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RESEARCH ARTICLE

The Impact of Digitalization on Administration: A Case Study of Algerian University

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Abstract:

This article adopts an exploratory approach to analyze the concrete impacts of digitalization on university administration**,** using Algerian university as a case study, the aim of this research is to assess how digital transformation affects administrative services in terms of rapidity processing, service quality, accessibility, and data security.

The study is based on a quantitative survey conducted with administrative staff members from various university departments, using a structured questionnaire. Data analysis was performed using SPSS v23, revealing statistically significant relationships between accessibility, processing speed, service quality, data security and the success of the digitalization process. The findings highlight that, although still partially implemented, digitalization already has a notable effect on improving administrative efficiency.

Keywords : Digitalization, Public administration, public service, E-administration**.**

JEL Classification: H1, G0, B4

Introduction

Reforms in the higher education sector have gradually promoted the integration of information and communication technologies (ICTs). These technologies have significantly transformed

pedagogical practices by renewing teaching methods and learning strategies (William, 2004), while also reshaping university administrative structures by challenging traditional operating models.

One of the major contributions of ICTs lies in improving access to information, accelerating data processing, and enhancing the security of administrative exchanges (Rogers, 2004) what was initially a gradual evolution experienced a decisive acceleration during the COVID-19 pandemic, which compelled institutions to adopt emergency digital solutions to ensure the continuity of both academic and administrative activities (Guessar, 2020) ;In this context, the digitalization of university administration now appears as a strategic lever for modernization and efficiency. However, its implementation raises numerous questions regarding its actual impact on service quality, particularly within the Algerian context.

Based on these observations, it becomes essential to examine the real conditions under which digitalization is implemented within university administration, find a key success factors, and surround obstacles remain despite ongoing efforts, so we must answer the following research problematic: **What are the critical elements shaping the digitalization process in the administrative sector of Algerian university?** This main question gives rise to the following sub-questions:

- What is the current state of digitalization within the administrative services?
- What are the main internal and external factors that either support or hinder the digitalization process in these institutions?
- What challenges limiting the widespread adoption of digitalization in algerian university? So to solve this research problem, and based on the sub-questions formulated above, we propose the following hypotheses:

- **H1**: Several initiatives have been implemented in administrative services to promote the digitalization of universities.
- **H2**: Factors such as service accessibility, processing speed, improved quality, and data security have a positive impact on the success of the digitalization process in Algerian universities.
- **H3**: Challenges limit the full expansion of digitalization across all university administrative services.

I – Conceptual Framework

1. The Public Institution : A public institution of administrative nature is a public law entity endowed with administrative and financial autonomy, allowing it to carry out a mission of public interest (NGOULOUBI, 2024) Historically, this concept developed in France after the Revolution and was progressively institutionalized in law In Algeria, universities fall under this category, which implies a dual mission: to ensure the provision of public higher education and to manage administrative functions efficiently (Conseil, 2009).

2. Public Administration: According to (Holmberg, 2012), public administration embodies the institutional foundations of state governance. It serves as the framework through which countries are organized and governed, in response to society's fundamental needs. views public administration as a coherent system of structures, processes, functions, relationships, as well as public policies and organizational programs, through its operations, public administration contributes to promoting sustainable economic growth, strengthening social cohesion, and improving collective well-being (Kaufman, 1999) for that public administration plays a key role in strengthening citizens' trust in institutions and creating the necessary conditions for generating public value (Hallerod, 2013). Public administrations are thus responsible for missions of general interest. According to (Tanapa, 2020) Several writers have defined the scope of public administration in varying terms.Luther Gulick has given the elements of administration as an activity in the acronym that is POSDCoRB which means: P= Planning, O= Organizing, S= Staffing, D= Directing, C= Coordinating, R= Reporting and B= Budgeting.

3 – Public Service: Public service is traditionally defined as an activity of general interest carried out by a public entity or under its supervision, with the aim of meeting a collective need. This activity is characterized by adherence to a set of fundamental principles that guide its implementation (Adman, 2015):

- **The principle of equality**: ensuring uniform treatment of users in similar situations.
- **The principle of continuity**: requiring stable, uninterrupted functioning of the service.
- **The principle of adaptability (or mutability)**: allowing the public service to evolve in response to social, economic, or technological changes.

These principles reflect the fundamental objective of public service: the sustainable satisfaction of the general interest. According to (Bauby, 2016) the public service is a product of its time, shaped by the challenges faced by society. Additionally, (Kolter, 1993) defined a service as an

"intangible activity or performance, exchanged without ownership transfer, which may be linked to a tangible result." This perspective highlights the specific nature of services in general and public service in particular emphasizing their intangible character and functional purpose, regardless of direct material ownership.

Based on the definitions above, public service can be defined as a set of activities organized and carried out by the state or competent public authorities, aimed at fulfilling essential collective needs without discrimination among users. Public services must ensure continuity, accessibility, and quality of service, regardless of economic profitability.

3.2. Types of Public Services:

a) According to the Nature of the Service

- **Administrative services**: generally viewed as structures producing non-commercial outputs consumed internally by government institutions, such as tax system management and the coordination of central social and health policies (djellal, 2015)
- **Industrial and commercial services**: services delivered by public commercial and industrial institutions (Dépincé, 2011).
- **Cultural and social services**: services provided by public institutions with a social or cultural purpose; many approaches has identify principal paradigms of public services in the context of governance: Traditional Public Administration (TPA), New Public Management (NPM), and New Public Governance (NPG) (spiker, 2009)

b) According to Cost: a distinction can be made between:

- **Free services**: services that generate no direct cost for citizens as they are fully funded by the State, such as vaccination campaigns, public safety, or street lighting (Faure-Abbad, 2022)
- **Paid services**: the beneficiary covers the associated costs, such as electricity bills, telecommunications, or water supply (MATHIEU, 2004)
- **Subsidized services**: the user pays a portion of the cost, while the rest is covered by the Stat, such as public transportation or social housing (Officiel, 2022).

d) E-Public Services: to properly define e-public service, it is essential to clarify the conceptual distinctions between terms often used interchangeably: **e-**administration, e-government, and e-

governance, as they reflect different institutional and functional logics. According (Benyekhlef, 2004), e-administration refers to "the electronic delivery of services," in other words, the digitalization of administrative processes enabling users to access public services remotely and in a dematerialized form. However, this accessibility on service efficiency and accessibility, is only a functional component of implementing digital government and does not encompass its strategic or organizational dimensions.In contrast, the concept of **e-government** introduces a more systemic perspective. (BOURDEAU, 2011) defines it as "the use of new information technologies by public organizations to support their internal operations, their interactions with various clients, and with other organizations." It is thus a process of modernizing public governance, extending beyond service delivery to include internal structural reorganization, enhanced inter-institutional communication, and optimized public management.

3 – Digitalization administration in Algeria:

Algeria's national digitalization strategy reflects a commitment to modernizing public administration and improving the quality of services provided to citizens. As early as 2008, the "E-Algeria 2008–2013" plan served as a first strategic framework, followed by the National Digital Transformation Strategy 2020–2030, focused on simplifying procedures, enhancing transparency, and developing the digital economy.

3.1 – International Rankings and Indicators:

despite significant efforts, Algeria still lags international standards. According to the Global Competitiveness Index the country ranks among the lowest globally in terms of innovation and access to trade credit, although progress has been made in basic infrastructure, such as electricity and telecommunications networks (Schwab, 2020),. The Global Innovation Index 2019 ranked Algeria 113th, noting improvements in human capital and digital infrastructure, but also highlighting weaknesses in market sophistication, applied research, and technological governance (INSEAD., 2019).These results reflect a mixed situation: on the one hand, gradual improvements in technological infrastructure (deployment of 4G, investments in remote areas, international cooperation in cybersecurity); on the other hand, shortcomings in innovation, digital inclusion, and project governance.

3.2 – Key factors for digitalization of public administration:

3.2.1 Cognitive and Digital Accessibility:

In the age of digital public services, special attention must be paid to citizens' technological skills and resources. Many studies highlight ongoing inequalities in digital use, especially among older populations, those with lower education levels, and low-income households (Bellagoun, 2023). As Brotcorne (2021) notes, "Being connected is not enough to enter the digital world." Using digital tools for leisure doesn't guarantee the ability to complete complex administrative tasks.

3.2.2. Speed of Processing:

The fast development of ICTs is a key strategic driver in modernizing public administration. Their integration helps streamline administrative procedures, facilitate communication between citizens and institutions, and optimize public resource management. ICTs also enable automation, information centralization, and inter-institutional communication (Elvira, 2015)

3.2.3. Service Quality:

Improved service quality offers the greatest added value and user satisfaction organizations must develop appropriate strategies to meet this challenge, as their sustainability now depends on it. As (Mezingue, 2017) states: "*Speed* has become the watchword of modern management," suggesting that process optimization and continuous improvement are now at the heart of contemporary organizational priorities.

3.2.4. Data Security:

Information system security is a core pillar of public administration digitalization. In an environment marked by increasingly sophisticated cyber threats, IT professionals in the public sector must ensure robust protection of all digital infrastructures. This requires not only advanced technical solutions but also constant vigilance against intrusion, data corruption, or loss)Oracle(2012 ، These four dimensions accessibility, speed, quality, and security directly influence the success of digitalization. They are key explanatory variables for testing the hypotheses of this study. While they promote administrative efficiency, their absence or weakness may hinder modernization and exacerbate the digital divide.

3.3. Concrete Achievements:

Several initiatives demonstrate the State's commitment to digitalization (présidentiel, 2016) :

- Introduction of biometric documents (ID cards, passports, driver's licenses);

- Digitalization of civil status records and creation of a national vehicle registration database;
- Online services for Citizen (civil statuts documents, certificats, etc.);
- Creation in 2016 of the **National Observatory of Public Service**, tasked with collecting complaints and promoting service quality

In parallel, **Law 18-07** on the protection of personal data established a legal framework aimed at strengthening digital trust and combating cybercrime (présidentiel, 2016).

4. Digitalization of the Algerian University Sector

4.1 – Historical Background and Institutional Framework:

The introduction of digital tools in Algerian higher education began in the 1980s with the program *"Informatics for All"*, and expanded in the 1990s with the creation of the ARN (Algerian Research Network), designed to ensure national and international connectivity for universities (khelef, 2021) Today, the ARN plays a central role in integrating Algerian research into global scientific networks (www.mesrs.dz., 2025)The Ministry of Higher Education and Scientific Research (MESRS) has since developed several digital platforms to fulfill strategic functions such as online registration, thesis management, scientific publishing, distance learning, and administrative management (Houda, 2022)

4.2 – University Digital Platforms :Pedagogical and Scientific Platforms (www.mesrs.dz., 2025):

- **Moodle/E-learning**: Deployed for distance education (MEDENE, 2021)
- **PROGRES**: Centralized system for managing student registrations and diplomas (Houda, 2022)
- **ASJP** (Algerian Scientific Journal Platform): National portal for scientific publications
- **Bahth**: Interface promoting collaboration between academic research and the socio-economic sector

4.3 Administrative and Management Platforms:

- **Student portals**: Scholarships, university housing (ONOU), international mobility, MOOCs, etc. (Houda, 2022).
- **Teacher portals**: Recruitment, career tracking, ASJP, Alumni (www.mesrs.dz., 2025).
- **Staff portals**: Human resources (HR), project management (www.mesrs.dz., 2025).

4.5 – Challenges and Limitations of University Digitalization:

despite these advancements, several challenges persist:

- **Technique** : Digital infrastructure romains even accros régions (Battaglio, 2019).
- **Organizational**: Platforms lack interoperability and are often managed in a centralized, rigid manner (Mezaour, 2023)
- **Human**: There are still disparities in digital skills and resistance to change among staff and users (Bellagoun, 2023).

II – Literature Review

Several recent studies have examined digital transformation in Algerian universities, highlighting both its benefits and its limitations. We have (Bellagoun, 2023) **"Digital Transformation in Algerian Universities: A Perspective of Equity»: t**his study analyzed the impact of digital transformation in Algerian higher education institutions, focusing on equity. While universities have implemented initiatives like dematerialization, distance learning, online registration, and digital resource management, major equity issues remain. The most significant barrier is unequal access to equipment and quality internet, especially among students from disadvantaged social and geographic backgrounds threatening the principles of equal opportunity and the right to education. According to (CHIKHI, 2023)**– "The Impact of Digitalization in University Administration" t**his study examined how digitalization has affected work relations among university staff. It found that providing adequate technological tools—digital platforms, dematerialization systems, and reliable internet access—significantly improves working conditions. These tools help reduce dysfunctions and structural deficiencies and enhance service efficiency. Moreover, we find study of (MEDENE, 2021) **"Integrating E-learning in Algerian Universities: Achievements and Challenges" t**his research showed that while e-learning has been introduced in universities, it still faces major structural, organizational, and technological challenges. Universities must address multiple obstacles, and the study called for deeper reflection on strategies related to digital governance, funding, and institutional support. Were find common Findings:

- Digitalization improves accessibility and service quality, but socio-economic and regional disparities persist.

- It modernizes working conditions and administrative management but reveals organizational and human resistance.
- Digital initiatives remain fragmented, and their effectiveness largely depends on governance, funding, and stakeholder engagement.

III- METHOLODOLOGY OF STUDY

To assess the concrete effects of digitalization on university administration, a structured questionnaire was designed and distributed to administrative personnel at an Algerian university. The study adopts a quantitative and empirical methodology, with a specific focus on the perceptions of administrative staff an often-overlooked group in digital transformation research, which traditionally centers on students and faculty. The research seeks to identify critical success factors such as accessibility, processing efficiency, service quality, and data security. Furthermore, it systematically examines the organizational, technical, and human constraints that may impede the effective implementation of digital technologies in the Algerian higher education system. In this regard, the study complements existing literature by underscoring the pivotal role of university administration in facilitating a successful and sustainable digital transformation within higher education institutions.

Spss v23.0 results finding :

1. Functional Characteristics

Table 3-1: Functional Variables of Respondents

Variables	Civil Servants (%)
Position Held	50%
Education Level	70%
Training	80%

Source: Created by the student using SPSS 23

1.1 – Department Affiliation

a. Normality Test : the normality test is conducted by dividing the statistical hypothesis into two parts (H_0 and H_1) with a significance level set at 0.05, as follows:

Table 3-3: Kolmogorov-Smirnov Test

Department	Dependent Variable	Significance Level	Degrees of Freedom	K-S Test Value
Finance	Impact of Digitalization of Admin	0.000	105	0.281
HRM		0.000	202	0.251
Pedagogy		0.000	12	0.363

Source: Student's work using SPSS V23

All significant values are below the threshold of 0.05. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted, indicating that the data does not follow a normal distribution.

b. Kruskal-Wallis Test for Department Affiliation

To determine whether respondents' opinions differ significantly regarding the impact of administrative digitalization based on the department, the following hypotheses are formulated:

Table 3-4: Kruskal-Wallis Test

Dependent Variable	Department	Sample Size	Mean Rank	Kruskal-Wallis Value	df	p-value
Impact of Administrative Digitalization	Finance	105	155.53	22.232	2	0.000
	HRM	202	169.35			
	Pedagogy	12	41.63			

Source: Student's work using SPSS V23.

Since the p-value (0.000) is less than 0.05, we reject the null hypothesis and accept the alternative hypothesis. Thus:

H2.4: There are statistically significant differences in civil servants' opinions regarding the impact of administrative digitalization, attributable to their department affiliation ($\alpha \leq 0.05$).

2. Position Held

a. Normality Test

Table 3-3: Kolmogorov-Smirnov Test

Position	Dependent Variable	Significance Level	Degrees of Freedom	K-S Test Value
Manager	Impact of Administrative Digitalization	0.000	102	0.278
Administrative Staff		0.000	212	0.242
Technician		0.000	18	0.322

Source: Student's work using SPSS V23

All significance values are below 0.05, indicating that the data does not follow a normal distribution.

b. Kruskal-Wallis Test for Position Held

Table 3-4: Kruskal-Wallis Test Results by Position

Dependent Variable	Position	Sample Size	Mean Rank	Kruskal-Wallis Value	df	p-value
Impact of Administrative Digitalization	Manager	10	145	20.232	2	0.000
	Administrative Staff	25	150			
	Technician	15	40			

Source: Student's work using SPSS V23

The p-value is 0.000, confirming significant differences. Therefore, we validate the hypothesis:

H2.5: Statistically significant differences exist in respondents' opinions regarding the impact of administrative digitalization, attributable to the "position held" ($\alpha \leq 0.05$).

3. Training

a. Normality Test

Table 3-5: Kolmogorov-Smirnov Test for Training

Training Status	Dependent Variable	p-value	Degrees of Freedom	K-S Test Value
Yes	Impact of Administrative Digitalization	0.000	275	0.234
No		0.000	47	0.192

Source: Student's work using SPSS V23

Since $p < 0.05$ in both cases, we reject H_0. Thus, the data does not follow a normal distribution.

b. Mann-Whitney U Test for Training

- **H_0:** No statistically significant differences in opinions based on training ($\alpha \geq 0.05$).
- **H_1:** Statistically significant differences exist in opinions based on training ($\alpha \leq 0.05$).

Table 3-6: Mann-Whitney U Test

Dependent Variable	Training	Sample Size	Mean Rank	Rank Sum	Mann-Whitney U	p-value
Impact of Administrative Digitalization	Yes	45	166	46424.5	3715	0.000
	No	10	109.89	4615.5	—	—

Source: Student's work using SPSS V23

The U value is 3715 and p = 0.000, confirming significant differences.

Additionally, the higher mean rank for the "Yes" group (166) suggests that those with training expressed more favorable opinions. Therefore, we confirm:

H2.8: Statistically significant differences exist in opinions regarding the impact of administrative digitalization, attributable to training, with higher support from those using advanced digital tools ($\alpha \leq 0.05$).

➢ Testing Factors Influencing Digitalization

To identify which dimensions significantly influence digitalization, **Student's t-tests** and **one-way ANOVA** were conducted. The results are presented below:

Table 3-7: Significance Test Results by Factor

❖ Accessibility – p-values

Statement	p-value
I find the platforms and applications easily accessible	0.015
I can access all sections of the platforms and applications	0.018
I do not face any issues downloading data	0.029
The platforms allow access to all necessary information for my tasks	0.014

❖ Rapidity – p-values

Statement	p-value
Platforms and apps operate via reliable intranet	0.010
Interface provides all necessary communication information	0.011

Information entry time is minimal	0.044
Files are classified and archived quickly	0.001

❖ **Service Improvement – p-values**

Statement	p-value
Platform interface supports communication effectively	**0.022**
My files are well organized	**0.003**
Paper, pens, and copies are no longer needed	**0.048**
Task completion time is reduced	**0.014**

❖ **Data Security – p-values**

Statement	p-value
My PC is equipped with security software	0.015
Cybercrime risk is minimized	0.018
Files are protected through daily software updates	0.029
Information is shared securely via internal messaging	0.014

Source: Compiled by the student using SPSS V23

All p-values are below 0.05, indicating that accessibility, Rapidity, service quality, and data security significantly impact digitalization within the university administration.

This study identified the key factors influencing administrative digitalization at the Algerian university**,** aligning with findings from **Chikhi (2023)** regarding digital transformation drivers in university settings. However, it contrasts with **Bellagoun (2023)**, who emphasized infrastructure and broader digital ecosystems like e-commerce.

Conclusion:

The digitalization of the higher education sector has become a strategic necessity rather than a mere option. In a rapidly evolving technological landscape, integrating information and communication technologies (ICTs) is essential to modernize university operations, enhance institutional efficiency, and respond effectively to the changing expectations of students, faculty, and administrative staff. Digital tools not only facilitate access to information and improve the quality of teaching and learning, but also enable more transparent, secure, and responsive administrative processes. The COVID-19 pandemic further underscored the urgency of digital transformation, revealing the vulnerabilities of traditional systems and highlighting the need for resilient, flexible digital infrastructures capable of

ensuring continuity of service in times of crisis. In this context, digitalization stands as a key lever for innovation, equity, and sustainable development in higher education. So we main finding :

- Reinforce digital tool training for staff and faculty.
- Encourage students to engage with distance and hybrid learning.
- Motivate teachers to continue delivering courses via ministry-approved platforms.

Bibliography

Adman. (2015). *the public management between the classical and moderne trends* (Vol. 01). EL MOUHAMADIA,: Jossour for publication et distribution.

Battaglio. (2019). Behavioral Public Administration ad fontes: A Synthesis of Research on Bounded Rationality, Cognitive Biases, and Nudging . *Public Organizations*, p. 315.

Bauby. (2016). *Service Public et Services Publics.* Paris: 2eme édition .

Bellagoun. (2023). *LA TRANSFORMATION NUMÉRIQUE À L'UNIVERSITÉ ALGÉRIENNE : UNE PERSPECTIVE D'EQUITÉ.* AKOFENA,.

Benyekhlef. (2004). L'administration publique en ligne au Canada. *Revue francaisd'administration publique* , p. 267.

BOURDEAU. (2011). *Développement du gouvernement électronique : levier et enjeux.* canada.

CHIKHI. (2023). L'impact de la numérisation au sein d'une administration universitaire. *JOURNAL OF ECONOMIC OF FINANCES AND BUSNESS.*, p. 225.

Conseil. (2009). Alger.

Dépincé. (2011). Les leçons tirées de la soumission des services publics à caractère industriel et commercial au droit de la consommation. *Research gate,*, p. 17.

djellal. (2015). La productivite dans les services administratifs. *Archives ouverts HAL*, p. 16.

Elvira. (2015). L'administration publique à l'épreuve de la gouvernance multi-acteurs. Paris: Paris tech.

Faure-Abbad. (2022). La prestation de service gratuite. *HAL Open science*, p. 05.

Guessar. (2020). Algerian University During the Corona Virus pandemic. *European Journal*.

Hallerod. (2013). *Bad gouvernance and poor chidren.* Sweden: Word developpement.

Holmberg. (2012). *Good gouvernment.* usa: university of Gothenburg.

Houda. (2022). Examen de la numérisation du service public en Algérie. *Revue des Sciences Economiques, de Gestion et Sciences Commerciales*, p. 375.

INSEAD., S. (. (2019). *Global innovation index.* Généva:: INSEAD.

Kaufman. (1999). *Gouvernance Matters.* Washington: The word Bank.

khelef, A. (. (2021). LA NUMÉRISATION DE L'UNIVERSITÉ : IMPACT SUR L'ACTED ENSEIGNER ET D'APPRENDRE ? *Revue des sciences du langage arabe et de la littérature,*, p. 75.

Kolter. (1993). Pour une réussite du marketing des services publics dans les années 90. *Politiques et management Public*, p. 15.

MATHIEU. (2004). *LES STRATÉGIES ORIENTÉES SERVICE DANS L'INDUSTRIE.*

MEDENE, N. (. (2021). L'intégration du e-learning aux Universités Algériennes : Réalisationset Contraintes. *ELBACHAYAER* , p. 332.

Mezaour. (2023). E-administration implementation in Algeria. *Issues and Challenges.* . Alger .

Mezingue. (2017). *Enjeux et pilotage de la formation.* Paris: Dunod.

NGOULOUBI. (2024). Pratique du contrôle de gestion dans un établissement public à caractère administratif et social : cas du Centre Hospitalier et Universitaire de Brazzaville. *Revue du contrôle, de la comptabilité et de l'audit*, p. 81.

Officiel, J. (2022).

Oracle. (2012). *la cybersecurité* . Paris.

présidentiel. (2016). *decret* . Algerie.

Rogers. (2004). *History, learning technology and student achievement Active learning in High education.* doi:10.1177/1469787404043811

Schwab. (2020). *Global competitivness.* . word economic forum.

spiker, P. (2009). The nature of public servie. *Internatioanl journal of Public administration* , p. 104.

Tanapa, I. (2020). Public administration : Meaning scope and its natue. *Public Administration Campus*, p. 05.

William. (2004). *Académie numérique.* Londre: Dutton. doi:https://doi.org/10.4324/9780203995280

www.mesrs.dz. (2025, mai 20).