

Digital Transformation in Algeria: Successes and Failures

Bachir Berkane^{1*}, Ouafa Rais²

¹ Mohamed Khider University of Biskra, (Algeria), bachir.berkane@univ-biskra.dz

² Mohamed Khider University of Biskra, (Algeria), ouafa.rais@univ-biskra.dz

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Abstract:

This study evaluates the current status of digital transformation in Algeria, outlining achievements and identifying persisting gaps. It focuses on the strategies implemented by the government, the investment in essential infrastructure, and the provision of advanced information and communication technologies. This includes access to various communication networks such as the Internet, Extranet, and Intranet, as well as the availability and uptake of both fixed and mobile telephony and Internet services.

The findings reveal that foundational infrastructure, including fixed and mobile Internet (4th generation modem) services and mobile telephony, is in place, supported by investments in fiber optics and satellite technologies to enhance Internet bandwidth. The transition towards e-administration and e-government has shown notable success. Nevertheless, the digitization of many services remains incomplete, hindered by resistance to change, digital illiteracy, and the prevalent digital divide.

Keywords: Digital Transformation; Internet; E-Services; E-Administration; E-Government.

**Corresponding author,*

1. INTRODUCTION

Since the inception of the Internet for commercial use in the 1990s and its subsequent global deployment by the United States post the collapse of the communist bloc, nations worldwide have harnessed this powerful network, particularly for managing and modernizing public institutions. Algeria embraced this technology, aspiring to match global advancements.

The Internet has unlocked immense possibilities for digital transformation, streamlining operations, reducing costs, and improving performance across various sectors, including education, health, administration, government, journalism, sports, and politics. However, Algeria commenced its digital transformation journey with some delay in a less than ideal technical environment, demanding significant financial resources and substantial IT expertise.

1.1 Main Question:

This study assesses the extent of success or challenges faced by digital transformation in Algeria.

1.2 Sub Questions:

This research addresses several sub-issues:

- _ What constitutes digital transformation?
- _ What is the current state of digital transformation in Algeria?
- _ What digital challenges does Algeria encounter?
- _ What are the future prospects for digital transformation in Algeria?

1.3 Research Hypothesis:

Based on the preliminary observations, the hypothesis posits that digital transformation in Algeria has realized significant achievements.

1.4 Significance of the Research:

This research is critically important both to Algeria and globally, as digitalization is crucial for integrating into the global information society. The shift to digital platforms facilitates sustainable development, reduces costs, digitizes the economy, enhances knowledge management, and improves governance. Digital transformation is increasingly viewed by scholars and international organizations not merely as an option but as an essential strategy encompassing e-commerce, e-government, e-health, among other digital applications.

1.5 Objectives of the Research:

The objective of this research is to explore and analyze the realities of digitalization in Algeria post-transition from traditional administrative methods. It

aims to contribute to academic discourse on this subject and provide strategic recommendations to advance digital transformation in Algeria.

1.6 Methodology and Research Plan:

The study adopts an analytical approach, drawing on peer-reviewed literature and official data from the Ministry of Post and Telecommunications and other digital metrics in Algeria. It encompasses a theoretical framework of digital transformation and an empirical analysis of digital transformation within the country, culminating in a discussion of the findings, hypothesis testing, and proposed recommendations.

2. Theoretical Framework for Digital Transformation

This section delves into the transition from traditional paper-based administration to digital management through the use of the Internet and information technology.

2.2 Concept of Digital Transformation

To adequately grasp the scope of digital transformation, it is crucial to distinguish it from "digitization," although some scholars may view them as synonymous, suggesting they are two sides of the same coin.

Despite their overlap, significant differences exist. Digitization refers to "the process of converting information into a digital format, wherein data is organized into discrete units of data (bits) that can be separately addressed (usually in multiple-bit groups called bytes)."

This process generally involves converting printed texts, images, including photographs, illustrations, and maps, into binary signals through scanning, allowing for display and manipulation on digital devices. In telecommunications, this conversion pertains to transitioning from analog signals to digital pulses. In the context of library science, digitization involves converting physical books and documents into digital formats¹.

In contrast, digital transformation is a broader, more encompassing shift that impacts business models and operational frameworks both in private and public sectors.

It is a response to advancements in internet technology, information systems, and database capabilities, aiming to enhance service delivery, maintain competitive advantage, and adapt to technological evolutions². Fari expands on this, noting that digital transformation is not merely about adopting technological tools within an organization³.

Instead, it represents a comprehensive overhaul that redefines internal and external business processes and service delivery, striving to offer swift and

straightforward services to the public. This transformation compels organizations to reevaluate and often change their business models to align with new market realities.

Additionally, digital transformation reshapes the way individuals live, work, think, interact, and communicate. It involves continuous planning and dynamic efforts to reformulate processes to integrate available technologies effectively⁴. It also triggers a change in organizational culture, influencing perceptions, behaviors, and actions at work.

This shift emphasizes the strategic use of information and communication technologies to enhance workplace environments and align organizational functions with the values, structures, and arrangements dictated by these technologies⁵.

Digital transformation, therefore, transcends mere digitization. It entails a fundamental transformation in business practices, communication strategies, and operational procedures through digital technologies such as smartphones, computers, and web-based platforms.

This phenomenon is evident across various domains, including marketing, e-commerce, e-learning, e-government, and online journalism, signaling a broader shift towards a comprehensive digital ecosystem, exemplified by transitions such as from print to digital journalism and from traditional commerce to e-commerce.

2.2 Steps of Digital Transformation

The journey of digital transformation unfolds through a well-defined sequence of steps, each crucial to fostering successful outcomes. According to Reda & Grissi⁶, these phases are meticulously designed to optimize the digital shift:

- Establishing a digital strategy.
- Modifying the organizational structure to imbue the institution with the necessary flexibility to adapt to new digital workflows and technologies.
- Identifying and measuring digital resources.
- Creating a digital transformation department for managing the transformation efforts, ensuring that initiatives are executed efficiently and align with strategic objectives.
- Identifying and resolving obstacles.

2.3 Digital Transformation Strategies

McKinsey highlights several strategies that encapsulate the essence of navigating the digital transformation landscape effectively⁷:

- **Digital Speed:** In the digital era, agility is paramount. Leading organizations differentiate themselves by accelerating processes from planning to execution, ensuring rapid adaptation to changes.
- **Reinvention:** To stay competitive and profitable, organizations must embrace innovation. This involves rethinking existing business processes and exploring new ways to deliver value through information technology.
- **Making Decisions Faster:** The ability to make swift decisions, particularly regarding acquisitions of tech-centric firms like Nokia or Yahoo, is crucial. These decisions, while sometimes costly, are strategic investments that can yield substantial benefits in the medium to long term.
- **Data-Driven Decisions:** "The road to recovery is paved with data," states Smaje. Decisions anchored in robust data analysis tend to be more effective and can guide the organization through recovery and growth phases.
- **Following Customers:** Understanding and responding to customer needs is essential. Leveraging artificial intelligence to analyze trends and preferences can lead to significant gains, enhancing customer satisfaction and loyalty.

2.4 Global Trend Towards Digitization

The global landscape is increasingly embracing digitization as a formal directive adopted by states, governments, business entities, and even individuals and the broader economic community. This shift has been particularly catalyzed by the onset of the COVID-19 pandemic, which emerged in December 2019 in Wuhan, China.

As the pandemic spread, bringing unprecedented health crises and economic disruptions, the world turned to digital technology as a critical solution to mitigate the impacts of health quarantines and the widespread suspension of traditional economic activities, such as the operations of restaurants, cafes, hotels, parks, and markets.

In response to the pandemic, there was a marked acceleration in the adoption of digital technologies. Digital solutions such as e-commerce, e-learning, e-health, and digital communication platforms, including email, text messaging, and audio-visual interactions through social media, saw significant growth.

These digital tools not only helped maintain economic activities but also played a crucial role in preserving social interactions in a time of physical distancing. Recognized and endorsed by international organizations such as the World Health Organization, UNICEF, the World Bank, and others, these digital

strategies received broad support. Even the United Nations Secretary-General, Antonio Guterres, has been a vocal proponent of these solutions.

On June 11, 2020, UN Secretary-General Antonio Guterres put forward a series of strategic recommendations aimed at guiding the international community towards ensuring that all individuals worldwide are connected, respected, and protected in this burgeoning digital era. His Roadmap for Digital Cooperation emerged from a comprehensive, multi-year collaborative effort involving multiple stakeholders, designed to address a wide array of challenges associated with the Internet, artificial intelligence, and other pivotal digital technologies.

This roadmap articulates a practical framework for implementing the Secretary-General's recommendations, aiming at fostering global digital cooperation in several key areas as outlined by the United Nations:

- Achieve global connectivity by 2030, where everyone should have safe and affordable access to the Internet.
- Promote digital public goods to unleash a more equitable world, adopting open internet sources and supporting public assets.
- Ensure digital inclusion for all, including the most vulnerable groups, who need equal access to digital tools to accelerate development.
- Enhance digital capacity building, as there is a need for skill development and training worldwide.
- Ensure the protection of human rights in the digital age, where human rights apply both online and offline.
- Support global cooperation in trustworthy artificial intelligence that is human rights-based, secure, sustainable, and promotes peace.
- Enhance digital trust and security through a global dialogue to promote sustainable development goals.
- Build a more effective digital cooperation architecture and make digital governance a priority, focusing on the United Nations approach.

The High-Level Panel on Digital Cooperation released a report titled "The Age of Digital Interconnectivity" in 2019, which included a set of important recommendations⁸:

- Build an inclusive digital economy.
- Develop human and institutional capacities.
- Protect human rights and the human factor.
- Enhance and stabilize digital trust and security.
- Promote global digital cooperation.

The panel, co-chaired by Melinda Gates from the United States and Jack Ma, the CEO of Alibaba Group from China, includes 18 prominent digital personalities from 18 countries, with a secretariat consisting of Mandeep Singh Gill from India and Jovan Kurbalija from Serbia. It is notable that the panel members are from some of the world's leading digital nations like China, India, France, and the United States. The report revolves around three main axes:

- _ Leaving no one behind.
- _ Digital societies and technologies.
- _ Mechanisms for global digital cooperation.

3. Digital Transformation in Algeria

In this section, we review the key indicators directly or indirectly related to digitization, as infrastructures are very crucial for the digital transformation process, such as the wired and wireless telephone network and various types of internet networks, the number of subscribers, the speed of flow, and the number of enterprises active in the field of information and communication technology, based on reports from the Ministry of Post and Telecommunications and information provided on its official website, which is part of the digital transformation process.

3.1 Indicators of Developments in Information and Communication Technologies and the Information Society

3.1.1 Fixed Telephone Indicators

The following table shows the number of subscribers to the fixed telephone network.

Table 1: Number of Subscribers to the Fixed Telephone Network

Indicator	2015	2016	2017	2018	2019	H1 2020
Residential Subscriptions	2,832,238	2,967,737	3,611,735	3,711,765	4,190,162	4,272,004
Professional Subscriptions	435,354	436,972	489,247	452,274	445,055	437,370
Total	3,267,592	3,404,709	4,100,982	4,164,039	4,635,217	4,709,374

Source: Ministry of Post and Telecommunications, Report on the Development of the Telephone and Internet Market in Algeria for the First Half of 2020, Directorate of Statistics Studies and Forecasting, p 2.

The table illustrates a continuous increase in the total number of subscribers to both professional and residential fixed telephone services, demonstrating the importance of fixed telephones for phone calls and internet connectivity, reaching a peak of 4,709,374 subscriptions in the first half of 2020.

3.2.1 Mobile Phone Indicators

Table 2: Mobile Phone Subscribers in Algeria from 2015 to H1 2020

Indicator	2015	2016	2017	2018	2019	H1 2020
Prepaid	39,296,986	41,197,999	41,943,543	41,036,380	40,635,183	40,670,308
Postpaid	4,093,979	4,619,847	3,902,122	6,184,408	4,790,350	3,741,422
Total	43,390,965	45,817,846	45,845,665	47,154,264	45,425,533	44,441,730

Source: Ministry of Post and Telecommunications, Development Report for the Telephone and Internet Market in Algeria for the First Half of 2020, Directorate of Statistics Studies and Forecasting, p 3.

It is observed from the table that the number of mobile phone subscriptions is very large and continually increasing, with the number of subscribers peaking in 2018 at about 47,154,264. However, there was a slight decrease in the first half of 2020, reaching about 44,441,730 subscribers.

It is also noted that subscribers to prepaid services outnumber those of postpaid services, which is due to the flexibility and advantages of prepaid services where each subscriber chooses the option that best suits their financial capacity for topping up their balance.

3.1.3 Fixed Internet Indicators

Table 3: Fixed Internet Subscribers in Algeria from 2017 to H1 2020

Indicator	2017	2018	2019	H1 2020
Subscriptions less than 2 Mbps	107,067	7,557	Not Published	Not Published
Subscriptions 2 Mbps to less than 10 Mbps	11,211,630	2,192,357	2,385,527	2,470,361
Subscriptions equal to or greater than 10 Mbps	920,268	863,921	1,195,199	1,205,565
Total	3,202,505	3,063,835	3,580,456	3,675,926

Source: Ministry of Post and Telecommunications, Development Report for the Telephone and Internet Market in Algeria for the First Half of 2020, Directorate of Statistics Studies and Forecasting, p 8.

The table shows a continuous increase in the number of subscriptions, which indicates the importance of the internet that varies in use from entertainment to education to work and other applications. Many subscribers use it in their field of work or specialty, such as teachers, students, merchants, craftsmen, businesspeople, engineers, students, etc. Especially with the improvement of the service and the growing number of subscribers to internet

services ranging from 2 megabytes to 10 megabytes and also internet exceeding 10 megabytes.

It can be said that the subscriptions are not only for individuals and families but also for service, industrial, commercial, security, and administrative institutions that need high bandwidth to connect their employees and various interests to the internet, especially since contemporary organizations rely heavily on the internet to manage their operations, particularly through e-commerce, e-marketing, connecting with the supply chain, and other electronic businesses.

3.1.4 Mobile Internet Indicators

Table 4: Mobile Internet Subscriptions from 2017 to H1 2020

Indicator	2017	2018	2019	H1 2020
3G Mobile Internet Subscriptions	21,592,863	17,422,312	11,989,157	10,637,991
4G Mobile Internet Subscriptions	9,867,671	18,920,289	24,922,271	26,329,792
Total	31,460,534	36,342,601	36,911,428	36,967,783

Source: Ministry of Post and Telecommunications, Development Report for the Telephone and Internet Market in Algeria for the First Half of 2020, Directorate of Statistics Studies and Forecasting, p 8.

For the first half of 2020, the Directorate of Statistics, Studies, and Forecasting (p 8) notes a significant number of subscriptions to mobile phone services using fourth-generation (4G) technology. During this period, the number of 4G subscriptions reached 26,392,792, while the number of third-generation (3G) subscriptions decreased to 10,637,911.

This decrease from the 21,592,863 subscriptions recorded in 2017 can be attributed to a substantial shift of users from 3G to the more advanced 4G technology, in anticipation of a future transition to fifth-generation (5G) technology upon its widespread adoption and regulatory approval by the regulatory authority.

The total number of subscriptions for the first half of 2020 amounted to 36,967,783, a very high figure indicating that individuals may own more than one subscription. This is within a competitive mobile market landscape where three operators exist: Mobilis, Ooredoo, and Algérie Télécom.

The rise in the number of mobile internet subscriptions indicates a strong demand for mobile internet in Algeria, driven by the spread of digital culture and the widespread use of the internet in education and administration, in addition to social communication, which enjoys great popularity in Algeria. This is also due

to the flexibility of mobile internet, which allows connectivity and mobility simultaneously, unlike fixed internet. Thus, it provides the freedom of movement for subscribers whether at home, university, or on the road, etc.

3.2 Indicators of Information and Communication Technology Economy

Table 5: Total Number of Enterprises in the Information and Communication Technology Sector

Year	2016	2017
Total Number of ICT Enterprises	227,770	239,646

Source: Ministry of Post and Telecommunications

The table shows an increase in the number of enterprises active in the field of information and communication technologies, indicating a new trend especially as contemporary enterprises rely on modern technologies to increase effectiveness in performance and gain a competitive edge.

Table 6: Information Technology Sector in Algeria

Activity	Individuals	Legal Entities	Total
Goods Production	43,602	11,668	55,270
Wholesale Distribution	6,488	2,990	9,478
Import for Resale	-	9,177	9,177
Retail Distribution	68,329	3,449	71,778
Services	82,541	11,402	93,943
Total	200,960	38,686	239,646

Source: Ministry of Post and Telecommunications

The table shows that the number of individuals active in the information technology field is larger than that of legal entities, which is a negative indicator as the number 38,686 for legal entities in 2017 is very low. There is a need to increase the number of legal entities to keep up with the digital transformation process in Algeria.

3.3 International Indicators

Table 7: ICT Development Index Ranking

Year	2010	2012	2013	2015	2016	2017	2018-2019
Ranking	114	114	114	113	106	102	Not Published
Index Value	2.99	3.30	3.42	3.71	4.32	4.67	Not Published

Source: Ministry of Post and Telecommunications, Report on International Indicators Related to the Postal and Telecommunications Sector, Directorate of Statistics Studies and Forecasting 2020, p 2.

The table shows Algeria's relatively low ranking in the ICT Development Index from 2010 to 2013, maintaining the 114th position, but it shows slight improvement in the years 2015 to 2017, reaching rank 102 in 2017.

Although still not a high rank, it indicates progress in the usage of information and communication technologies in Algeria, facilitated by the implementation of e-government and database systems, despite the technological gap that needs more concerted efforts to bridge.

Table 8: Sub-index of Access to Information and Communication Technology

Year	2010	2012	2013	2015	2016	2017	2018-2019
Ranking	110	107	107	110	102	98	Not Published
Sub-index Value	3.64	4.22	4.46	4.27	4.83	5.14	Not Published

Source: Ministry of Post and Telecommunications, Report on International Indicators Related to the Postal and Telecommunications Sector, Directorate of Statistics Studies and Forecasting 2020, p 2.

This sub-index shows improvement in Algeria's ranking from 110 in 2010 to 98 in 2017, although there was a regression in 2015 to rank 110 again. The continuous improvement in sub-index values to 5.14 by 2017 indicates progressive enhancement in access to ICT.

Table 9: Sub-index of Utilization of Information and Communication Technology

Year	2010	2012	2013	2015	2016	2017	2018-2019
Ranking	119	130	131	122	110	108	Not Published
Sub-index Value	0.55	0.67	0.73	1.52	3.38	2.92	Not Published

Source: Ministry of Post and Telecommunications, Report on International Indicators Related to the Postal and Telecommunications Sector, Directorate of Statistics Studies and Forecasting 2020, p 2.

The table illustrates fluctuations in the ranking for the sub-index of ICT utilization, with Algeria ranking better at 108 in 2017 compared to earlier years, despite it still being a low rank internationally. The data suggests that utilization of ICT in Algeria remains weak relative to other nations, particularly those advanced in ICT applications. This is attributed to delays in implementing e-government, e-commerce, and distance education, among other digital applications, compounded by digital illiteracy and a significant technological gap.

Table 10: Sub-index of ICT Skills

Year	2010	2012	2013	2015	2016	2017	2018-2019
Ranking	103	98	98	93	87	80	Not Published
Sub-index Value	6.56	6.72	6.72	6.98	6.10	6.29	Not Published

Source: Ministry of Post and Telecommunications, Report on International Indicators Related to the Postal and Telecommunications Sector, Directorate of Statistics Studies and Forecasting 2020, p 3.

This sub-index is relatively better compared to others and shows a substantial improvement from rank 103 in 2010 to rank 80 in 2017, a decline of about 23 ranks over seven years. Although still a moderate rank, it is promising for further improvement, especially with the increasing focus on electronic applications, internet use, and modern technologies such as smartphones, tablets, and computers in Algeria, suggesting potential for better rankings in the development of ICT and related sub-indexes in the future.

Table 11: Huawei Global Connectivity Index (GCI)

Year	2015	2016	2017	2018	2019	2020
Ranking	79/79	79/70	79/68	79/70	79/69	79/69
Index Value	23	25	27	29	31	32

Source: Ministry of Post and Telecommunications, Report on International Indicators Related to the Postal and Telecommunications Sector, January 2021, p.4.

Algeria ranked last in the years 2010, 2012, and 2013, while it occupied the second-to-last position in 2015. However, there was a marked improvement when it climbed to the 102nd position in 2017.

Although it still ranked low globally, this improvement indicates the effectiveness of digital transformation efforts and the beginning of mastering information and communication technologies to narrow the technical gap that separates Algeria from developed countries.

Table 12: Huawei Global Connectivity Index (GCI)

Year	2015	2016	2017	2018	2019	2020
Ranking	79/79	79/70	79/68	79/70	79/69	79/69
Index Value	23	25	27	29	31	32

Source: Ministry of Post, Telecommunication and Information Technology, Report on International Indicators for the Telecommunications Sector, January 21, P 04.

This index is one of the global benchmarks used to measure the quality of internet connectivity. We observe that Algeria was at the bottom of the rankings in 2015 and 2016.

However, there was an improvement in the rankings as it reached its best position at 68th in 2017, and then maintained the 69th position in 2019 and 2020. Therefore, it is essential to redouble efforts and improve infrastructure to enhance Algeria's international ranking in this index."

3.3 International Indicators

Table 13: United Nations E-Government Development Index (EGDI)

Year	2010	2012	2014	2016	2018	2020
Index Value	0.3181	0.3608	0.3106	0.2999	0.4227	0.5173
Ranking	131	132	136	150	130	120

Source: Ministry of Post and Telecommunications, Report on International Indicators Related to the Postal and Telecommunications Sector, January 2021, p 3.

The United Nations E-Government Development Index (EGDI) is a pivotal metric for evaluating the real-world progress of e-government initiatives across nations. Countries actively seek to ascend this ranking to position themselves as leaders in digital governance. Regrettably, Algeria has historically placed low on this index due to prolonged delays in fully deploying its e-government initiatives. Nonetheless, there has been noticeable progress, with Algeria's ranking improving to 120th in 2020, up from 150th in 2016.

International benchmarks, particularly in the postal and telecommunications sectors, underscore Algeria's position trailing behind many nations, some of which are less economically developed yet have made substantial investments in information and communication technology.

In contrast, several affluent nations excel in these rankings due to their well-established infrastructures that are conducive to digital transformation. For instance, it was not until 2018 that Algeria began to legislate e-commerce. By 2020, the country was ranked 69th out of 79 in the Huawei Global Connectivity Index "GCI" and 120th in the UN's e-government rankings.

While domestic metrics, such as internet throughput starting from 1 Mbps, might appear to meet minimal acceptable standards, the rapid pace of international digital advancement poses a significant challenge.

Numerous countries have reached advanced stages of e-government and digital economy integration, deeply integrating digital processes into the everyday lives of their citizens, from setting up websites for personal and business use,

engaging in e-learning, to managing financial transactions online, this includes paying debts, collecting payments, buying, selling, covering expenses, and even receiving government subsidies. Thus, improving Algeria's standing in these indicators is not just critical for its digital transformation but also essential in attracting foreign investment.

3.4 Efforts and Resources Dedicated to Narrowing the Digital Divide for Achieving Digital Transformation

Algeria has been making efforts to enhance digital transformation, and among the most prominent efforts are⁹:

- Development of high and very high throughput policies, where the Ministry of Post and Telecommunications has prepared a national plan that aims to:
 - Consolidate Algeria's stable foundations.
 - Improve good governance.
 - Continue human development.
 - Increase economic growth dynamics.
- The Ministry of Post has implemented several measures including "the creation of technology parks and incubators to support startups and entrepreneurs, thereby enhancing the local content industry." A significant number of startups and innovative project owners have been supported by these initiatives. Additionally, the Electronic Commerce Law was established in 2018, now regulated and licensed under the economic activity code number 607604.
- The official launch of the child online protection guide in Arabic and French, which can be easily downloaded to help families protect their children.
- Strengthening e-government through the launch of the electronic portal for public procurement and the updating of the citizen's portal.

4. Results Analysis

This study has delved deeply into the pivotal issue of digital transformation in Algeria, examining its progression, evaluating its successes and shortcomings, and outlining the trajectory it is likely to follow. Central to this investigation were questions concerning the current state of digital readiness in Algeria, the challenges it faces, and the strategic directions it may pursue in the future. This discussion addressed a spectrum of sub-issues interconnected with the overarching theme of digital transformation.

The inquiry commenced with a comprehensive review of the existing literature on digital transformation, which provided a theoretical backdrop against which Algeria's efforts could be gauged. Subsequently, the study scrutinized

various key indicators of digital transformation within the Algerian context, encompassing dimensions such as information and communication technology indicators, economic indicators, and international postal and telecommunications benchmarks.

These indicators furnished a quantitative foundation to assess the extent of Algeria's digital evolution, detailing specifics such as the tally of fixed and mobile phone subscribers, internet connectivity rates, and the activity scale of enterprises within the ICT sector. A broader perspective was also considered, placing Algeria within an international frame of reference, typically among 170 to 178 countries.

Despite a notable increase in the numbers of mobile and fixed phone subscribers and internet users, Algeria's performance on international scales suggests only marginal advances, positioning it within the mid to lower tiers of global communications rankings. This positioning underscores a crucial insight: while internet penetration is on the rise, its integration into professional spheres remains limited.

The predominant use of the internet for social interaction and entertainment highlights a significant underutilization of its potential in professional and developmental contexts. Moreover, the technological chasm that separates Algeria from digitally advanced nations such as India, UAE, China, Japan, Germany, Estonia, the USA, and the UK remains stark and challenging.

Acknowledging these realities, it is evident that Algeria has embraced a robust political commitment to invigorating its information technology sector, promoting widespread electronic administration, and implementing e-government frameworks. This commitment was manifested in initiatives like the "Algeria Electronic 2013" project spearheaded by the Ministry of Post and Telecommunications.

The project has seen substantial investments funneled into enhancing the ICT infrastructure, including the deployment of fiber optic cables across the Sahara Desert and the maritime expanses, and the launch of satellites aimed at broadening internet accessibility. The proliferation of e-commerce, bolstered by the widespread adoption of electronic payment methods and the expansion of official websites and social media platforms, marks a significant stride forward.

However, the transition to a fully electronic administration has encountered considerable obstacles. Many administrative departments still rely heavily on paper-based processes, and the integration of electronic services across different governmental sectors remains piecemeal. Key ministries such as the Ministry of

Interior and Ministry of Justice, which are critical to the e-administration ecosystem, have yet to fully embrace these technologies.

The absence of a unified governmental portal that allows seamless access to various departments, coupled with the inadequate readiness of interdepartmental administration systems designed to integrate operations across multiple ministries, illustrates the challenges still to be surmounted.

As the Algerian society increasingly becomes dependent on the internet for both personal and professional engagements, and with a clear political consensus leaning towards digital transformation, the future does hold promise. This potential can be realized if the persistent barriers such as resistance to change, electronic apprehension, and the continued reliance on less efficient paper-based methods can be effectively addressed.

Moreover, while digitalization refers specifically to the conversion of data from analog to digital formats, digital transformation transcends this definition. It represents a comprehensive shift in lifestyle and business models, advocating for a transition away from traditional paper-based systems towards a dynamic management of information through modern digital and communication technologies.

As the world moves towards an era where digital governance and digital economies become the norm, spurred by the imperatives of globalization and the quest for sustainable development, Algeria's journey towards digital transformation, although fraught with challenges, is both necessary and inevitable. Algeria has achieved digital milestones represented in:

- The number of fixed telephone subscribers in 2018 was approximately 4,158,518.
- The household penetration rate of fixed telephony in 2018 was 51.41%.
- The number of mobile phone subscribers in 2018 was about 51,490,146.
- The length of fiber optics in 2018 was about 145,120 km.
- The international internet bandwidth in 2018 was about 1,050,000 Mbps.
- The total number of fixed internet subscribers in various formats in 2018 was about 3,063,835.
- The total number of mobile internet subscribers (3G and 4G) in 2018 was about 39,860,900.
- The total number of ICT enterprises in 2017 was about 239,646.

Despite the impressive statistics, these figures do not fully capture the essence of digital transformation, as a substantial portion of internet subscribers comprises teenagers and children. Their engagement with the internet

predominantly revolves around text messaging, movie streaming, and social media browsing, lacking a deep awareness of the broader benefits and capabilities that the internet offers.

Moreover, the number of active registered enterprises listed in the CNRC does not accurately reflect the actual economic participation of these entities. While there has been notable progress in digitizing several services, such as civil status, passports, identification cards, criminal records, and commercial registers, and many government platforms now facilitate access to a wealth of information, news, updates, and downloadable forms, documents, and reports, these advancements alone are insufficient.

The absence of a fully realized digital economy and a cohesive, comprehensive e-government system, embodied by a fully integrated, user-centric portal, highlights the limitations and partial successes of the current digital transformation efforts. Consequently, the study reaffirms the main hypothesis: that while there are areas of success, the overall digital transformation in Algeria remains an incomplete and evolving process.

Digital transformation in Algeria has succeeded in some areas and failed in others. The study confirmed the validity of the following sub-hypotheses:

- Digital transformation is the transition from traditional paper-based administration to digital administration.
- Digital transformation in Algeria is still below the required level.
- Algeria faces significant digital challenges, including the widespread implementation of electronic administration in public departments, activation of comprehensive e-government, and e-commerce.
- Given the growth in the market for modern communication technologies and individual and governmental interest in digitization and artificial intelligence, the prospects for digital transformation in Algeria remain promising, provided resistance to change and electronic fear are overcome, as well as reliance on easy paper-based solutions.

5. Conclusion

Digitalization and digital transformation have emerged as critical themes in administrative discussions worldwide, particularly in the wake of the COVID-19 pandemic. These topics are especially pertinent in developed countries such as the United States, which not only produce and export advanced information technology but also actively leverage these capabilities to bolster their global competitiveness.

Conversely, Algeria, as a developing nation, faces unique challenges in its quest to bridge the technological divide and foster substantial digital

transformation across its public administration, economic sectors, and educational systems.

Initiated in 2008, the ambitious "Algeria Electronic 2013" project, spearheaded by the Ministry of Post and Telecommunications, marked a significant governmental effort to integrate digital technologies into the fabric of Algerian society.

In response to these challenges, it is essential to foster an environment that not only facilitates but also accelerates digital adoption. The following strategic recommendations are proposed to enhance Algeria's digital transformation trajectory:

- ✓ Reduce the cost of fixed and mobile internet further from the current price levels.
- ✓ Value the work of regulatory authorities.
- ✓ Accelerate the implementation and application of electronic administration.
- ✓ Utilize both Algerian and foreign experts, granting them benefits and authority to perform their tasks.
- ✓ Engage in very important international cooperation with both Arab and foreign countries through partnerships between Algerian, foreign, and even governmental and international institutions in a win-win relationship.
- ✓ Activate Algerian e-government as soon as possible.
- ✓ Review, update, and improve current electronic services.
- ✓ Secure the internet and activate child and teenager protection programs, including blocking harmful websites.

6. Bibliography List:

- 1 - Khawathra, Samia. "Digital Transformation During and After the COVID-19 Pandemic." *Algerian Journal of Legal and Political Sciences* 58, no. 02: 103-126, 2021.
- 2 - Salami, Jamila, and Youssef Bouchi. "Digital Transformation Between Necessity and Risks." *Journal of Legal and Political Sciences* 10, no. 02: 944-967 2019.
- 3 - Fari, Loubna Sahar. "An Analytical Study of the Determinants of Successful Digital Transformation in Companies." *Algerian Journal of Economics and Finance* 08, no. 15: 33-45, 2021.
- 4 - Khawathra, Samia. "Digital Transformation During and After the COVID-19 Pandemic." *Algerian Journal of Legal and Political Sciences* 58, no. 02: 103-126, 2021.

5 - Mohamed, Abderrahman Hassan Hassan, and Mohamed Ahmed Al-Ghabiry. "Digital Transformation and Automation." *Journal of Administrative and Financial Sciences* 04, no. 03: 08-31, 2020.

6 - Grissi, Seddouki, and Si Tayeb Lhachmi Reda. "Reality and Importance of Digital Transformation and Automation." *Opinions Journal for Economic and Administrative Studies* 03, no. 02: 99-109, 2021.

7 - Afif, Hana, and Wahiba Khaloufi. "The Trend Towards Digital Transformation: A Necessity or an Option." *Journal of Money and Business Economics* 06, no. 01: 276-291, 2022.

8 - United Nations. "High-level Panel on Digital Cooperation of the Secretary-General of the United Nations." Accessed September 3, 2022. <https://www.un.org/ar/sg-digital-cooperation-panel>, n.d.

9 - Ministry of Post and Telecommunications. "Indicators." General Directorate for Digital Economy. Accessed September 3, 2022. <https://www.mpt.gov.dz/ar>, 2022.