

DIGITAL TRANSFORMATION IN ALGERIA

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Abstract:

Digital transformation is a necessity of our time and has therefore received significant attention from the state due to its effective role in organisational management, replacing manual work with digitisation. This study aimed to clarify the theoretical aspects of digital transformation, as well as the various challenges and achievements in this field in Algeria. The study concluded with important results, the most significant of which is that Algeria has reached a reasonable level of digital transformation and is striving to keep up with global developments, enabling it to transition to a digital government.

Keywords: digital transformation, information, communications.

1. Introduction:

Today's world is characterised by numerous developments, innovations and inventions across various aspects of life. Among these, the advancements in information and communication technologies are among the most significant features of the early twenty-first century. These developments have given rise to the digital revolution, which is rooted in the knowledge economy and has had a profound impact on human life in general, as well as on organisations operating in various fields.

The digital revolution has significantly influenced organisations worldwide, contributing to the rise of e-management, widely regarded as one of the most important outcomes of technological advancements in information and communication. Many economic and social actors, as well as business management researchers, consider e-management an essential source of differentiation and a critical factor in ensuring performance quality and facilitating rapid adaptation to changes in a dynamic environment. This has compelled organisations to adopt e-management in order to leverage its benefits and address the shortcomings of traditional management practices.

1.1 Research problem

In light of the preceding discussion, the following research problem can be posed: What is the current state of Algeria's adoption of digital transformation as a strategic option in its transition to a technology-based digital economy?

1.2 Research hypotheses

Despite Algeria's recent experience in digital transformation, it has made significant progress.

1.3 Objectives of the research

The objectives of this study can be summarised as follows:

- Addressing the conceptual framework related to digital transformation and the digital economy.
- To understand the current state of digital transformation in Algeria.

1.4 Importance of the research

The importance of this research lies in its attempt to shed light on the theoretical aspects of digital transformation, while also discussing Algeria's challenges and achievements in this field.

1.5 Research methodology and tools used

To address the research problem, a descriptive approach was adopted to present various theoretical concepts related to the field of study. A range of references were used, including scientific articles and websites.

1.6 Structure of the research

In this context, the research is divided into the following sections:

- The theoretical aspect of digital transformation.

Challenges of digital transformation in Algeria.

- Algeria's indicators and achievements in the field of digital transformation.

An analytical study of digital transformation in Algeria.

2. The First Axis: Digital Transformation

The twentieth century saw a huge increase in digital technology, in terms of both technological advancements and the creation of digital hubs and frameworks. Digitisation has facilitated the exchange of ideas and the transfer of information, prompting organisations worldwide, including universities, to strive for the advantages and benefits of digitisation. In this section, we will present various theoretical aspects related to digital transformation.

2.1 Fundamental concepts of digital transformation

Several key concepts can be identified:

Digital transformation is the process of converting printed materials into digital formats using computers and intranet networks. This involves organising the materials into separate data units known as 'bytes' and storing them on internal storage media such as hard drives or external devices, or making them accessible via the intranet¹. It is evident from this definition that digital transformation involves converting various information sources into a format that can be read by computer technologies and digital networks.

Digital transformation strategies are defined as a concept that focuses on coordinating various processes and determining priorities and objectives during the implementation of digital transformation within an organisation. They are also described as 'a designed plan, method or means adopted at the institutional level to build a culture of digital transformation'². These strategies involve processes, objectives, guidelines and control structures for the digital transformation process, and serve as an interface for coordinating various digital activities³.

2.2 The importance of digital transformation strategies

Digitisation has permeated every aspect of life and taken a dominant role in strategic fields. This increase in significance highlights the strategic importance of digital transformation.

¹- Yass, N. (2019). 'Requirements for digital transformation in Arab countries'. *Library and Information Journal*, 13(1), pp.126–127.

²- Pelletier, C. Raymond. 'Orchestrating the Digital Transformation Process through a Strategy-as-Practice', A. Rivieres, 2020, p. 4318.

³- Korachi, Zineb; Bounabat, Bouchaib. 'General approach for formulating a digital transformation strategy', *Journal of Computer Science*, V16:14, p. 495.

three distinctive dimensions: creating value, delivering value and customer interaction. Moreover, digital

transformation is a global phenomenon that cannot be avoided: partnerships must engage with it or risk becoming obsolete as it evolves rapidly and accelerates.

Roshwan and Qassem⁴ argue that digital transformation strategies offer diverse benefits for customers, the public, institutions, and companies. The most significant of these are:

- improving and organising operational efficiency while reducing costs and effort.
- Creation of opportunities to provide innovative and creative services.
- Enhancing quality and simplifying processes.
- Expansion and outreach to a broader customer base.

We concur with the views of these researchers and believe that digital transformation is strategically important in the modern technological landscape, contributing to organisational development by increasing influence, enhancing speed of customer reach, reducing costs and boosting profits and success.

2.3 Requirements for Digital Transformation:

Digital transformation necessitates the provision of a set of essential needs and the foundational infrastructure that constitutes this transformation⁵. This involves conditions arising from the integration of mechanical requirements and digital communication networks, which can be outlined through the following roles:

Computers: Digital transformations have demonstrated that communication is no longer confined to the traditional notion of a sender, recipient and message. Instead, communication now relates to dialogue between machines and humans, as well as interaction between human and material agents. This interaction has become more intense due to the development of computer systems and their software based on digital technology. Computers have evolved from data processing machines to information processing systems and, ultimately, knowledge processing devices. Today, computers possess artificial intelligence capabilities that enable them to infer and draw conclusions. This explains expert systems, which are capable of reading, hearing, seeing and distinguishing between distances and shapes. They can understand, analyse, solve problems, prove theories and generate texts and shapes. The field of computer science continues to advance, producing ever-more intelligent computers, and thousands of digital systems are now used daily across various fields⁶.

Digital networks generally refer to a collection of places or relationships between several units, whether social or technological. A digital network consists of communication networks among digital devices, primarily computers. It signifies the interconnection of devices as if they were a single unit. There are two types of communication network:

- Local Area Network (LAN): This type of network connects a group of computers within a limited geographical area, enabling users to share resources such as printers and scanners.

⁴- Roshwan, Abdul Rahman Muhammad Suleiman, Qasim, Ahmad Abdul Hafiz and Zainab. 'The Role of Digital Transformation in Enhancing Bank Performance and Attracting Investment', First International Conference on Information Technology and Business, Gaza, 2020, p. 7.

⁵- Abdul Razak Mosaidi, 'Transformations in Reading in the Digital Age' – a thesis submitted for the Master's degree in Library and Information Science, University of Oran, Algeria, 2014–15, pp. 39–40.

⁶- Fares Karim, 'Requirements for Implementing E-Governance in the Information Systems Centre of the E-Government in Qatar', Thesis for a Master's Degree in Business Administration, Qatar, 2008, p. 110.

The most prominent equipment used in digital transformation includes the following:⁷

Computers with specifications suitable for digital processes.

- Scanning devices, such as scanners, which are used to examine written, printed and photographic information.
- Printers that assist in printing digitised information on paper.
- Software used in the digitisation process, including:
 - HTML Editor: Allows the editing or writing of any relevant HTML codes.
 - XML Source: This editor works in a similar way to the HTML editor.
 - Text Editor or Word Processor: Enables you to create, write, format and edit text.
 - Image Editor: Facilitates the production and storage of images for preservation and display purposes.
 - Scanning software: Digitises documents and images.
 - Optical Character Recognition (OCR) software: Converts various document types, including scanned paper documents and PDF files, into editable and searchable data.
 - File Transfer Protocol (FTP) software: Used for transferring files over the internet.
 - Page layout and design software: Used for designing printed and digital publications.
 - PDF software: For creating and managing Portable Document Format (PDF) files.
 - Image compression and adjustment software: For optimising image size and quality.
 - Information retrieval software: For extracting data from digitised documents.
 - Software for duplicating digitised documents onto blank media.

2.4 Stages of Developing a Digital Transformation Strategy

There are six essential steps to a digital transformation strategy, which can be outlined as follows:

Step One: Create a Vision for Digital Transformation and Objectives

In the first step, the organisation must define its vision and objectives. Rather than focusing solely on the problems they aim to solve through innovation, they should consider their ultimate goal and what they want to achieve. It is therefore important to set long-term goals and focus more on the experience they wish to provide for their customers and employees. Organisations need to develop a strategic vision for their objectives and available resources to achieve their global vision⁸.

Step Two: Assess the organisation's digital transformation capability

In this step, the organisation must evaluate its current status with regard to digital transformation. Specifically, it should assess its infrastructure and determine how well its systems and software applications meet current and future requirements. This evaluation will help the organisation to identify which services need upgrading and which processes require automation or improvement. Consequently, the organisation can select the most effective tasks, investments and efforts for its digital transformation strategy.

⁷- Yass, N. (2019). 'Requirements for digital transformation for Arab information institutions'. Previous reference, p. 37.

⁸- Saeed Abbukhiten. 'Developing a Digital Transformation Strategy for Manufacturing', *Procedia Computer Science*, V170, p. 669.

Step Three: Design the end user and employee experience

Once the organisation has established its vision and assessed its current status, it should support leadership from individuals capable of implementing change and transformation. It is crucial to persuade others to participate in management rather than resist it, by clarifying

the benefits and outcomes⁹.

Step Four: Review and select solutions and vendors

In this step, it is necessary to identify the organisation's strengths, weaknesses, opportunities and challenges.

Step Five: Create an implementation roadmap

In this step, quantify all the resources needed for successful operation and performance to avoid potential mistakes¹⁰.

Step Six: Adjust organisation culture and infrastructure

In the final step of the digital transformation strategy, the organisation must prepare its infrastructure. Initially, it should establish a team of digitally qualified experts, such as a digital officer and other professionals, to ensure a successful transformation. If human resources are lacking, external support is necessary, which may involve partnering with a reliable implementation partner. Finally, it is essential to make digital transformation a core part of the organisation's objectives, building a new digital culture that aligns with transformed operations¹¹.

2.5 Challenges of Digital Transformation:

A wide range of strategic challenges hinder digital transformation, complicating the digitisation of organisations and obstructing the realisation of strategies. We agree with the various challenges presented by researchers, which can be elaborated on as follows:

Poor internet service and communication networks:

The internet is widely used by banks and the financial and non-financial sectors, as well as in education in schools and universities. Poor internet connectivity adversely affects banking operations and the educational process. Users increasingly seek advanced services, and communication networks must be capable of supporting the growing number of users, devices, software and databases. This requires high-quality, flexible and efficient communication networks to facilitate transformation processes.

- **Digital organisational culture:** This primarily refers to the need to foster an open and positive attitude towards future technological challenges, overcoming resistance to digitisation and bridging the digital divide between different generations¹². A digital

⁹- Mohammad Fathi Abdul Rahman Ahmed, 'Proposed Strategy to Transform Minya University into a Smart University in Light of Digital Transformation Trends and the Emirati Model of Hamdan bin Mohammed Smart University', Fayoum University Journal of Educational and Psychological Sciences, Issue 6, p. 477.

¹⁰- The same reference, p. 477.

¹¹- Mohammad Mohammad Al-Hadi, 'Towards Building a Roadmap for Digital Transformation for Community Organisations in the Digital Source Strategy', Egyptian Journal of Information, Issue 26, p. 4.

¹²- Shadid Mostafa Mohammad Ali, 'The Impact of Digital Transformation on Service Performance Level Applied to Public Administration Employees', Journal of the Faculty of Economics and Political Science, Issue 14, p. 204.

organisational culture relies entirely on knowledge of digital work and its various tools, which have permeated every aspect of our lives and have become fundamental to daily operations. The absence of a digital culture, low employee adoption, and a lack of awareness of its importance and how to use it in digital practices leads to digital transformation being obstructed and complicated.

- **Digital skills:** The challenge here lies in developing and updating digital skills within the organisation. Digital skills mean that an employee is proficient in using all technological tools. A lack of digital skills among employees creates difficulties when using digitisation applications and tools, which has a negative impact on the success of a digital transformation strategy¹³.

Limited financial allocations for digital transformation

Financial environment components, such as budgets, financial reserves and procurement procedures for equipment, applications and technologies, contribute to the success of the digital transformation process. However, insufficient funding for digital transformation can lead to failure¹⁴.

- **Information security risks:** Insufficient safeguards for organising computers can lead to breaches. Information security risks are numerous and have increased recently, including espionage, hacking and piracy. These risks affect digital transformation and heighten concerns about its adoption in organisations.

- **Digital culture:** In this digital age, modern technologies must inspire trust among beneficiaries to be successful and effective. The concept of trust significantly impacts the design and development of innovative products and services¹⁵.

- **Weak laws and regulations:** These challenges arise from the lack of clear definitions of excellence and of legal obligations stemming from electronic operations. The absence of laws and regulations, or their lack of clarity concerning digital transformation and the operations it encompasses, may result in individuals losing numerous rights.

2.6 Risks of digital transformation

The process of digital transformation is not without its risks. Several factors have contributed to an increase in digital risks, including:

- The growing number of targeted sites due to the increasing number of connected devices.
- The increasing complexity of cyberattacks.
- The pace of digital innovation outstripping cybersecurity measures.
- The integration of information technology systems, operational technology and the Internet of Things.

¹³- Hamid chaima Abdul Hakim, 'Competencies of Workers in Engineering University Libraries in the Digital Environment', Al-Mustansiriya Centre for Arab and International Studies Journal, Vol. 7, Issue 70, p. 256.

¹⁴- Madi, K. I. Abu Hajir and Tarek, F. 'The Readiness of Private Palestinian Universities for Digital Transformation', First International Conference on Information Technology and Business, Gaza, 2020, p. 6.

¹⁵- Ibrahim Zakharia Abdul Mun'im, 'Challenges facing Iraqi culture in the light of digital culture', Literature Magazine, Issue 115, p. 1.

These risks are closely related to the risks of digital transformation and cybersecurity. Cybersecurity is defined as ‘the protection of information on devices, computer networks, processes, and mechanisms designed to safeguard computer systems, information, and services from any unauthorised or unintended interference, changes, or differences that may occur’. A combination of technical, organisational, and managerial measures is employed to prevent unauthorised use and misuse, and to recover electronic information and regulate communications and data. The cyberspace environment encompasses not only the internet, but also other global and specialised networks such as ACARS, SWIFT, GSM and PSTN¹⁶.

The objectives of cybersecurity are as follows:¹⁷

- Ensuring the availability and continuity of information system operations.
- Protecting operational systems from unauthorised access for malicious purposes.
- Safeguarding national interests, security and sensitive infrastructure.

Taking all necessary measures to protect citizens and consumers from potential risks in various areas of internet usage.

- Enhancing network protection.
- Strengthening the confidentiality and privacy of personal data.
- Protecting operational technology systems, including the hardware and software that comprise them, as well as the services they provide and the data they contain.

In light of the risks arising from digital transformation, countries must reconsider their cybersecurity measures, particularly since digital innovation has surpassed these measures. Furthermore, the legislative framework must align with these transformations in order to combat various crimes and cyberattacks. Entering the realm of the digital economy requires an appropriate legislative environment to accommodate this transformation.

3. The Second Axis: Challenges and Achievements of Algeria in the Field of Digital Transformation

3.1 Challenges of Digital Transformation

The need to revitalise the digitisation sector has presented the Algerian government with three key challenges:¹⁸

Challenge One focuses on investing in technology, promoting access to high-speed internet and enacting related legislation. This legislation encompasses not only physical aspects, but also software and applications related to smart laws, which are considered one of the most important sources of added value.

- Challenge Two: Algeria’s most significant challenge is intensifying the use of information and communication technology. This involves efforts to digitise the commerce and administration sectors, enhance their efficiency and facilitate the activities of individuals and institutions. This can subsequently lead to advancements in achieving economic and social development for the entire community.

¹⁶- 16. Saleh bin Ali bin Abdul Rahman Al-Rabea, 'Digital Security and Protecting Users from Internet Risks', Communications and Information Technology Authority Vision 2023, Kingdom of Saudi Arabia, edu.gov.sa, p. 6.

¹⁷- Saleh bin Ali bin Abdul Rahman Al-Rabea, 'Same reference', p. 13.

¹⁸- Ben Said Lakhdar and Mostafa Radni (2022), 'The necessity of digital transformation in Algeria and its prospects in light of the COVID-19 crisis', Forum Journal for Economic Studies and Research, Vol. 6, No. 1, pp. 32–342.

and executive texts governing the virtual world, with the aim of making these texts more flexible and better aligned with electronic requirements.

3.2 Indicators and achievements of Algeria in the field of digital transformation:

Indicators of digital transformation in Algeria

The indicators of digital transformation in Algeria include:¹⁹

- A. International Government Development Index

Algeria has achieved a positive improvement in this index, ranking 20th out of 193 countries, according to a United Nations report. It has moved from a medium to a high level based on three indicators.

- Infrastructure for transportation.
- Human capital.
- Online service index.

The latter is a positive sign for Algeria's digitisation efforts.

B. Scientific Innovation Index: Algeria scored 23.98 out of 100 points in 2018-2019, ranking 113th out of 129 countries surveyed. This is a negative indicator for digital transformation in Algeria.

Achievements in the Field of Digital Implementation:

New entities and institutions have been added to the existing list to showcase the development of information technology, communication and digitisation. This includes the establishment of a new institution aimed at supporting the development of digitisation and acting as a catalyst for digitisation in Algeria.

- defining major milestones in a strategy to promote the use of modern technology and allow a digital economy centred on start-ups to emerge.
- modernising public administrations by creating structured information platforms and digitising administrative procedures to make them available online; overseeing the implementation and operation of the government data centre. The aim is to maximise the impact of investments made in the digital field and create decision-making systems to enable more effective monitoring of governmental procedures.

3.3 Analytical study of digital transformation in Algeria

An analysis of statistical models regarding digital transformation in Algeria will be conducted.

Table 01: Evolution of Gold Card Users during the Period (2020–2024) in Million Units.²⁰

Year	2020	2021	2022	2023	2024
Number of Gold Cards	6766383	8841339	10124456	12504426	12883609

¹⁹- Khira chaouchi and Zahra Khlouf (2023) 'Digital Transformation in Algeria', Journal of Accounting, Auditing and Finance, 5(1), p. 25.

²⁰- Source prepared by the researcher based on postal indicators, 2024.

This table contains statistics on Gold Card users over the last five years. It shows that Algeria Post has issued an increasing number of Gold Cards, reaching approximately 6,766,383 in 2020. This figure is expected to continue rising, reaching approximately 13 million cards by 2024. This reflects the extent to which information and communication technology services have expanded in Algeria, as well as growing awareness of their use among individuals. Moreover, in today's world, this card has become essential.

Table 02 shows the evolution of electronic payment in Algeria (2020–2023) in millions of units²¹.

Method	Year			
	2020	2021	2022	2023
Baridi Mob		5991451	19343269	50594287
Online	4070057	6936531	8059207	1234694

What can be observed from this table is that electronic payments are steadily increasing, whether through BaridiMob or online, during the period between 2020 and 2023. This is due to the widespread use of smartphones, the development of a dedicated BaridiMob application, the introduction of benefits for using this application, and its ease of use.

Table 3: Evolution of Fixed Internet Subscriptions by Technology Type (2018-2022)²²

²¹- Source prepared by the researcher based on postal indicators, 2024.

²²- Source: Evolution of fixed internet subscriptions by technology type, 2024.

Years	2018	2019	2020	2021	2022
Number of subscriptions	3063100	3580456	378912	4175372	4705846

This table shows the evolution of internet subscriptions from 2018 to 2022, with continuous growth evident throughout the period. This growth can be attributed to the widespread availability of smart devices with internet access, digital transformation initiatives, infrastructure improvements, and increased network coverage. Additionally, the policy supporting digital transformation projects indicates a positive trend.

4. Conclusion:

Digital transformation offers numerous advantages, providing savings in terms of effort and money, as well as speeding up transactions. This has made it a necessity for individuals and organisations alike. Digital transformation also fosters competition and transparency. Given Algeria's strong foundation, it can achieve comprehensive digital transformation. Our study has led us to the following findings:

5. Findings:

1. Algeria is achieving positive results in terms of internet service development and digital system usage, which has led to a reduction in human intervention in transactions and an increase in transparency.
2. The increase in electronic payments (Baridi Mob) encourages the development of such applications and interactive platforms, providing faster access to government services.
3. The increasing issuance of Gold Cards reflects public awareness of digitisation.
4. The development of digital infrastructure is being driven by projects aimed at improving internet speed.

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