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The Role of Digital Transformation in Improving the Quality of Internal Auditing – a Case Study of Naftal Company, Chlef Marketing District-

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Abstract: This research paper aims to study the impact of digital transformation on internal auditing in economic institutions. The descriptive approach was used in the theoretical part to review the most important characteristics of digital transformation and internal auditing, as well as the relationship between them. The analytical approach was used in the applied part, where a questionnaire was distributed to the employees of Naftal Company, Chlef Marketing Branch, in order to study the impact of digital transformation, with its dimensions, on internal auditing. The study concluded with a set of results that collectively support the acceptance of the hypothesis indicating that Naftal Company's orientation (Chlef District) toward digitization directly contributes to improving the quality of control performance and developing its internal auditing practices.

Keywords: digital transformation, internal auditing, artificial intelligence.

1. Introduction

Internal auditing is one of the central functions that ensures the soundness of control systems and the quality of financial and operational reports. However, the increase in the volume and complexity of data, and the interconnection of operations across multiple digital systems, has placed the internal auditor before challenges that require advanced analytical machines and tools. In this context, digital transformation has emerged as a fundamental necessity for redesigning auditing processes and improving their effectiveness, while artificial intelligence technologies have provided new capabilities for detecting anomalous patterns, predicting risks, and automating continuous tests.

This study aims to shed light on the role of digital transformation supported by artificial intelligence in improving the quality of internal auditing within institutions.

1.2. Objectives of the study: This study aims to

- Measure the effect of digital transformation supported by artificial intelligence on the quality of internal auditing. Identify the main artificial intelligence technologies and mechanisms used in internal auditing processes and examine their practical contribution.

- Analyze the technical, organizational, and ethical barriers that hinder the adoption of artificial intelligence solutions in internal audit units.

- Propose practical recommendations and policies that contribute to integrating artificial intelligence in a way that enhances reliability, interpretability, and compliance.

1.3. Study methodology: This study relied on a research methodology that combines theoretical analysis and applied case studies, including the collection of quantitative and qualitative data to analyze the role of digital transformation in providing practical assessment tools for decision-makers in internal audit units.

1.4. Structure of the study: This study was divided into two main sections: a section on the theoretical fundamentals of internal auditing and digital transformation, and an applied section to study the effect of digital transformation on internal auditing at Naftal Company, Chlef Marketing District.

2. Literature review of Digital Transformation and Internal Auditing

2.1 Digital Transformation

Michael Wade defined digital transformation as "bringing about organizational change through the use of digital technologies and business models to improve performance"(Khaled Belkacemi, Omar Dahimi,2025). It is also the process of institutions moving from the traditional business model to the modern model that relies on digital technologies in innovating products and services, as well as methods of management and marketing, while providing new channels for revenues through building a digital strategy, which cannot occur except through an assessment of digital capabilities and a study of the requirements of digital investment in light of digital marketing activities, with the presence of a willingness for change among management toward digital transformation.(Kheira Chaouchi, Zahra Khellouf,2023)

It is also defined as an integrated system that works to accelerate and facilitate the process of providing and delivering services with high efficiency by benefiting from modern digital applications and technologies.(Hussam Ahmad Hlaak, Dr. Ali Alhousain Aleid, TA. Attia Al-Huseyin,2023)

It can be said that digital transformation is a framework that reshapes the way people live, work, think, interact, and communicate based on the available technologies, with continuous planning and constant efforts to reformulate practical experiences. It also provides enormous possibilities for building effective societies.

Digital transformation is characterized by a set of characteristics, as follows:

• Interactivity: where the communicator and the recipient exchange roles, and communication practice becomes bilateral and reciprocal, not in one direction, but between the two parties, remotely and at low cost, with ease of preservation and retrieval.

• Asynchrony: which is the possibility of interacting with the communication process at a time that suits the individual, whether as a receiver or a sender.

• Participation and dissemination: digital transformation allows every person who possesses simple means to publish his message and share it with others.

• Flexibility: the digital network is characterized by flexibility, as digital systems are usually controlled by computer Software programs, which allows a high degree of quality of use.

• Intelligence: digital networks are characterized by a very high degree of intelligence, as the digital system can be designed to continuously monitor changes in the conditions of communication channels and correct their path.

• Diversity: with the development and multiplicity of digital innovations in communication, the recipient has more options for employing the communication process in a way that is consistent with his needs and motives for communication.

• Integration: the Internet represents a communication umbrella that brings together communication systems and forms, various digital media, and content in its different forms within a single system that provides the recipient with multiple options within an integrated framework by providing methods of exposure, availability, and storage means in an integrated manner at the time of exposure on the Internet and its various websites. (Zineb Belkheir, Amal Bousmina,2023)

Below are some of the most important digital transformation technologies:

✓ Cloud Computing: Cloud computing is characterized by many advantages centered on user centrality, where the user can become an owner of computing simply by connecting to the Internet, which enables him to share information easily and flexibly. The cloud focuses on meeting user needs and providing the required applications centrally, and it provides a centralized infrastructure that enables efficient management of operations and reduces the burden on institutions. In addition, the cloud manages software, applications, and documents centrally, which allows access to them easily and smoothly. Cloud computing relies on distributed computing power and artificial intelligence technologies to extract and analyze big data, and provides easy ways to implement applications without the need for major investments in hardware and software. Finally, cloud computing provides scalability that enables companies to meet increasing needs efficiently and flexibly without the need to purchase new equipment. (Maha Hassan Hamza,2025)

✓ Blockchain Technology: Some have defined blockchain technology on the basis of the Bitcoin system, while others have defined it as a digital ledger that stores transactions after they are verified by nodes or network devices. In another definition, it is the distributed and shared ledger that provides documentation and the ability to verify transactions, while others have considered it a shared database. Based on these definitions, blockchain is a distributed database that operates in a peer-to-peer network, where each peer in the network possesses a complete or partial copy of the database. (Madi Abdel Latif Al-Ruhaili, Hanaa Ali Al-Dakhawi,2020)

✓ Big Data: It refers to data whose volume exceeds the capacity of ordinary database software to collect, store, manage, and analyze it. This technology works to organize huge and random data. (Zahraa Qasim Kaour, Taleb Ahmed Al-Ali,2025)

✓ Artificial Intelligence: Artificial intelligence is a concept that refers to a science or scientific system that includes a field of research and application aimed at discovering human mental abilities and simulating them automatically, by translating those abilities mechanically and electronically. Artificial intelligence as a science is not limited to the field of research only, but is also considered a field of application, relying on the methods, results, and applications of other explanatory and applied sciences. (Maha Hassan Hamza,2025)

✓ Internet of Things: It is a system of interconnected devices connected to the network or to one another, where data is exchanged without necessarily requiring interaction with another human being. It is sometimes referred to as “smart devices.” Internet of Things devices use software and hardware to process data, sensors, actuators, and network connectivity with one

another. In other words, IOT (Internet of Things) is a group of electronic devices that can share information among themselves. (Sadouk Khadra, Neil Kheira,2022)

✓ Faster Computer Processing: Computational technologies make computing devices smarter in terms of high accuracy in processing a huge amount of data at very high speed. This has allowed the emergence of the cloud for companies, which provides enormous storage capacity for information and easy, secure, and very fast access to it.

✓ Virtual Reality and Augmented Reality: Simulating the real world is considered one of the most important features of virtual reality, by providing digital experiences (using a VR headset) that simulate the real real world, and augmented reality, which combines digital and physical reality.(Abdel Rahman Mohammed Rashwan, Hiba Hamada Abu Arab,2022)

✓ Three-Dimensional Printing: It is one of the advanced manufacturing technologies, where the shape to be printed is designed through computers, divided into small successive layers, and then sent to printing. This technology relies on building preliminary models of the objects to be implemented, with the possibility of modifying them before carrying out the project, which saves a great deal of effort and financial expenditure. Its uses are numerous and include many sectors.(ئ Qarin Rabie,2023)

✓ Cyber Security: It is a set of technological means and measures used by individuals, bodies, institutions, or any other entities, with the aim of protecting everything related to them, including data, tools, systems and programs, equipment, or devices, whether computers, personal computers, smartphones, and others, from unauthorized access or tampering. Thus, cyber security employs both physical and informational protection.

2.2. Internal Auditing

Internal auditing was defined by the French Institute of Audit and Internal Control (IFAC) as "an independent and objective activity that provides the institution with assurance regarding the degree of control over its operations, offers recommendations for improvement, contributes to creating added value, and helps it achieve its objectives through a systematic and regular assessment of risk management, control, and corporate governance processes, while providing proposals to enhance their effectiveness." (Tabchouche Sarah, 2023)Internal auditing is also one of the components of the institution's internal control system. It is a purposeful and independent activity that combines assurance and advisory roles. This activity is carried out by an individual or a department within the institution and is specifically designed to add value to it and improve its performance. It also contributes to achieving the institution's objectives by adopting organizational methods that help assess and develop the effectiveness of risk and process management, in addition to verifying the efficiency of internal control systems and adopted procedures.

2.3. Applications of Digital Transformation in Internal Auditing

✓ Big Data Analysis: Digital transformation enables the analysis of millions of transactions in record time and the detection of unusual patterns and deviations that may be difficult for the human auditor to identify, which enhances the accuracy of audit results.

✓ Intelligent Process Automation: Robotic Process Automation (RPA) technologies supported by artificial intelligence help automate repetitive tasks such as:

- Examining documents and reconciliations;
- Verifying data validity;

- Preparing preliminary audit reports;
- Continuous Auditing;
- Risk prediction.

2.4. The Impact of Digital Transformation on Internal Auditing

The use of digitalization in carrying out financial operations contributes significantly to completing audit tasks efficiently and effectively. Among the factors that affect audit quality are the time and effort spent in performing audit services, through the use of digital transformation software that saves time and effort. In order to complete the audit task with high quality, electronic technologies must be available and used by an audit team or qualified auditors capable of objectively evaluating financial data and audit evidence. Electronic technologies help achieve independence and neutrality in auditing financial statements and detecting errors and material misstatements.

Digital transformation, through its technologies, contributes to achieving the dimensions of internal audit quality as follows**: (Abdel Rahman Mohammed Rashwan, Hiba Hamada Abu Arab,2022)**

- Achieving cost advantage: In terms of reducing the cost of audit services and increasing the profitability of audit offices by applying digital transformation software to the audit of financial data. This has contributed to completing audit services quickly and providing more than one service to a large number of institutions. It also saves the time required for planning and determining the size of tests through expert systems and artificial intelligence. This requires skills, specifications, and competencies within the work team to achieve the desired objectives of the internal audit process with high quality.
- Achieving quality: Digital transformation contributes to the auditing profession, particularly in carrying out financial operations, by completing audit tasks efficiently and effectively through the use of software that helps perform audit tasks, thereby saving the required time and effort.
- Increasing market share: Digital transformation affects the achievement of internal audit quality through the speed and accuracy it provides in presenting financial data. This increases institutions' ability to achieve competitiveness in light of the existence of information technology, which connects business organizations with audit offices in order to make use of them.
- Achieving excellence: Information technology provides a competitive advantage to business institutions, enabling them to provide their services and products. These institutions seek to benefit from and exploit it in a way that serves their interests. Audit offices are considered part of these institutions that benefit from digital transformation technologies and use them to accomplish their tasks with high quality and ensure the proper provision of their services to the institutions under audit.
- Achieving creativity: Creativity in using electronic auditing helps the auditor design the necessary programs to perform audit tasks. It also makes the auditor capable of developing existing systems so that they suit and align with internal accounting systems through the use and development of artificial intelligence programs and expert systems programs.

3. Field Study

In order to address the problem of the study and answer its questions, a convenience sample drawn from the study population was relied upon. Its size reached (35) employees from Naftal Corporation – Marketing District of Chlef. This sample was adopted as a basis for conducting the field analysis. The following table shows the distribution of questionnaires in terms of number and percentages, whether distributed, retrieved, or valid for analysis.

Table 1. Number and Percentage of Distributed, Retrieved, and Valid Questionnaires

Percentage (%)	Number	Questionnaire
%100	39	**Distributed questionnaires**
%89.74	35	**Retrieved questionnaires**
%10.25	04	**Missing questionnaires**
%89.74	35	**Valid questionnaires**

Source: prepared by reserchers

This tool was used in order to analyze the nature of the relationship and measure the impact of digital transformation on internal auditing within the institution under study.

The following table also shows the distribution of the questionnaire statements according to the study variables.

Table2. Statements Defining the Study Variables.

Variables	Dimensions	Statement No
Digital transform	Infrastructure dimension	**From 01 to 03**
	Digital data dimension	**From 04 to 06**
	Digital operations dimension	**From 07 to 09**
	Human resources dimension	**From 10 to 13**
Internal auditing	Internal audit efficiency	**From 14 to 18**
	Internal audit effectiveness	**From 19 to 23**

Source: prepared by reserchers

3.1. Analysis of Individuals' Attitudes Toward the Digital Transformation Items

1.1.3.Infrastructure Dimension

Table3. Responses of the Study Sample Members to the Statements Related to the Infrastructure Dimension.

Statement order	Statement	Mean	Std deviation
	Infrastructure	4,02	0,62

Source: prepared by researchers using SPSS outputs

The table above shows that the opinions of the sample members regarding the availability of digital infrastructure at Naftal Corporation (Marketing District of Chlef) received a generally high rating, as the overall arithmetic mean for this dimension reached (4.02), with a standard deviation of (0.62). This reflects strong agreement among the respondents on the readiness of the technical means.

2.1.3. Digital Data Dimension

Table 4. Responses of the Study Sample Members to the Statements Related to the Digital Data Dimension.

Order	Statement	Mean	Std deviation
	Digital data	3,40	0,51

Sources: prepared by researchers using SPSS outputs

The statistical results shown in the table above indicate that the digital data dimension at Naftal Corporation in the Chlef District obtained an overall arithmetic mean of (3.40), with a standard deviation of (0.51), which places it within the medium level of assessment.

3.1.3. Digital Operations Dimension

Table (05): Responses of the Study Sample Members to the Statements Related to the Digital Operations Dimension.

Order	Statement	Mean	Std deviation
	Digital operations	3,88	0,73

Sources: prepared by researchers using SPSS outputs

The results shown in the table above indicate that the digital operations dimension at Naftal Corporation (Marketing District of Chlef) obtained an overall arithmetic mean of (3.88), with a standard deviation of (0.73), which places it within the high level of assessment.

4.1.3. Human Resources Dimension

Table 6. Responses of the Study Sample Members to the Statements Related to the Human Resources Dimension.

Item number	Statement	Mean	Std deviation
	Human resources	3,68	0,70

Sources: prepared by researchers using SPSS outputs

The table above shows that the opinions of the sample members regarding the role of human resources in supporting digital transformation at Naftal Corporation (Chlef District) received a generally high assessment, as the overall arithmetic mean for this dimension reached (3.68), with a standard deviation of (0.70). This assessment reflects management's awareness that the human element is the main driver of the success of any technological transformation aimed at developing internal auditing.

3.3. Individuals' Attitudes Toward the Items of the Internal Auditing Variable

3.3.1. Internal Auditing Efficiency Dimension

Table 7. Responses of the Study Sample Members to the Statements Related to the Internal Auditing Efficiency Dimension.

Item number	Statement	Mean	Std deviation
	Internal audit efficiency	3,94	0,54

Sources: prepared by researchers using SPSS outputs

The table above indicates that the opinions of the sample members regarding the level of internal audit efficiency at Naftal Corporation (Marketing District of Chlef) obtained an overall arithmetic mean of (3.94), with a standard deviation of (0.54), which places this dimension within the high level of assessment. This result confirms that the internal audit system in the institution enjoys good effectiveness that contributes to controlling operations and protecting assets.

3.3.2. Internal Audit Effectiveness Dimension

Table 8. Responses of the Study Sample Members to the Statements Related to the Internal Audit Effectiveness Dimension.

Item number	Statement	Mean	Std deviation
	Internal audit effectiveness	4,05	0,51

Sources: prepared by researchers using SPSS outputs

The table above shows that the opinions of the sample members regarding the level of internal audit effectiveness at Naftal Corporation (Marketing District of Chlef) obtained an overall arithmetic mean of (4.05), with a standard deviation of (0.51), which places this dimension within the high level of assessment. This result reflects the central role played by auditing in achieving the institution's strategic objectives and ensuring the soundness of its operations.

3.4. Responses of the Study Sample Members Regarding Digital Transformation and Internal Auditing

The following table shows the results of the responses of the study sample members regarding digital transformation and internal auditing:

Table 9. Responses of the Study Sample Members Regarding Digital Transformation and Internal Auditing.

Item number	Statement	Mean	Std deviation
1	Digital transform	3,73	0,46
2	Internal auditing	4,00	0,49

Sources: prepared by researchers using SPSS outputs

The table above shows a general assessment of the two main variables in the study at Naftal Corporation (Marketing District of Chlef), where it is clear that the opinions of the sample members tended toward agreement with a high level of assessment for both variables. This reinforces the hypothesis stating that there is a close correlation between the path of digitalization and the development of supervisory practice.

-Testing the First Main Hypothesis:

This hypothesis states the following: "There is a statistically significant effect of digital transformation on improving internal auditing."

Table10 . Results of the Simple Linear Regression Test Between the Digital Transformation Variable and Internal Auditing.

	Reg coeff	t Value	Sig	Corr coeff	R^2	F Value	Corr Sig
Constant	2,456	3,811	0,001	0,382	0,146	5,649	0,023
Digital transform	0,408	2,377	0,023				

Sources: prepared by researchers using SPSS outputs

The statistical results shown in the table above indicate the existence of a positive and statistically significant effect of digital transformation on improving internal auditing at Naftal Corporation, as the value of the correlation coefficient reached (0.382), which reflects a direct relationship between the two variables. The coefficient of determination reached (0.146), which means that digital transformation contributes (14.6%) to explaining the changes occurring in the level of internal auditing within the institution, while the remaining percentage

is attributed to other factors outside the scope of the model.

Regarding the quality of the model, the calculated F value recorded (5.649) at a significance level of correlation of (0.023). Since this value is less than the adopted significance level (0.05), this confirms the validity of the model for prediction. The results also showed that the regression coefficient for digital transformation reached (0.408), which means that increasing attention to digitalization by one unit leads to an improvement in internal auditing by (40.8%). This value is statistically significant in view of the t value of (2.377) at a significance level of (0.023).

As for the constant, it recorded a value of (2.456), with a t value of (3.811) and a Sig significance level of (0.001). Taken together, these results confirm the acceptance of the hypothesis indicating that Naftal Corporation's orientation (Chlef District) toward digitalization directly contributes to raising the quality of supervisory performance and developing its internal auditing practices.

Accordingly, we accept the validity of the first main hypothesis, which states that "there is a statistically significant effect of digital transformation on improving internal auditing."

Based on the previous test, the proposed study model can be formulated as follows:

Internal Auditing = 0.408 (Digital Transformation) + 2.456

These results reflect a state of functional harmony within the Marketing District of Chlef, where auditors, managers, and the rest of the functional staff agree on a unified assessment of the impact of digitalization on auditing practices. The difference in tasks and job positions did not lead to a difference in perceiving the importance of digital transformation as a work environment, nor in assessing the level of efficiency and effectiveness of internal auditing. This is attributed to the comprehensiveness of the digital systems applied at Naftal Corporation, which has made "digitalization" a common work language at which all employees intersect, regardless of their job titles, thereby enhancing the coherence of the organizational vision toward developing supervisory work.

4. Conclusion

The results of the study show that digital transformation supported by artificial intelligence is an effective tool for enhancing the quality of internal auditing if it is accompanied by sound data infrastructure, clear model governance, and institutional skill development; otherwise, its benefits may be limited due to operational and compliance risks. The most important results can be summarized as follows:

- Digital transformation leads to reducing the cost and time of the auditing process, as data automation saved auditors' time, resulting in a reduction in the average completion time for each task.

- Strategic decision-making improved, and issues related to data quality and system integration emerged. Improving data quality and data governance first requires implementing systematic data-cleaning programs, standardizing account names, and establishing a unified data warehouse with clear access and monitoring policies to ensure reliability.

- Auditors, managers, and the rest of the functional staff of Naftal Corporation, Marketing District of Chlef, agree on a unified assessment of the impact of digitalization on

auditing practices. The difference in tasks and job positions did not lead to a difference in perceiving the importance of digital transformation as a work environment.

- The main hypothesis of the study was confirmed, stating that there is a statistically significant effect of digital transformation on improving internal auditing.

Recommendations

- Invest in training auditors in data analytics and artificial intelligence concepts, and integrate data analysts and data engineers into audit teams to ensure effective cognitive and technical activation.

- Raise technological awareness among workers in the institution.

- Open communication channels with regulatory authorities to clarify automated auditing methodologies.

- Apply security controls to protect data and models from unauthorized access or manipulation.

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