoxe numérique algérien : Investissements massifs, impact économique limité. *El Watan* .
7. CNUCED. (2024). *Rapport 2024 sur l'économie numérique*. Genève: Nations Unies.
8. Djezzy. (2025). *Djezzy affiche une forte croissance au deuxième trimestre 2025*. Consulté le 08 17, 2025, sur Djezzy: https://www.djezzy.dz/djezzy/actualite-et-nouveautes/communiques-de-presse/djezzy-affiche-une-forte-croissance-au-2e-trimestre-2025-portee-par-une-hausse-des-revenus-et-des-investissements-strategiques/
9. Fethi FERHANE, Elyas SALAH, Abdelkader DJEFLAT, . (2017). Les compétences et les capacités essentielles à la réussite de la transformation digitale des entreprises : Une étude exploratoire sur 94 entreprises algériennes. *Revue des Sciences Economiques, *, 41-55.
10. Hanna Nagy. K, .. (2024). *Economic Development in the Digital Age*. Switzerland: Palgrave Macmillan.
11. HAUT-COMMISSARIAT A LA NUMERISATION. (2024, 08). *Stratégie Nationale de la Transformation Numérique*. Consulté le 07 07, 2025, sur https://hcn.dz/SNTN-Fr.pdf?fbclid=IwY2xjawKOqfBleHRuA2FlbQIxMABicmlkETFKZHFndmlBc3FGRDRVRlpHAR6cvX_520xCPVunds3nKZYuQaO-d4qWhph9j2zfwPMpJ45THsrBoeu19HT5Sg_aem_1fTOugsHA9trVqtXYjQe9A
12. Haut-Commissariat à la Numérisation. (2024, 08). *Stratégie Nationale de la Transformation Numérique*. Consulté le 07 07, 2025, sur https://hcn.dz/SNTN-Fr.pdf?fbclid=IwY2xjawKOqfBleHRuA2FlbQIxMABicmlkETFKZHFndmlBc3FGRDRVRlpHAR6cvX_520xCPVunds3nKZYuQaO-d4qWhph9j2zfwPMpJ45THsrBoeu19HT5Sg_aem_1fTOugsHA9trVqtXYjQe9A
13. JUST-INFO. (2025, 06 25). *JUST-INFODZ*. Consulté le 07 11, 2025, sur Algérie : le e-commerce décolle… sans pilote: https://just-infodz.com/algerie-le-e-commerce-decolle-sans-pilote-

rapport/#:~:text=Les%20chiffres%20parlent%20d'eux%2Dm%C3%AAmes%20:%20le%20commerce,de%204%20000%20op%C3%A9rateurs%20fin%20mars%202024.
14. Kaidi, T. (2026, 3 17). Impressionnant developpement du-e-commerce en Algerie. *El-moudjahid* .
15. Mac Kinsey & company. (2020). *quelles nouveautés sur la mode éco-responsable.* Consulté le 07 21, 2025, sur Pando.
16. MESRS. (2023). Consulté le 07 13, 2025, sur https://www.mesrs.dz/index.php/agregats-ar-2024-2025-2/
17. Mezouar Amel. (2020). Les PME face au transfert d'économie algérien vers le digital. *Séminaire national sous le thème : « La mutation digitale des organisations, un impératif pour libérer la*, (p. 10). Tamda.
18. Ministère des Finances. (2024). Consulté le 07 08, 2025
19. Mostefaoui, O. M. (2026, Avril). Geography of the Digital Paradox: A Development Economics Perspective on Algeria's Structural Transformation (1994–2022). *International Journal of Computational and Experimental Science and Engineering* , pp. 1-15.
20. ONS. (2025). Consulté le 08 05, 2025, sur https://www.ons.dz/spip.php?article3059
21. Pegase. (2025). *Digitalisation : le vrai levier pour votre entreprise en Algérie*. Consulté le 08 02, 2025, sur Pegase expert de la transformation digitale: https://www.pegase-dz.com/actualites/129-digitalisation-le-vrai-levier-pour-votre-entreprise-en-algerie
22. PNUD. (2020). *Rapport sur le développement humain 2020.* Consulté le 07 13, 2025, sur https://hdr.undp.org/sites/default/files/Country-Profiles/fr/DZA.pdf
23. Rogers, E. M. (1962). *Diffusion of Innovation.* Retrieved 6 30, 2026, from file:///C:/Users/win7/Downloads/Farmers_and_researchers_How_can_collaborative_adva.pdf
24. Statista. (s.d.). *Etudes et rapports*. Consulté le 07 01, 2025, sur https://fr.statista.com/etudes-et-rapports/
25. STITI Amina. (2025). L'ENTREPRENEURIAT DIGITAL EN ALGÉRIE ENTRE DEFIS, OBSTACLES ET PERSPECTIVES. *REVUE DES SCIENCES COMMERCIALES* , 86.
26. UNIES, N. (2024). *Enquête sur L'E-gouvernement 2022.* Consulté le 07 08, 2025, sur https://publicadministration.un.org/egovkb/Portals/egovkb/E-Government%202022%20Sep%2027%20Fr%20Final%20-DK.pdf
27. van Dijk, J. (2020, 2 24). The Digital Divide. *Book Review* . Cambridge, UK: Polity Press.
28. world Bank. (2016). *Digital Dividends.* Washington: World Development.
29. World Bank. (2025, 04 18). *How Algeria is Crafting a Dynamic Economy for Tomorrow.* Retrieved 07 09, 2025, from https://www.worldbank.org/en/news/feature/2025/04/18/how-algeria-is-crafting-a-dynamic-economy-for-tomorrow
30. World Economic Forum. (2020, 12 16). *The Global Competitiveness Report*. Retrieved 08 10, 2025, from https://www.weforum.org/publications/the-global-competitiveness-report-2020/