The Digital Transformation's Role in Enhancing Healthcare Services in Algerian hospitals
A case study of Ibn Zohr Hospital in "Guelma Province"

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Abstract:
      The aim of this study is to explore the impact of digital transformation on enhancing healthcare services in Algerian hospital institutions. Ibn Zohr hospital in the State of Guelma is selected as a case study, and different independent variables, such as regulatory, technical, human, and financial requirements, are investigated.
      The study sample included 55 employees, and the results demonstrate a significant positive impact of these variables on healthcare service enhancement at the hospital.
Keywords: **Digital Transformation; Healthcare Services; financial requirements.**

Résumé:
L'objectif de cette étude est d'explorer l'impact de la transformation numérique sur l'amélioration des services de santé dans les institutions hospitalières algériennes. Hôpital Ibn Zohr à L'État de Guelma est sélectionné comme étude de cas et différentes variables indépendantes, telles que les exigences réglementaires, techniques, humaines et financières, sont étudiées.
L'échantillon de l'étude comprenait 55 employés et les résultats démontrent un impact positif significatif de ces variables sur l'amélioration des services de santé à l'hôpital.

Mots clés: Transformation numérique ; Services de santé ; exigences financières.

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Introduction

Digital transformation has been one of the most prominent topics in recent years. Its importance stems from the major advances in the fields of information technology and communication that the world is experiencing today, necessitating that various public and private sectors keep up with these rapid, growing developments by embracing radical changes across all their activities, services, work processes, and methods to address challenges through leveraging advanced digital methods and technologies. These help simplify business transactions, boost service quality, reduce costs, reach larger customer bases, and enhance competitiveness.

Healthcare institutions as hospitals, health centers, specialty clinics, laboratories and allied medical support and maintenance units are responsible for delivering health services. With the spread of chronic and epidemic illnesses (such as Coronavirus) and surging patient loads, these facilities must digitalize their operations and rely on E-Management to better their services and elevate the quality of care provided.

1. Research Model: The study model can be illustrated in the following figure:

Figure (01): Model of Research

Dependent variable   **Effect relationship**   **Independent variable**
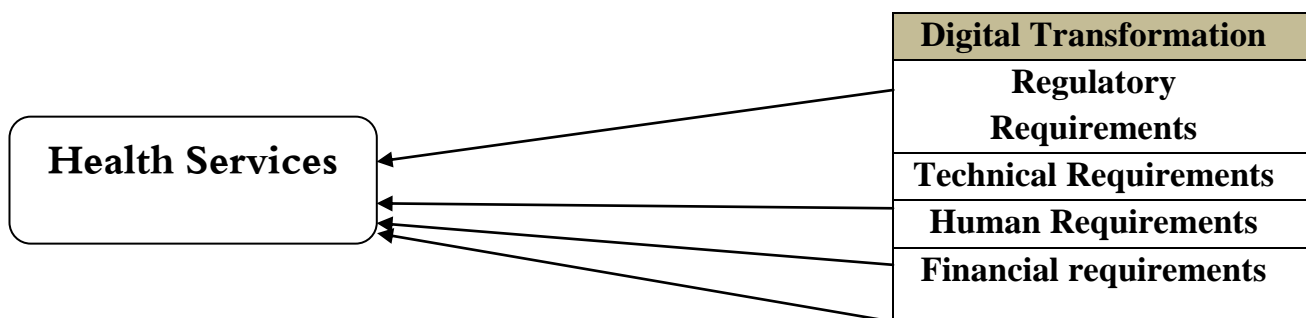
2. Research Problematic :

Based on the above, the research problem centers on the primary question as follows:

What impact does digital transformation have in the enhancement of healthcare services at Ibn Zohr Hospital in the Guelma Province, Algeria?
Through this primary question, we raise a series of sub-questions, including the following:

- What impact do regulatory requirements have in the enhancement of healthcare services at the study institution?

- What impact do technical requirements have in the enhancement of healthcare services at the study institution?
- What impact do human requirements have in the enhancement of healthcare services at the study institution?
- What impact do financial requirements have in the enhancement of healthcare services at the study institution?

3. Research Hypotheses:

Through this research, we aim to test the following hypotheses:

- **First hypothesis:** There is a positive impact of the regulatory requirements in the enhancement of healthcare services in the institution under study, with a significance level of 0.05.
- **Second hypothesis:** There is a positive impact of the technological requirements in the enhancement of healthcare services in the institution under study, with a significance level of 0.05.
- **Third hypothesis:** There is a positive impact of the human requirements in the enhancement of healthcare services in the institution under study, with a significance level of 0.05.
- **Fourth hypothesis:** There is a positive impact of the financial requirements in the enhancement of healthcare services in the institution under study, with a significance level of 0.05.

4. Research objectives:

- Highlighting the different theoretical aspects surrounding digital transformation and healthcare services in hospitals.
- Developing an understanding of the role played by digital transformation in its many dimensions towards enhancing healthcare services in the institution under study.
- Providing recommendations and presenting proposals specifically for the institution under study.

5. Previous Studies:

- First Study : Study of (Mustapha Mohamed Ali Shdid, 2021) titled "The Impact of Digital Transformation on the Performance Level of Services provided through the Application by the Employees of the General Traffic Department in Cairo Governorate," in the Studies Journal, Volume 22, Issue 4, October 2021.

The aim was to recognize the role of the digital transformation process fulfilling specific requirements (strategy, organizational culture, transformational leadership, and human resources) in the enhancement of the performance standards of the services offered by traffic units in Cairo Governorate. A questionnaire distributed to 168 respondents was used to collect data. The study found a strong correlation between the requirements of digital transformation and

the improvement in the performance level of services offered by the institution examined. Additionally, the study emphasizes the need to develop the government work environment, provide digital services, and speed up the digital transformation project.

- Second Study : Study of (Ayman Bouzana, Wafa Hamdouche) titled "Transitioning Towards Utilizing Emerging Digital Health Applications as a Mechanism to Confront COVID-19: A Comparative Study of China and South Korea's Experience" was published in the Human Resources Development Research Unit Journal, Volume 17, Issue 1, May 2022.

The aim of this study was to shed light on the ongoing transformation towards the use of digital technologies (such as artificial intelligence, big data, electronic health records) in healthcare as a mechanism to combat the consequences of the COVID-19 pandemic.

The study highlights the importance of digital transformation in the healthcare services and presents the experiences of China and South Korea to demonstrate how digital health applications have resulted in a marked enhancement in the efficiency of healthcare services worldwide, particularly in light of this pandemic.

Firstly: The theoretical framework of the study

1. Fundamentals of digital transformation:

1.1. Digital Transformation Concept:

Digital transformation is defined as the conversion of business activities, services, and operations into digital models with virtual content that leverages the deep and rapid changes and opportunities provided by digital technologies to provide more agile capabilities that foster innovation. (Machhour & Samah, 2021, p. 236)

Digital transformation is also defined as a continuous process that institutions undertake to adapt to their customers' and markets' requirements by utilizing digital capabilities to innovate new business models, products, and services that blend digital and manual work and customer experiences seamlessly while improving operational efficiency and organizational performance. (Slaimi & Bouchi, 2019, p. 948)

2.1. Digital Transformation Requirements:

The requirements for digital transformation can be summarized as follows:

1.2.1. Organizational Requirements:

Organizational requirements encompass the following:

1. **Strategy Determination:** The mechanism of digital transformation in institutions is dependent on establishing a clear strategy by a group of experts in the field and identifying priorities and objectives to be achieved, while ensuring that the senior management of the institution monitors the

implementation of this strategy to ensure successful outcomes. (Ishaq, 2021, p.17)

2. **Leadership:** Leadership plays a crucial role in the success of any project. The support of senior management and the provision of a suitable work environment are crucial for success, as is the supervision of leadership to endorse all strategic operations of the institution. In addition, the leadership's monitoring of the project and providing feedback guarantees its success and enhancement. (Al-Swat & Yasser, 2022) Furthermore, the conviction, interest, and support of senior management for the implementation of information and communication technology in institutions constituting essential components for achieving the success of digital transformation.

2.2.1. Technical Requirements: The process of digital transformation requires the use of a system of specialized devices, systems and mediums of information storage, and software that function via technological environments and data centers, utilizing all assets effectively. To guarantee the provision of adequate services to customers, a professional team accountable for handling the technical system and network infrastructure is required. (Alam, 2021, p.191)

3.2.1. Human Requirements: Human resources constitute an essential element for the success of any organization, system, or program in general. They represent a core requirement when it comes to implementing digital transformation through providing adequately trained individuals that can utilize and analyze data through digital technologies to make effective decisions. Additionally, the strategic planning process in deploying the vision of digital transformation necessitates human capacities and experience capable of managing the process of transformation. (Alam, 2021, p.191)

4.2.1. Financial Requirements: The digital transformation process requires financial support to implement the respective project, which inherently necessitates providing necessary devices, tools, and contemporary electronic software, in addition to continuously paying the costs of human resource training. (Samia, 2021)

2. Healthcare Services

2.1. Definition of Healthcare Institutions: A healthcare institution is defined as any institution that provides direct healthcare services, such as hospitals, health centers, specialty clinics, or indirect services such as laboratories and medical administration and support services. (Al-Mounaim, 2018)

2.2 Definition of Healthcare Service: A healthcare service is defined as any medical intervention, guidance or diagnosis provided to patients leading to their satisfaction or benefit, ultimately leading to good health. (Al-Bakri, 2005, p. 168)

Furthermore, a healthcare service can be defined as a collection of intangible activities provided to patients, aimed at reducing physical, mental and social fatigue, as well as tangible activities such as medication and food. (Ahlam, 2013-2014, p. 17)

Healthcare service refers to the range of healthcare services provided by healthcare institutions, be it therapeutic for individuals, preventive for the community and the environment or productive, such as in the manufacture of pharmaceuticals and medical devices. (Tarbah and Mazouzi, 2018, p. 77)

3.2 Foundation of Healthcare Services: The provision of good quality healthcare services to patients depends on the availability of sufficient quantity and quality services. (Aïcha, 2012, pp. 38-39)

A. Quantity Sufficiency

Quantity refers to the provision of medical services in adequate numbers and proportionate to the population, which includes:

- Availability of a sufficient number of human resources: doctors, nurses, laboratory technicians, assistants, etc.
- Availability of an adequate number of healthcare facilities, hospitals, laboratories, and pharmacies.
- Provision of healthcare services at all times.
- Provision of an administrative and financial system that provides healthcare services.
- Provision of methods and means of healthcare education to community members.

B. Quality sufficiency

Quality sufficiency encompasses the following aspects:

- Establishing criteria and principles that determine the required level of care for all members of the medical team.
- Increasing the efficiency and training of medical staff by implementing scientific programs to enhance their knowledge.
- Providing financial and administrative support to all healthcare professionals.

Secondly, Field Study:

1. Introduction to the Institution of Study:

The Ibn Zohr Public Hospital in the Guelma Province is one of the public hospitals founded during the colonial period. It covers an area of 20,000 km² and occupies a strategic location that connects people in the Guelma Province. The hospital's bed capacity is 90, scattered among the departments and internal units. This institution has an administrative character and legal personality and enjoys financial independence while remaining under the control and supervision of the provincial government (Article 1 of Executive Decree No. 07/140 related to its

establishment and management). It comprises the diagnostic, therapeutic, hospitalization, and medical rehabilitation framework.

2. Study population and sample: The study population consists of employees at the Ibn Zohr Hospital in the Guelma Province, where a random sample of 55 individuals was selected, distributed according to job categories.

3. Methodology of Field Study:

1.3. Study Tool: The data was collected using a questionnaire containing 42 direct questions formulated in closed-ended formats, covering various aspects of the topic. A 5-point Likert scale was used for the questions, with answers ranging from ("strongly agree", "agree", "neutral", "disagree", "strongly disagree". The questionnaire was divided into two parts:

- The first part: included demographic variables, such as gender, age, educational qualification, employment status, and professional experience.

- The second part: was divided into two themes:

Theme one: evaluated the independent variable, digital transformation, through 20 defined paragraphs. These paragraphs were divided into four dimensions:

- **Dimension 1:** Concerning regulatory requirements (6 paragraphs)
- **Dimension 2:** Concerning technical requirements (5 paragraphs)
- **Dimension 3:** Concerning human requirements (4 paragraphs)
- **Dimension 4:** Concerning financial requirements (5 paragraphs)

Theme two: Paragraphs specifically detailing healthcare services as the dependent variable, assessed through 17 paragraphs.

2.3. Statistical methods used in the study: To analyze the data from the survey questionnaire, the Statistical Package for Social Sciences (SPSS) version 25 was used, and these methods were employed:

- Alpha Cronbach coefficient was used to measure the reliability of the items in the questionnaire;

- To measure the reliability of the research tool, the split-half reliability test was used using the Gettman coefficient;

- Frequencies and percentages were calculated;

- Means and standard deviations were calculated;

- Kolmogorov-Smirnov test was employed to check whether the data followed a normal distribution;

- Simple linear regression analysis was carried out.

4. Validity and reliability of the research tool:

1.4. Face validity: The questionnaire was presented to a group of experts in the field, and their feedback was positive, along with a few comments and suggestions.

2.4. Reliability of the study using the Alpha Cronbach coefficient: The Alpha Cronbach coefficient was used to determine the reliability of the study, and the results were presented in the following table:

Table (01): Results of the stability test of the study tool (Alpha Cornbach coefficient

Variables	Dimensions	Number of paragraphs	Alpha Cornbach Value
Independent variable: Digital Transformation	Regulatory Requirements	06	0.819
	Technical requirements	05	0.625
	Human requirements	04	0.727
	Financial requirements	05	0.614
	Total paragraphs of the first theme	20	0.823
Dependent variable: Healthcare services		17	0.834
Alpha cronbach Total		37	0.859

Source: Prepared by the researcher based on the outputs of SPSS v25

The above table shows that the results of the Cronbach's alpha coefficient values for the entire questionnaire is 0.859, which is a statistically acceptable. This implies that the responses from the study sample demonstrate a high consistency rate, with an accuracy ratio exceeding 85%. The Cronbach's alpha coefficient values for each dimension or axis were also found to be statistically acceptable.

3.4. Semi-Split-Half Test (Guttman's Coefficient of Reliability):

To conduct the semi-split-half test, the questionnaire is split into two equal parts, and the correlation coefficient between the two parts is calculated. The semi-split-half test can be calculated using both Spearman-Brown and Guttman's coefficient of reliability. As for the specific study questions, they were divided into two parts: even-numbered questions (2-18) and odd-numbered questions (1-19). The resulting data is presented in the following table:

Table (02): Testing the half-split of the Guttmann coefficient and the Spearman Brown coefficient

Cronbach alpha coefficient	Part one of phrases	Cronbach alpha coefficient of the part one	0.822
		The number of phrases	19a
	Part two of phrases	Cronbach alpha coefficient of the part one	0.827
		The number of phrases	18b
	Total number of phrases		37
	Correlation between Part I and II		0.765
Spearman Brown Coefficient	Part one		0.655
	Part two		0.655
Guttman coefficient			0.678
	Moderate	Variance	Standard Deviation	The number of phrases
Part One	57.23	123.66	12.230	19a
Part Two	55.76	80.43	9.356	18b
Total Number	112.99	278.09	20.976	37

Source: Prepared by the researcher based on the outputs of SPSS v25

The table above shows that the value of the Superman-Brown test is (0.655), where this test requires the value of Cronbach's alpha and variance to be equal, which is not available in the above table. However, the Guttman coefficient test does not require this condition, so we will rely on its value. According to the previous table, the Guttman test reached a value of (0.678), indicating a reliability value of (67.8%) according to this test, which is acceptable.

5. Test of Study Hypotheses:

Before conducting the test of study hypotheses, it is essential to perform a test of the normal distribution to verify the extent to which the data follows a normal distribution. The Kolmogorov-Smirnov test was used for this purpose, and the following table presents the results of this test.

Table 03: Kolmogorov-Smirnov Normal Distribution Test

Themes	Statistical Value	Level of significance (Sig)
Digital Transformation	0.096	0.200
Health Services	0.115	0.067

Source: Prepared by the researcher based on the outputs of SPSS v25

According to Table 03, the significance level value for the study themes is 0.200 for the digital transformation theme, which is higher than the significance level adopted in the study (0.05). Additionally, the healthcare services theme has a significance level value of 0.067, which is also greater than the significance level. Consequently, all the data is normally distributed, and statistical tests can be applied to the study.

1.5. First Hypothesis Testing:

The first hypothesis is formulated as follows:

H0: There is no positive effect of regulatory requirements on enhancing healthcare services at the studied work site with a significance level of 0.05.

H1: There is a positive effect of regulatory requirements on enhancing healthcare services at the studied work site with a significance level of 0.05.

Simple regression analysis was used to examine this hypothesis, and the following table presents the test results:

Table(04): Simple regression analysis to test the first hypothesis

Variables	Regression coefficients		Beta Value	T Value	Level of Significance (sig)
	B	Std.Error			
Constant regression	1.526	0.678		2.250	0.029
Regulatory Requirements	0.514	0.192	0.346	2.686	0.010
Correlation coefficient R: 0.346a Standard Line of Rating:0.80562			Determination Coefficient R_2: 0.120 Adjusted determination coefficient : 0.103		

Source: Prepared by the researcher based on the outputs of SPSS v25

The aforementioned table demonstrates the impact of regulatory requirements on enhancing healthcare services at the researched institution. The results confirm that the Determination coefficient (R^2) has reached (0.120), indicating that regulatory requirements explain only 12% of the variation in healthcare service quality enhacement at Ibn Zohr hospital in Guelma, which is a low percentage. The remaining percentage, however, can be attributed to other factors that have not been included in the model. The correlation coefficient value obtained was 0.346, which points out a weak positive correlation between regulatory requirements and healthcare services under study. Furthermore, the statistical significance of the regression slope was 0.514 with a positive sign, highlighting a meaningful positive correlation between the variables under consideration in the study site. This means that a

one-unit increase in the independent variable (regulatory requirements) results in a 0.514 unit increase in the dependent variable (healthcare services). The results revealed that the level of significance was 0.010, which is less than 0.05. Therefore, the null hypothesis is rejected while the alternative hypothesis is accepted, **proving that regulatory requirements have a statistically significant positive effect on enhancing healthcare services at Ibn Zohr Hospital in Guelma at a significance level of 0.05.**

2.5. Second Hypothesis Testing :

The second hypothesis include:

H0: There is no positive effect of technological requirements on enhancing healthcare services in the studied institution, with a significance level of 0.05.

H1: There is a positive effect of technological requirements on enhancing healthcare services in the studied institution, with a significance level of 0.05.

To test this hypothesis, a simple regression analysis was used, and the following table shows the test results :

Table(05): Simple regression analysis to test the second hypothesis

Variables	Regression coefficients		Beta Value	T Value	Level of Significance (sig)
	B	Std.Error			
Constant regression	2.332	0.383		6.086	0.000
Technical requirements	0.318	0.118	0.348	2.698	0.009
Correlation coefficient R: $^{0.348a}$ Standard Line of Rating 0.80516			Determination Coefficient R_2:0.123 Adjusted determination coefficient : 0.105		

Source: Prepared by the researcher based on the outputs of SPSS   v25

The above table demonstrates the impact of technological requirements on enhancing healthcare services in the institution under study. The results indicate that the Determination coefficient (R^2) has reached (0.123), which means that 12.3% of the changes in healthcare services can be attributed to the independent variable (technical requirements) in Ibn Zohr Hospital in Guelma province, a weak percentage. The remaining percentage is ascribed to other factors that were not included in this model. Furthermore, the correlation coefficient is 0.348, indicating a weak positive relationship between technological requirements and healthcare services in the sample. The results reveal a statistically significant regression slope of 0.318 with a positive sign, indicating a positive impact relationship between the variables

in the studied sample. This implies that a one-unit increase in the value of the independent variable (technology requirements) leads to a 0.318 unit increase in the dependent variable (healthcare services). The results indicate that the level of significance reached (0.009), which is less than (0.05), leading to the rejection of the null hypothesis and the acceptance of the alternative hypothesis. **The alternative hypothesis suggests a positive and statistically significant effect of technical requirements on improving healthcare services at Ibn Zohr hospital, "Guelma" province, at a significance level of 0.05.**

3.5. Third Hypothesis:

The third hypothesis is formulated as follows:

H0: There is no positive effect of human requirements on enhancing healthcare services in the studied institution at a significance level of 0.05.

H1: There is a positive effect of human requirements on enhancing healthcare services in the studied institution at a significance level of 0.05.

To test this hypothesis, simple regression analysis was used and the following table shows the test results:

Table(06): Simple regression analysis to test the third hypothesis

Variables	Regression coefficients		Beta Value	T Value	Level of Significance (sig)
	B	Std.Error			
Constant regression	1.727	0.448		3.859	0.000
Human requirements	0.508	0.139	0.450	3.666	0.001
Correlation coefficient R: 0.450a Standard Line of Rating 0.76695			Determination Coefficient $_{R2}$: 0.202 Adjusted determination coefficient : 0.187		

Source: Prepared by the researcher based on the outputs of SPSS v25

The presented table highlights the impact of financial requirements on enhancing healthcare services in the institute under study. The results indicated a Coefficient of Determination (R^2) of 0.279, signifying that roughly 27.9% of the variations that occur in healthcare services can be attributed to the independent variable, i.e., financial needs, at Ibn Zohr hospital in Guelma. This percentage is inadequate, and the remaining percentage is accredited to other factors that weren't considered in this model. The correlation coefficient, on the other hand, demonstrated 0.528, signalling moderate negative correlative effects between financial requirements and

healthcare services within the studied group. The results also exhibited statistical slope significance, which amounted to 0.447, with a positive sign indicating a positive causal connection between the two variables in the studied group. This indicated that financial requirements' value increased by a unit, leading to a 0.447-unit raise in the dependant variable, i.e., healthcare services. Ultimately, the results demonstrated the significance level of 0.000 which is less than 0.05, and accordingly, the null hypothesis was rejected, and the alternative hypothesis was accepted, **indicating the statistical significance of a positive effect of financial requirements in developing healthcare services at Ibn Zohr hospital, at a significance level of 0.05.**

Table(07): Simple regression analysis to test the fourth hypothesis

Variables	Regression coefficients		Beta Value	T Value	Level of Significance (sig)
	B	Std.Error			
Constant regression	1.971	0.315		6.265	0.000
Financial requirements	0.447	0.099	0.528	4.526	0.000
Correlation coefficient R: 0.528a Standard Line of Rating 0.72925			Determination Coefficient $_{R2}$: 0.279 Modified Determination coefficient: 0.265		

Source: Prepared by the researcher based on the outputs of SPSS v25

6. Study results :

The key results of this study can be summarized as follows:

✓ The move towards implementing digital transformation solutions in Algerian hospitals is an imperative necessity, owing to its role in enhancing the delivery of healthcare services to various groups in society.

✓ Digital transformation empowers hospital establishments to improve the efficiency and effectiveness of the services and functions they provide.

✓ There is a positive effect of regulatory requirements on the enhancement of healthcare services in the studied institution, with a 12% rate of variability in the healthcare services variable attributed to the regulatory requirements variable.

✓ Technical requirements have a positive effect on enhancing healthcare services in the establishment, with 12.3% of the variability in healthcare services attributed to the technical requirements variable.

✓ Human requirements have a positive effect on the enhancement of healthcare services in the establishment, with 20.2% of the variability in healthcare services attributed to the human requirements variable.

✓ Financial requirements have a positive effect on enhancing healthcare services in the establishment, with 27.9% of the variability in healthcare services attributed to the financial requirements variable.

7. Recommendations:

Based on the study results, several recommendations can be suggested:

✓ It is necessary to provide various financial, human, and organizational requirements and capabilities to implement the digital transformation project in Algerian public hospitals.

✓ There is a need for an integrated and clear strategy to transform the processes and operations of Algerian public hospitals into digital ones.

✓ Drawing on global experiences in utilizing lagging technological applications in the Algerian healthcare sector (digital health applications), particularly in light of the COVID-19 pandemic, can help enhance and ease the delivery of healthcare services.

8. References :

o Ben Terbah, Ben Terbah, & Aissa Mazouzi. (2018). Dimensions of healthcare service quality and their role in achieving excellence: A case study of the public hospital Hmida Ben Adjila in El Oued. Journal of Administrative and Financial Sciences, 1, pp. 74-91.

o Ben Farhat Abdelmounaim. (2018). The impact of management patterns of public healthcare institutions in Algeria on service quality: A case study of a sample of public healthcare institutions (PhD Thesis). Faculty of Economic and Management Sciences, Biskra: Mohamed Khider University.

o Tamer Yasser Al-Bakri. (2005). Marketing of healthcare services. Oman, Jordan: Dar Al-Yazouri.

o Djamila Slaimi & Youssef Bouchi. (2019). Digital transformation between necessity and risks. Journal of Legal and Political Sciences, 10(2), pp. 944-967.

o Khouathra Samia. (2021). Digital transformation during and after the COVID-19 pandemic. Algerian Journal of Legal and Political Sciences, 58(02), pp. 103-126.

o Duraydi Ahlam. (2013-2014). The role of using waiting line models in improving healthcare service quality: A case study of the public healthcare institution in Skikda (Raziq Younes) (Magister's thesis). Faculty of Economic and Management Sciences, Biskra: Mohamed Khider University.

o Rama Hussein Ishaq. (2021). The impact of digital transformation on enhancing citizen satisfaction with government services: A field study of the Electronic Citizen Service Center (Magister's thesis). Syria: Syrian Virtual University.

o Talq Awadh Allah Al-Swat and Sayer Al-Harbi Yasser. (2022). The impact of digital transformation on academic performance efficiency: A case study of the faculty members of King Abdulaziz University. Arab Journal of Scientific Publishing (43), pp. 647-686.

o Atiq Aïcha. (2012). Healthcare service quality in Algerian public institutions: A case study of the public hospital in the Saïda province (Magister's thesis). Faculty of Economic Sciences, Management Sciences, and Business Sciences, Tlemcen: Abou Bakr Belkaïd University.

o Nahla Abdelwahab Abdelsadik Mashhour & Abdelhafid Youssef Samah. (2021). The impact of digital transformation on the competitiveness and value added of the tourism sector. Journal of the Arab Universities Federation for Tourism and Hospitality, 21(3), pp. 233-271.

o Walid Kamil Mohamadin Kamil Alim. (2021). Digital transformation and its impact on enhancing the competitive advantage of banking services from the perspective of service officials: A field study applied to the banking sector in southern Upper Egypt. Journal of Economics and Commerce, 52(1), pp. 159-220