

The Effectiveness of Digitalization in Improving the Efficacy of the Healthcare Sector in Algeria

Naima HAMBLI¹

Traditional Industries Laboratory (Algeria) / University of Algiers 3
hambli.naima01@univ-alger3.dz

Redouan AINOUS

MECAS Laboratory (Algeria) / University of Algiers 3
ainous.redouan@univ-alger3.dz

Received date: 27.03.2025, Accepted date, 18.04.2025, Publication date: 01.06.2025

Abstract: This study aimed to assess the impact of digitalization on the efficiency of Algeria's healthcare sector, focusing on patient data management, information security, and decision-making support. It used a quantitative approach, gathering data through a questionnaire completed by 35 employees from various roles within an Algerian healthcare institution. The results, analyzed with SPSS, showed that digitalization significantly improved the accuracy and speed of patient data management, enhancing care quality. It also strengthened information security by implementing advanced protection systems, reducing the risk of data breaches. Furthermore, digitalization supported decision-making by providing accurate and timely data, enabling better decisions. However, the study highlighted challenges such as insufficient employee training on digital systems and the need for further investment in technological infrastructure. Overall, digitalization was found to have a positive impact on healthcare efficiency, though addressing these challenges is essential for maximizing its benefits.

Keywords: Digitalization, healthcare sector efficiency, data management, information security, decision-making.

Jel Classification Codes: I11, O33, L86.

Introduction

In light of the rapid technological developments taking place in the world today, digitization has become one of the most important pillars on which countries rely to achieve sustainable development and development in various sectors. Among these sectors, the health sector is one of the vital areas that have benefited greatly from digital developments, as digital transformation has opened up enormous possibilities to expand the quality of health services, improve the efficacy of operational processes, and achieve integration between various actors in the health system.

¹ Corresponding Author.

Digitization means digitizing traditional processes and services using modern technology, which contributes to improving efficiency, providing more accurate and faster services, reducing operational costs, as well as enhancing communication between patients and health service providers.

The global health sector has witnessed a remarkable shift towards digitization in recent decades, with the adoption of electronic health records (EHRs), telemedicine applications, and artificial intelligence in diagnosis and treatment, which contributed to enhancing the accuracy of medical decisions and improving the patient experience. At the national level, Algeria has begun to adopt a digital strategy aimed at developing the health sector by introducing modern technologies in health data management, improving digital infrastructure, and enhancing information security. Several initiatives and online platforms have been launched that aim to improve health record management, facilitate patients' access to medical services, and support data-driven decision-making. However, these efforts still face multiple challenges related to lack of technological infrastructure, limited funding, cybersecurity concerns, as well as resistance to change by some health workers.

In this context, this study raises a essential problem about the effectiveness of the application of digitization in cultivating the efficiency of the health sector in Algeria. It seeks to answer fundamental questions related to the impact of digitization on patient data management, its role in enhancing health information security, and the extent to which it contributes to supporting decision-making processes within health institutions. Understanding these aspects will make it possible to make recommendations that help enhance the digital transformation process and make the most of modern technologies in the health field.

This study is of great importance in terms of importance the title role of digitization in improving the efficiency of Algerian health institutions, in light of the urgent need to modernize the health system in line with global developments. By analyzing the impact of digitization on data management, information security, and decision support, this study can provide valuable insights for decision makers in the health sector, and help identify the strengths and challenges associated with implementing digitization. The results of this study can also contribute to raising awareness of the importance of digital transformation among health workers, and motivate them to adopt technological innovations to improve the quality of services provided to patients.

Accordingly, the study addresses a set of key objectives, which include analyzing the impact of digitization on patient data management, evaluating its role in enhancing health information security, studying its contribution to supporting medical and administrative decision-making, in addition to identifying factors that promote or hinder the application of digitization in Algerian health institutions. To achieve these objectives, the study relied on the quantitative approach using the questionnaire as a main tool to collect data from workers in an Algerian health institution, as the sample included 35 employees from different disciplines and educational levels. The data was also analyzed using SPSS software to test hypotheses and draw conclusions that could contribute to improving digital transformation policies in the health sector.

Thus, this study aims to provide a scientific addition on the effectiveness of digitization in increasing the efficiency of Algeria's health sector and proposing

practical recommendations that can accelerate the pace of digital transformation, which contributes to improving the quality of health services and increasing the effectiveness of the health system as a whole.

Hypotheses of the Study

Main Hypothesis: Digitization positively contributes to improving the efficiency of the health sector

The first sub-hypothesis: Digitization contributes positively to information security in the health institution

Second sub-hypothesis: Digitization contributes positively to patient data management

The third sub-hypothesis: Digitization contributes positively to supporting decision-making in health institutions

1. Digitization and the health sector

1.1. The Concept of Digitization

Digitization is a modern concept whose emergence has been associated with the emergence of information and communication technology, which has resulted in a shift from the use of traditional methods in the transfer of information and knowledge to the use of numbers in the transfer of this information and knowledge, by employing modern technology in this field.

Concepts related to the term "digitization" vary according to the context in which it is used. In Kuny Terry's view, scanning is the process of converting information sources from various forms into a form readable by computer technologies through the binary system (bits), which is the basic information unit of a computer -based information system. This is done by converting information into a set of binary numbers, a process that can be called 'digitization', thanks to a set of specialized technologies and devices (Bawden & Robinson, 2012).

On the other hand, Charlotte Percy defines digitization as: 'a method that allows data and information to be converted from an analog to a digital system' (Floridi, 2014).

Digitization in the health sector refers to the process of digitizing health services, administrative and medical processes into a digital form using modern technology. This process includes the use of electronic health records (EHR), artificial intelligence (AI), the Internet of Things (IoT), big data, and other technologies to improve the quality of healthcare and increase the efficiency of operations (World Health Organization, 2021).

2.1. The importance of digitization in the health sector:

- Improving the quality of health care: Digitization enables rapid access to health information for patients, helping to make more accurate medical decisions (Topol, 2019).
- Increasing operational efficiency: Reducing medical errors and facilitating the management of human and material resources (Adler-Milstein & Jha, 2017).
- Enhancing communication between patients and service providers: through health applications and remote consultations (Meskó et al., 2017).
- Big data analysis: Helps predict diseases and improve prevention and treatment strategies (who, 2021).
- Reduce costs: by improving resource management and reducing the need for paperwork (Adler-Milstein & Jha, 2017).

3.1. Characteristics of digitization in the health sector:

Digitization in the health sector is one of the most prominent technological transformations that are reshaping the way health services are provided. Digitization has several key characteristics, including: improving the efficiency of operations through the use of electronic health records, enhancing communication between patients and service providers via telemedicine, and facilitating access to medical information thanks to digital databases. In addition, digitization contributes to improving the quality of health care by analyzing big data to diagnose diseases more accurately. However, the application of digitization in the health sector requires a strong technological infrastructure and effective protection of patient data to ensure the success of this digital transformation.

- Systems integration: linking electronic health records with diagnostic and treatment systems (Topol, 2019).
- Security and privacy: Using encryption technologies to protect patient data (Meskó et al., 2017).
- Resilience: The ability to adapt to technological changes and new requirements (who, 2021).
- Collaboration between health entities: Information exchange between hospitals, clinics and health centers (Adler-Milstein & Jha, 2017).

4.1. Challenges of digitization in the health sector:

- Application cost: Digitization requires significant investment in technological infrastructure (who, 2021).
- Cybersecurity: The risk of compromising sensitive health data (Meskó et al., 2017).
- Resistance to change: Health workers may have difficulty adapting to new technologies (Topol, 2019).
- Lack of technological infrastructure: especially in remote areas or developing countries (who, 2021).
- Legal and ethical challenges: such as protecting patient privacy and liability for medical errors in the digital environment (Adler-Milstein & Jha, 2017).

2. Aspects of the use of digitalization in the health sector in Algeria

The indices of the use of digitalization in the health sector in Algeria can be observed through the following:

1.2. Portals and online platforms

- **Industry thematic portals**
- **Portal dz.gov.sante RH:** This is the largest portal of the Algerian Ministry of Health, providing many options and features aimed at following the career path of health users (Zedira, 2022).
- **Portal dz.santé. PROMOTION:** Launched in March 2021, this portal allows to follow the career path of employees in different health institutions, as well as to continuously view cases that meet the conditions for promotion to a higher rank (Zdeira, 2022).
- **Portal dz.gov.santé .covid:** Created in response to the COVID-19 pandemic, this portal makes it possible to track the situation of people who have received the vaccine. After receiving the second dose, the individual's file is complete and they

can receive an internationally recognized vaccination certificate (Kalsh and Buhafs, 2022).

- **Mandatory Authorized Disease Portal (DZ.SIS.MDO):** This portal is part of the MDO reporting system, as it helps in collecting epidemiological data and information, and facilitates coordination between health institutions in the field of disease and epidemic prevention (Zaida, 2022).
- **dz.GOV.SIS.DHIS portal:** This portal has three main purposes: to follow up and maintain medical equipment, to follow up the treatment of patients in their homes, and to follow up health convoys (Zedaira, 2022).

2.2. Online platforms

Electronic platform for telemedicine consultation: This platform provides telemedicine consultation services using a phone or computer, allowing Algerian patients to book medical appointments and receive consultations without having to go to health institutions (Kalsh and Bouhafs, 2022).

- **The digital platform “SEHA - Tech”:** is a digital network that connects patients, hospitals and pharmacies. Created by the Algerian Foundation for Innovation and Development (AFIND), it aims to make it easier for patients to have appointments with doctors or to search for pharmacies (Kalash and Bouhafs, 2022).

- **Digital platform “Dokta”:** This platform aims to help patients find competent doctors in a short time, in addition to tracking medical appointments by notifications and alerts (Kalash and Bouhafs, 2022).

- **The electronic platform for tracking the development of the Coronavirus:** It is an electronic portal for the Algerian Ministry of Health to display the growths of the Coronavirus in the country (Kalash and Buhafs, 2022).

3. The role of digitization in the health sector

The health sector has undergone major changes in the digital age, with technology playing an important role in improving the quality of health services and attractive the efficiency of medical institutions. Increased reliance on digital systems has led to the development of new data management mechanisms, improved information security, and supported decision-making processes, contributing to higher levels of accuracy and speed in healthcare delivery.

Digitization is no longer an option; it has become an urgent necessity to keep pace with the rapid developments in the field of health care. They are not limited to simply digitizing paper data, but extend to using advanced technologies such as artificial intelligence, big data analysis, and cloud computing technologies to deliver more efficient and effective services. However, this digital transformation also poses new challenges, especially with regard to information security and the protection of patient privacy, which calls for the development of integrated strategies to ensure that digitization is maximized while minimizing the associated risks.

In this context, three key relationships emerge between digitization and the health sector, including: the impact of digitization on information security, its role in improving data management, and its impact on supporting decision-making processes. The study of these axes sheds light on how to employ technology to enhance health performance and ensure the sustainability of medical services in the digital age, from which the researcher highlights this relationship as follows:

1.3. The relationship between digitization and information security

Digitization plays a pivotal role in enhancing information security through the application of advanced technologies such as encryption and identity verification systems. According to Anderson (2020), digitization enables the creation of integrated protection systems that protect data from intrusions and unauthorized access. For example, digital identity management systems help ensure that only authorized persons have access to sensitive information.

However, digitization also increases security challenges, as cyberattacks become more sophisticated. According to Smith & Johnson (2021), increasing reliance on digital systems requires the development of advanced security strategies, such as the use of AI to proactively detect security threats.

2.3. Digitization and Data Management

Digitization contributes to better data management by adopting advanced database systems and Big Data Analytics technologies. According to Davenport & Harris (2017), digitization enables massive amounts of data to be stored in an orderly and easily accessible format, enhancing the efficiency of search and retrieval processes. In addition, digitization helps analyze data faster and more accurately. According to Beasley et al. (2018), the use of AI techniques in data management allows for the analysis of patterns and trends that can help make more informed decisions.

3.3. The relationship between digitization and decision making

Digitization improves decision-making processes by providing accurate and timely data. According to LaValle et al. (2011), the use of digital systems allows leaders to access comprehensive information that helps them make informed strategic decisions. For example, Decision Support Systems help analyze data and make evidence-based recommendations.

In addition, digitization contributes to enhanced transparency and accountability in the decision-making process. According to Brynjolfsson & McAfee (2014), the use of digital data reduces human bias and increases the accuracy of decisions made.

Application Framework

Methodology and Research Sample:

This study relied on the **quantitative approach** to examine the effect of digitization on the efficiency of the health sector in Algeria. The **questionnaire** was castoff as the key tool for data collection, as it was distributed to 35 employees working in an Algerian hospital institution. The sample included staff from different disciplines and educational levels, including doctors, nurses, pharmacists, and administrators. The data were analyzed using **SPSS software** to determine relationships between variables and test hypotheses.

Study Tools:

- **Questionnaire:** A questionnaire has been designed consisting of several sections covering different aspects of the impact of digitization on data management, information security, and decision making. The questionnaire was distributed to the employees of the health institution under study.
- **SPSS software:** This software was used to analyze statistical data, determine correlation coefficients, and test hypotheses using regression analysis and analysis of variance (ANOVA).

- **Scientific references:** A number of scientific references and previous research have been relied upon to support the theoretical basis of the study, and to provide a contextual on the concepts of digitization and its requests in the health sector.

3. Personal and functional data analysis

Table (01): Description of the study sample

Variable	Category	Freq	%	Variable	Category	Freq	%
Gender	Female	22	62,9	Experience	Less than 5 years	26	74.3
	Male	13	37.1		Over 12 years	5	14.3
Age Group	30-20	25	71/4		Under 5	4	11,4
	31 years old	4	11,4	in harnessing technology	Good	15	42.9
	50 - 41	6	17,1		Weak	1	2.9
Academic Qualification	Secondary school education	2	5,7		Medium	14	40
	Higher education	31	88,6		Excellent	5	14.3
	Vocational	2	5,8	Leverage Technology	More than three times	3	8.6
Position	Pharmaceutical (adj.)	3	8.6	Training Courses	Time	7	20
	Physician	8	22.9		2 times	4	11,5
	Detectives	5	14.3		No time and	21	60
	Administrative Officer	3	8.6				
	Pathogenic (Med.)	1	2.9				
	It's a whole nother job.	15	42.9				

Source: Prepared by researchers based on the outputs of SPSS version 26

The table highlights the demographic and professional characteristics of the study sample. Key findings include :

- **Gender:** Females make up the majority (62.9%), reflecting their growing presence in the health sector.
- **Age:** Most participants (71.4%) are between 20 and 30 years old, indicating a young and tech-savvy sample.
- **Experience:** The majority (74.3%) have less than five years of experience, consistent with the younger age group.
- **Education:** A high percentage (88.6%) hold university degrees, suggesting they are well-equipped to adopt digital tools.
- **Tech Experience:** While 42.9% have good tech experience, 40% have average experience, pointing to a need for more training.
- **Training:** About 60% have never received tech training, which may explain varying levels of digital competence.

- **Job Roles:** The sample is diverse, with the largest group (42.9%) in "other" roles, followed by doctors (22.9%), lab workers (14.3%), and pharmacists/administrative officials (8.6% each).

The sample reflects a young, educated workforce in health institutions, but a lack of tech training poses a challenge. To optimize digital use, increasing training opportunities is recommended to enhance employees' digital skills and improve institutional performance.

3. Themes of study

Table(02): The level of adoption of digitization in the health institution under study

Statement	mean	SD
The health institution has a highly reliable infrastructure (data + technology + digital systems)	3,09	1,358
The health institution has advanced analysis tools to process health data and improve decision-making based on accurate insights	2,71	1,363
The health institution uses channels of communication and interaction between doctors and patients through digital applications and platforms	2,91	1,358
The organization provides telehealth services such as virtual consultations to increase access to services	2,77	1,477
It is concerned with improving the skills of health personnel through training programs based on technology, which ensures their qualification to use digital systems	3,23	1,33
Secures health data from cyber risks, ensures privacy and protects sensitive information	3-26	336
Ensures the integration of various systems within the organization (e.g. health information systems, resource management systems, customer relationship management systems) to facilitate the exchange of information and data between departments	3,17	1,339
Supports innovation in health service delivery through the application of new technologies such as artificial intelligence	2,94	1,392
Total	3,01	1,36

Source: Prepared by researchers based on the outputs of SPSS version 26

Statistical results indicate that the sample members' evaluation of the digital infrastructure of the health institution came at an average level (3.09) with a noticeable discrepancy between the opinions of the respondents as reflected by the high standard deviation (1.358). As for the use of advanced analysis tools, the arithmetic mean was (2.71), which is below the neutral level, indicating a deficiency in the adoption of data as a basis for decision-making, with a clear dispersion of opinions (1.363)

Regarding the use of digital platforms for physician-patient communication, they were also rated below average (2.91), demonstrating poor integration of technology in patient interaction, which is in line with the low evaluation of telehealth services (2.77), which suffers from significant variation in adoption among sample members as evidenced by high standard deviation (1.477)

On the other hand, training programs on the use of digital systems received a relatively higher rating (3.23), which indicates that there are efforts in this aspect, but the divergence of views (1.33) reflects the varying level of benefit among employees. In terms of health data security, the arithmetic mean was (3.26), reflecting the organization's interest in protecting information, although the variance (1.336) indicates different perceptions about the effectiveness of these efforts.

Regarding the integration of digital systems within the institution, an average (3.17) was recorded, which indicates that there are attempts to achieve this goal, but the actual application may not be integrated between the various departments. As for supporting innovation through modern technologies such as artificial intelligence, it came with a medium rating (2.94), indicating the weak use of these tools in improving health services.

Table (03): The extent of adoption of digital systems in patient data management

Statement	mean	SD
Digital patient data management systems are implemented	3,46	1,221
The use of digital systems improves the accuracy of patient data	4,29	893
Use of digital systems reduces errors in data entry	4,03	0,954
The use of digital systems reduces the time taken to enter and retrieve data	4/31	832
Advanced systems are used to store and share patient data such as electronic health records, telemedicine	3.8	1,158
Big data analytics platforms and tools are relied upon	3,63	1,14
There is a high level of digital maturity that allows the data analyzed to be interpreted digitally to inform healthcare decisions	3,11	1 409
Traditional methods of collecting, storing, analyzing and interpreting patient data are relied upon	3,11	1,157
Total	3,71	1,09

Source: Prepared by researchers based on the outputs of SPSS version 26

The results indicate that the implementation of digital patient data management systems received an average rating (3.46) with a variation in the opinions of respondents (1.221), reflecting the existence of efforts in this area but may not be fully generalized. On the other hand, the sample showed strong support for the benefits of using digital systems, as the arithmetic mean to improve data accuracy was (4.29) with a relatively low degree of dispersion (0.893), indicating a general agreement that digitization contributes to improving data quality.

In terms of reducing errors in data entry, this aspect received a high average (4.03), which reflects a clear recognition of the importance of digitization in reducing human errors. Also, the highest rating in data entry and retrieval speed was recorded with an average (4.31) and low standard deviation (0.832), which indicates the employees' awareness of how efficient these systems are in improving daily performance.

As for the use of advanced systems for storing and sharing patient data, it received an average (3.8), indicating partial adoption of these systems, but did not reach the stage of full adoption. Also, the assessment of the reliance on big data analysis tools was above average (3.63), but it reflects a divergence of views as reflected in the value of the standard deviation (1.14), which may indicate a different level of use of these tools between departments or individuals.

In terms of digital maturity, the rating was lower (3.11), which reflects the lack of access to an advanced level that allows for the interpretation of health data for effective decision-making, and the reliance on traditional methods received the same average (3.11), which may indicate the continued use of some non-digital methods in conjunction with modern systems.

Table (04): The extent of adoption of digital systems in information security in the health institution

Statement	mean	SD
Digitization contributes to improving the level of information security compared to traditional methods	4	1
Cybersecurity concerns with increased use of digital technologies	3.8	0,868
Increased use of EHRs leads to increased risk of data breaches and cyberattacks	3,74	886
Implements robust security measures (encryption, firewalls, access controls) to protect patient data	3,74	1,146
Digital systems are regularly updated and patched to prevent vulnerabilities	3,77	1,06
Digital systems are designed with security in mind	3,71	1,073
There is a clear plan for responding to data breaches and cyberattacks	3,49	1,04
Cyber Security Training	3.6	1,006
Total	731	1,009

Source: Prepared by researchers based on the outputs of SPSS version 26

The results of the study show that digitization clearly contributes to improving the level of information security compared to traditional methods, as this factor obtained a high average (4) with relatively low variation in the opinions of respondents (1), indicating general agreement on this benefit. However, concerns about cybersecurity remain, with this factor averaging (3.8), an assessment that reflects employees' awareness of potential risks when adopting digital technologies, with limited divergence of views (0.868)

As for the impact of the use of electronic health records on the risk of data breach, it was evaluated at an average of (3.74), which indicates that there is awareness of the

risks associated with the adoption of digital systems, although the difference in opinions (0.886) indicates different levels of awareness among respondents. On the other hand, the implementation of security measures such as encryption, firewalls and access controls were assessed on the same average (3.74), with greater divergence of views (1.146), which may reflect a disparity in the application of these measures between different departments within the organization.

In terms of updating and periodic maintenance of digital systems to prevent security vulnerabilities, this factor obtained an average (3.77), which indicates that there are efforts in this area, but the variance (1.06) suggests that some employees may not be sufficiently aware of periodic updates. Also, the consideration of security in the design of digital systems obtained an average (3.71), indicating a general awareness of the existence of security considerations during the design of systems, despite the relative variation (1.073) in perception among individuals.

The existence of a clear plan to respond to data breaches and cyberattacks received a relatively lower rating (3.49), which may indicate that these procedures are not clear to all employees or that there are deficiencies in their implementation, especially with the recording of a divergence of opinions (1.04). Finally, evaluating the availability of cybersecurity training programs with an average of (3.6) indicates that the organization offers such programs, but perhaps they are not sufficient or comprehensive for all employees, as reflected by the difference in views (1.006)

Table (05): The extent of adoption of digital systems in decision-making in health institutions

Statement	mean	SD
Digitization enables the collection and analysis of large amounts of health data, enhancing the ability to make evidence-based decisions	4.2	677
Electronic health records provide accurate and reliable information to support timely decision-making	4.2	0,797
Medical databases help improve coordination between medical teams, and collaboration between specialists in making informed decisions	4.09	853
Clinical Decision Support Systems Provide Healthcare Professionals with Faster and More Efficient Access to Patient Records	4,06	838,0
Implementing decision support systems helps plan for better use and allocation of resources, contributing to increased efficiency and reduced costs	4.2	759
The use of data analytics and AI algorithms supports healthcare decision making	4	0,84
Reliable digital data-driven decision making improves clinical outcomes and quality of health care delivered	4,17	618
Digitization through convenient personalized care and enhanced patient engagement and access to their health information improves their experience and supports their decisions to book appointments, communicate easily with healthcare providers, and gain their satisfaction	4,14	0,81
Total	4,13	0,77

Source: Prepared by researchers based on the outputs of SPSS version 26

The results of the study indicate that digitization plays a vital role in improving decision-making processes within the health institution, as the various factors studied obtained relatively high averages, reflecting the consensus of the respondents about their importance. For example, the ability of digitization to collect and analyze large amounts of health data to support evidence-based decisions averaged (4.2) with low divergence of views (0.677), indicating a wide recognition of the role of digitization in improving the exactness of decisions.

The importance of digital health records in supporting decision-making came with a similar assessment (4.2), with a slight divergence of views (0.797), which indicates that the majority of respondents agree about their role in providing accurate and reliable information. In addition, medical databases that contribute to improved coordination among medical teams received an average (4.09) with moderate variance (0.853), indicating a slight variation in the extent of their actual utilization within the institution.

Clinical decision support systems, which allow healthcare professionals quick and efficient access to patient records, received an average of (4.06) with a variance of (0.838), reflecting a good awareness of their importance despite the differences in individual experiences among workers. Similarly, the implementation of decision support systems that help allocate resources has received a high average (4.2) and low variance (0.759), reflecting a general recognition of their positive impact in improving the efficiency of health operations.

In terms of applying data analytics and AI algorithms to support decision-making, this factor received an average of (4) with a variance of (0.84), which indicates that while important, there is some variation in the extent of reliance on it in practice. As for decisions based on reliable digital data, they recorded the highest average in the table (4.17) with the lowest variance (0.618), indicating that most participants agree on the role of digitization in improving health care quality and clinical outcomes.

Finally, digitization contributes to improving the patient experience, supporting their appointment decisions and communicating with health care providers, as this factor obtained an average (4.14) with a variance of (0.81), which indicates a good awareness of these benefits despite the varying patient experience with digital systems.

4. Hypotheses Testing :

Sub-hypothesis 1: Digitization contributes positively to patient data management

Table (05): Results of testing the first sub-hypothesis

Level of significance (Sig)	Calculated F	T value	(B)	Beta	(Coefficient of Determination)	Correlation coefficient R
0.000	914	4.232	0.353	0.593	0.352	0.593

Source: Prepared by researchers based on the outputs of SPSS version 26

Regression analysis shows that digitization contributes positively to patient data, as the correlation coefficient (R) between the digitization and the patient data management reached a value of (0,593), indicating a medium to strong correlation between the two variables. The coefficient of determination (R Square) was (0,352), which means that digitization explains about (35.2%) of the changes in patient data

management, while the remaining (64.8%) is due to other factors that were not included in the model.

Looking at the analysis of variance (ANOVA), we find that the value of (F) reached (17,914) with a level of significance (0,000), which is less than (0,05), which indicates the significance of the model as a whole, that is, the impact of digitization on patient data management is statistically significant, and is not due to chance.

As for regression coefficients, the value of the constant (B) was equal to (2,654) with a significance level of (0,000), which indicates that patient data management has a basic level independent of digitization. On the other hand, the impact coefficient of digitization (B) was (0,353) with a value of (t) equal to (4,232) and a significance level of (0,0000), which means that digitization has a positive and statistically important impact on patient data management, so that each one-unit increase in digitization leads to an increase of (0,353) in improving patient data management.

Second sub-hypothesis test: Digitization contributes positively to information security in the health institution

Table (06): Results of testing the second sub-hypothesis

Level of significance (Sig)	Calculated F	T value	(B)	Beta	Correlation coefficient R	(Coefficient of Determination)
.016	6.481	.546	0.254	0.405	0.405	0.164

Source: Prepared by researchers based on the outputs of SPSS version 26

Regression analysis shows that digitization contributes positively to information security within the health institution, but to a lesser extent compared to its impact on patient data management. The correlation coefficient (R) between digitization and information security was (0,405), indicating an average correlation between the two variables. The coefficient of determination (R Square) was (0,164), which means that digitization explains only about (16.4%) of the changes in information security, while the largest percentage (83.6%) remains due to other factors that were not included in the model.

Analysis of variance (ANOVA) showed that the factorial value (F) reached (6,481) with a level of significance (0,016), which is less than (0,05), which indicates the significance of the model, that is, the impact of digitization on information security is statistically significant, although the interpretive power of the model remains relatively weak.

As for the regression coefficients, the value of the constant (B) was equal to (2,967) with a significance level of (0,000), which indicates that there is a basic level of information security independent of digitization. On the other hand, the impact coefficient of digitization (B) was (0,254), with a value of (t) equal to (2,546) and a significance level of (0,0160), which indicates that digitization has a positive and statistically important impact on information security, so that each one-unit increase in digitization leads to an improvement of (0,254) in information security within the health institution.

Testing the third sub-hypothesis: Digitization contributes positively to supporting decision-making in health institutions

Table (07): Results of testing the third sub-hypothesis

Level of significance (Sig)	Calculated F	T value	(B)	Beta	Correlation coefficient R	(Coefficient of Determination)
835	- 0.044	0.209	0.019	.037	.037	0.001

Source: Prepared by researchers based on the outputs of SPSS version 26

The results of the third sub-hypothesis test indicate that digitization does not contribute positively to supporting decision-making within health institutions according to this statistical model. The correlation coefficient (R) between digitalization and decision making is (0,037), which is very weak, which means that the relationship between the two variables is almost non-existent. The coefficient of determination (R Square) reached (0,001), indicating that digitization explains only (0.1%) of the changes in decision-making, which is a very small percentage, indicating that the factors affecting decision-making in health institutions may be completely different from digitization or that the relationship between them is not direct.

The analysis of variance (ANOVA) supports this result, as the f-value (F) was (0,044) with a significance level (0,835), which is very far from the statistically acceptable level (0,05), which means that the model is not significant, and therefore the impact of digitization on decision-making is not statistically significant.

These results mean that digitization, according to this analysis, does not significantly affect decision-making in health institutions, and this may be due to multiple factors, such as the lack of integration of digital systems with decision-making processes, the poor reliance on digital analytics in decision-making, or perhaps the impact of other intermediate variables that are not included in the model.

culture in investing in digitization to support strategic decisions.

Key Hypothesis Testing: Digitization Positively Contributes to Improving Health Sector Efficiency

Table (08): Results of testing the main hypothesis

Level of significance (Sig)	Calculated F	T value	(B)	Beta	Correlation coefficient R	(Coefficient of Determination)
0.014	6.75	598	0.209	0.412	0.412	0.170

Source: Prepared by researchers based on the outputs of SPSS version 26

The results of testing the main hypothesis indicate a positive impact of digitization on improving the efficiency of the health sector, but this impact is not very strong. The correlation coefficient (R) was (0,412), indicating an average relationship between digitization and health sector efficiency. The coefficient of determination (R Square) reached (0.17), which means that digitization explains (17%) of the changes in the efficiency of the health sector, which is a reasonable percentage, but also indicates that there are other factors that affect efficiency more.

The analysis of variance (ANOVA) supports this result, where the value of (F) (6,75) with a level of significance (0,014), which is less than (0,05), which indicates the

significance, the impact of digitization on the efficiency of the health sector is statistically significant.

As for the regression coefficients, the Constant was (3,231) with a coefficient of significance (0,000), indicating that a certain level of efficiency exists even in the absence of digitization. While the regression coefficient of digitization reached (0,209) with a coefficient of error (0,081) and a value (t) equal to (2,598) with a level of significance (0,014), which indicates that digitization positively affects the efficiency of the health sector, but to a limited extent.

Conclusion

This study sought to examine the effect of digitization on the efficiency of the health sector in Algeria, fixing on three main axes, patient data management, information security, and decision support. By analyzing data collected from 35 employees

In an Algerian health institution, results were reached showing the impact of digitization on these aspects, including:

- Patient data management: The results showed that digitization contributes positively to improving patient data management, as a strong relationship was recorded between the use of digital systems and increasing data accuracy, reducing errors, and speeding access to information. However, there is still a need to strengthen the integration of digital systems and expand their use in health institutions.
- Information security: Although digitization contributes to improved information security compared to traditional methods, the results showed that this impact is relatively limited. There are ongoing cybersecurity concerns, requiring enhanced security measures and increased awareness among staff.
- Decision support: The results did not show a strong correlation between digitization and decision support in health institutions. This is due to several factors, including the lack of integration of digital systems with decision-making processes, and the lack of sufficient reliance on digital analytics in strategic decision-making.
- Overall efficiency of the health sector: The results showed that digitization contributes positively to improving the efficiency of the health sector, but to a limited extent. There is a need to strengthen digital infrastructure and provide more training for employees to ensure that digitalization is made the most of.

Accordingly, the researcher made a number of suggestions:

- Enhancing digital infrastructure: Health institutions should invest in the technological infrastructure needed to support digital transformation, including modernizing existing systems and adopting new technologies such as artificial intelligence and big data analytics.
- Improve information security: Security measures should be strengthened to protect health data, including using advanced encryption technologies, regularly updating systems, and providing training programs on cybersecurity for employees.
- Staff training: More training courses should be provided to staff to enhance their digital skills and ensure their effective use of digital systems. This will help reduce resistance to change and increase the efficiency of technology use.
- Digital systems integration: Greater integration of different digital systems within health institutions should be pursued to ensure a smooth flow of information and better support decision-making processes.

- Enhancing awareness of the importance of digitization: Awareness among decision makers and employees about the position of digitization in improving the efficiency of the health sector should be augmented, and the implementation of modern technologies to progress the quality of health services should be encouraged.
- Further studies: Further studies should be conducted to analyze the impact of digitization on other aspects of the health sector, such as healthcare quality and patient experience, and to identify other factors that may affect the efficiency of the health sector.

BIBLIOGRAPHY

In Arabic :

1. Journal Articles:

- زديرة، شرف الدين. (2022). الرقمنة في المؤسسات العمومية للصحة دراسة حالة المؤسسة العمومية للصحة الجزائرية قايس-ولاية خنشلة. مجلة البحوث الاقتصادية والمالية، 9(02)، 866-881.
- كلاش، خلود. سميحة، بوحفص. (2022). بروز معالم الصحة الإلكترونية كآلية لمجابهة فيروس كورونا في الجزائر، مجلة وحدة البحث في تنمية الموارد البشرية، 17(01)، 336-360.

In Foreign Languages :

1. Books:

- Anderson, R. (2020). *Security Engineering: A Guide to Building Dependable Distributed Systems*. Wiley.
- Bawden, D., & Robinson, L. (2012). *Introduction to Information Science*. Facet Publishing.
- Brynjolfsson, E., & McAfee, A. (2014). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. W.W. Norton & Company.
- Davenport, T. H., & Harris, J. G. (2007). *Competing on Analytics: The New Science of Winning*. Harvard Business Review Press.
- Floridi, L. (2014). *The Fourth Revolution: How the Infosphere is Reshaping Human Reality*. Oxford University Press.
- Topol, E. J. (2019). *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*. Basic Books.

2. Journal Articles:

- Adler-Milstein, J., & Jha, A. K. (2017). Health information exchange among U.S. hospitals. *The American Journal of Managed Care*, 23(1), 41-48.
- LaValle, S., Lesser, E., Shockley, R., Hopkins, M. S., & Kruschwitz, N. (2011). Big data, analytics and the path from insights to value. *Mit Sloan Management Review*, 52(2), 21-32.
- Meskó, B., Drobni, Z., Bényei, É., Gergely, B., & Györfy, Z. (2017). Digital health is a cultural transformation of traditional healthcare. *mHealth*, 3, 38.
- Smith, J. D., & Johnson, A. B. (2021). Cybersecurity in healthcare: A systematic review of modern threats and trends. *Journal of Medical Internet Research*, 23(4), e23456.
- Wang, Y., Kung, L., & Byrd, T. A. (2018). Big data analytics: Understanding its capabilities and potential benefits for healthcare organizations. *Technological Forecasting and Social Change*, 165.