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The Role of Internal Audit Activity to support Applying the Digital Transformation Mechanisms in Egyptian Business Enterprises: A field Study

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Abstract:

This research aims to clarify the assurance and Consulting roles of Internal audit activity to support management in applying digital transformation mechanisms in Egyptian business enterprises, and to assist management to face the associated Risks and reducing its impact. In addition, the research aims to discuss the challenges that face internal auditors under applying digital transformation mechanisms and suggest some solutions to overcome these challenges. To achieve these goals, the researchers adopted a positive approach, utilizing deductive analysis of previous studies related to the research topic to derive the research hypothesis, In addition to use the inductive approach to test the validity of the research hypothesis in the real practice in the Egyptian business environment. This was done by conducting a field study on a sample of 120 individuals divided in two groups: academics represented in the professors of auditing in Egyptian universities, and internal auditors of some stock Companies listed on the Egyptian Stock Exchange. Statistical tests were used Commensurate with the nature of the data Collected. And based on the results of the field study, the first hypothesis was accepted, which states that there is agreement between the study sample groups about the importance of the internal audit roles to support applying the digital transformation mechanisms in Egyptian business enterprises. Also, the second hypothesis was accepted, Which states that there is an agreement between the study sample groups about the challenges that may face the internal auditors during performing their roles to support applying digital transformation mechanisms in Egyptian business enterprises, as well as the third hypothesis which states that there is agreement between the study sample groups about the suggested solutions to overcome the challenges of applying digital transformation mechanisms in Egyptian business enterprises.

Keywords: Internal Audit, Digital Transformation, Egyptian Business

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1. Introduction:

The business environment has witnessed many developments during the last few years which have led to fundamental changes in the way business is performed at the local and global level. Among the most important of these developments is the emergence of the concept of digital transformation, which is considered one of the most important topics that have captured the attention of researchers in recent times.

Digital transformation is based on using modern technology such as smart phone applications, artificial intelligence techniques, big data analytics and various forms of social media to achieve major breakthroughs in the way business is done by improving relationships with customers, achieving operational efficiency and creating new business models such as digital platforms.

Many studies discussed the definition of digital transformation, (Hess et al., 2016) defined digital transformation as "an organizational transformation that takes place through the integration between modern technology and enterprise operations within the framework of the digital economy," and (Rogers, 2016) also emphasized that digital transformation is not only related to the technological dimension, but also deals with the strategic dimension, through the necessity of a digital transformation strategy to overcome the obstacles of implementing new business models and meet the customers' needs .

Also, (Makkawi, 2019) defined digital transformation as "a process aimed at improving the performance of business organizations by bringing about fundamental changes through a combination of enterprise operations, information technology, computing and communications", and (Abdel-Razek, 2019) added that digital transformation is " the process of companies moving to apply business models that rely on digital technologies to support innovation, develop products and services provided, provide new channels for marketing and distribution and create job opportunities that depend on the availability of advanced technological skills " .

Briefly, previous studies concluded that digital transformation is a strategy to create a competitive advantage using modern technology in all activities of the entity, starting from changing the design and specifications of products, methods of performing operations and business models, and even marketing methods and after-sales services.

So, digital transformation can bring about major changes in business enterprises and at the level of society, because it is considered a continuous dynamic process based on a mixture of modern technology and enterprise processes related to the production of goods and services. Also, digital transformation includes more than just the application of modern technology, as it affects the organization, including people, processes and products, as business enterprises seek to achieve long-term gains represented in improving productivity and innovating new ways to produce goods and provide services (Ziyadin et al., 2020).

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Additionally, several studies (Hess et al., 2016; Aditya et al., 2018; Kraus et al., 2019; Vial, 2019) have indicated to the benefits achieved from digital transformation, the most important of which are:

- Increasing operational efficiency, improve the performance of business organizations, and achieve a competitive advantage by using real-time data to control operations and improve productivity, in addition to interacting with customers and suppliers to provide new and advanced products and services.
- Reducing costs and increasing the accuracy and speed of decision-making.
- Encouraging innovation, increasing growth rates, and improving the reputation of the entity.
- Creating new means for developing and marketing products and services, and more fast and easy access to new markets.
- Improving the quality of products and services through applying modern technology.

So, it becomes clear the importance of digital transformation and the benefits it achieves that contribute to improving the standard of living of community members and improving the quality of products and services provided to them, in addition to opening new markets and creating new job opportunities that require advanced technological skills, which contributes to an increase in the rate of GDP growth, achieving sustainable development through applying the digital economy, The goal of business assurance functions is to continue contributing value to the organization even as technology develops and transforms how businesses operate. To do this, they must continuously adjust to the rate at which technology is changing within their organizations. If they don't, there will be a "value-gap" in which the Business Assurance functions are unable to deliver value at a speed that corresponds with the organization's growth.

2. Research Problem:

The modern business environment is characterized by continuous fluctuations and unity of competition and increase in reliance on information and communication technology has strongly influenced the way business is performed, and the traditional methods of doing business are no longer appropriate to help business enterprises survive. The digital transformation has changed the process of creating value in business enterprises as a result of integrating information and communication technology in the operations of the enterprises, which requires a flexible and rapid response, and the continuous provision of new and innovative products and services to meet the needs and desires of customers.

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Considering the rapid development in information technology and communications, the increase in the volume and variety of data that needs to be processed and stored, and the need to present it in the form of appropriate information in a suitable time, all these factors have led to the necessity of using electronic information systems to deal with this huge amount of data. Unfortunately, this technological progress has been accompanied by the emergence of many important risks related to data security and confidentiality, given that this technological development has not been accompanied by a similar development in control procedures and controls, nor a similar development in the awareness and experiences of the employees and users of electronic information systems (Abu Musa, 2004).

So, despite the advantages of using electronic accounting information systems, which are represented in the accuracy and speed of analyzing and processing data, the deficiency of control procedures leads to ease of manipulating this data and thus inaccuracy of outputs (Al-Sharif, 2006). On the other hand, the internal audit activity is considered one of the most important supervisory tools and one of the main parties responsible for the governance in business enterprises.

Several studies including (Cashell & George, 2010; IIA,2009; E&Y,2012; IIARF, 2011a; Abdullah, 2013; Chambers,2014) has found that the radical change that has taken place in business environment caused In increasing the responsibilities of internal audit activity and developing its role within enterprises, from a supervisory function to a strategic partner for the management to add value to the enterprise and help it achieve its objectives, by evaluating and improving the control, governance and risk management processes. So, recent years have seen a growing interest in internal auditing development and utilization as value-adding activity.

Also, several studies (IIA,2009; PWC,2009a,b; PWC,2010a,b CIIA,2018; KPMG,2018,2019; Deloitte,2019) have addressed the most important types of risks that the internal audit should focus on over the next few years, and provide recommendations for management to deal with these risks and manage them effectively to mitigate their effects. These risks include: the risks of digital transformation and digitization of operations, risks associated with electronic information systems and cyber-security, risks associated with analyzing and using big data, risks of relationships with external parties such as customers and supply chains, third-party relationships, fraud risks and corrupt practices, Crisis and disaster risks and response plans to them, risks related to the continuity of the establishment, risks of changing laws, legislations and accounting standards.

Therefore, the internal audit must evaluate the adequacy and effectiveness of control procedures over electronic accounting systems, assess the risks related to the security of information systems, and confirm that the management has properly identified these risks and has taken appropriate measures to manage these risks and limit their impact, while

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providing recommendations to the management regarding dealing with these risks when needed. Auditing is one of the domains affected by the immersion of new technology. As a result, it is undergoing a critical turning point in the wake of advances in information technology and its rapid penetration of companies. As a result, the audit profession is in a period of transition from traditional paper-based auditing to a more digitized audit with automated and dematerialized processes (Karimallah, Drissi, 2024).

On the other hand, the internal audit and control activities must keep pace with the evolution of the surrounding environment to face the continuous changes and developments in the business environment, to improve the performance of the enterprise's activities and operations and help it achieve its goals, so that the internal audit is actually a value-adding activity for business enterprises and their stakeholders. Therefore, the internal audit and control must expand its roles related to internal control, governance and risk management, to meet the increased risks associated with the use of electronic accounting information systems in light of applying digital transformation.

So, this research aims to clarify the assurance and consulting roles of internal audit activity to support management in applying digital transformation mechanisms in Egyptian business enterprises, and to assist management to face the associated risks and reducing its impact. The research also aims to discuss the most important difficulties and challenges that face internal auditors under applying digital transformation mechanisms. Finally, the research aims to present some suggested solutions that can be employed and used to overcome these challenges.

Our research will be organized as follows: the next section presents Theoretical Framework, then the research methodology and the field study. Finally, the research limitations and conclusion.

3. Theoretical Framework:

The effective application of digital transformation requires adoption of a set of mechanisms that include technologies, data, human resources, and processes. Business enterprises need to make more investments to support and develop these mechanisms and to continuously improve them. By studying and analyzing these mechanisms, we find that the internal audit and activity has an important assurance and consulting role in studying and implementing each of them. So, the internal audit and control should communicate continuously with the audit committee, board of directors and key stakeholders to determine their needs for assurance and consulting services related to applying the digital transformation mechanisms.

3.1 Internal Audit Roles and Responsibilities regarding the applying of Digital Transformation Mechanism:

3.1.1 Technologies:

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Technologies are considered the most important mechanism or requirement that must be met to implement digital transformation, where the digital transformation is implemented by an interconnected system of hardware, software, storage media and databases, in order to ensure the provision of an appropriate level of service to the enterprise's personnel, customers and suppliers with high efficiency and quality.

So, the internal audit role should begin at an early stage, starting from helping the management in planning to implement the digital transformation, where the internal audit can play an important advisory role to assist the management in developing a digital transformation strategy, assisting decision-makers in directing investments towards technologies, processes, and selecting human resources appropriate to the conditions and capabilities of the enterprise, which contributes to the success of the digital transformation experiment and reduce the risks associated with it.

Internal Audit Activity (IAA) can also:
* Provide the necessary knowledge and making recommendations to the board of directors and the audit committee regarding the most recent developments and pioneering experiences in digital transformation plans at the industry level, both internationally and locally.
* Provide support for other activities in the entity through the experiences that internal audit team has in various fields.

3.1.2 Data:

And for data, despite the advantages of using electronic information systems such as the large storage capacity that accommodates a huge amount of data, and the accuracy and speed of processing this data, the expansion of using these systems may be accompanied by many risks related to information security, as weak control procedures may lead to the ease of manipulating data, which requires the need to develop control procedures, increase awareness and expertise of employees to deal with electronic information systems, maintain information security, reduce the risks of using these systems, and provide reliable and high-quality information to users.

Therefore, Electronic information systems are exposed to various risks, which can be classified according to different classifications (Abu Musa, 2004). These risks can be classified according to their source into internal and external risks, employees are considered the main source of internal risks, while competitors, information hackers and natural disasters represent the most important sources of external risks. The internal risks are considered more dangerous and cause greater losses because employees have the authority to access the data and they are more aware of the internal control procedures and

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their weaknesses, therefore they have a greater opportunity to modify, distort or destroy the data.

Electronic information systems risks can also be classified according to the perpetrator, into risks resulting from the human factor (due to some unintentional human actions such as omissions, errors, or some intentional behavior with the aim of fraud and manipulation), and other risks not resulting from the human factor such as natural disasters that humans have no part in, such as earthquakes, volcanoes, floods and others.

In addition, the risks of using electronic information systems can also be classified on the basis of intentional, into risks resulting from intentional actions such as forgery or intentional destruction of data with the aim of concealing fraud, manipulation and misappropriation of assets, and other risks resulting from unintended spontaneous actions that do not have intentional intent, such as entering data incorrectly or unintentionally destroying it due to omission or error. (Abu Musa, 2004) believes that most of the risks are caused by unintended mistakes, and that these errors can be corrected or avoided by providing more training for workers and better supervision over them.

It is also possible to classify the risks of electronic information systems according to the effects resulting from them, into risks that result in material damage to the system, computers and means of data storage as a result of some natural disasters or power outages, and technical or logical risks that negatively affect the availability of data, which may affect the entity's reputation and competitive position. Finally, the risks of electronic information systems can be classified based on their relationship to the stages of the information system, as they can be divided into:

(A) Input Risks: such as entering incorrect data, whether intentionally or unintentionally, modifying or corrupting data, deleting some data, whether intentionally or unintentionally, and entering data more than once.

(B) Processing Risks: These risks mainly affect the stored data and the programs that process this data. Examples of these risks include unauthorized access to some users and their access to unauthorized information, modifying programs and making illegal copies of programs using software in an unauthorized manner, introducing viruses into computers to cause the programs to malfunction.

(C) Output Risks: These risks include stealing data and information or misusing them, concealing or falsifying some outputs, making unauthorized copies of outputs, printing and sending information to persons who are not authorized to access it, either intentionally or by mistake.

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Previous studies clarified the reasons for the occurrence of these risks (Abu-Musa, 2006; Al-Sharif, 2006; Abu Shaiba and Al-Fatimi, 2017), and the most important of these reasons can be summarized as follows:

- Weak and ineffective internal control procedures in the enterprise.
- The lack of clear and documented policies and programs to protect the security of information systems.
- Employees participate in using the same passwords to access the information system.
- Lack of separation between conflicting tasks and functions related to accounting information systems in the enterprise.
- The lack of adequate protection programs against computer viruses and hacking operations.
- Lack of an accurate description of the responsibilities and authorities of each person within the organizational structure of the enterprise.
- Lack of awareness and the lack of knowledge and experience necessary for workers to deal with electronic information systems, and their lack of adequate training.
- The difficulty of reviewing the procedures that take place through the computer because they are not visible, and thus the difficulty of discovering errors in electronic accounting information systems.

Therefore, the management should design and implement the necessary controls to protect the security of electronic information systems and ensure that they work properly. The procedures for controlling electronic accounting information systems must include three main groups that cover all stages of the system, as follows (Ibrahim, 2000; Hashem, 2010):

(1) Controlling Inputs: These procedures aim to ensure the accuracy of the data and that it has been entered into the system correctly, and that it has not been subjected to any deletion or modification, to ensure that the data is free from errors or distortion before its operation, which leads to obtaining sound outputs.

(2) Controlling Data Processing: It aims to verify that the data is being run correctly and authorized by the use of appropriate programs, and the drivers must be provided with functions and tasks that record any attempt to interfere with the work of the programs during the operation and data processing process, in addition to applying procedures that include Correct operations such that incorrect inputs are rejected.

(3) Controlling Outputs: These procedures aim to ensure that the outputs are correct, complete and accurate, and that they have been handed over to persons authorized to see them.

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So, Internal Audit should play important assurance and consulting roles to ensure the availability of reliable, accurate, credible and timely information through:

(1) Evaluating the adequacy and effectiveness of control procedures related to protecting the information security and confidentiality and preventing penetration and unauthorized access.
(2) Evaluating the adequacy and effectiveness of the plans and procedures related to ensuring the continuity of the proper functioning of electronic information systems and facing the risks which may lead it to stop working.
(3) Assuring that information is correct and not subject to modification or destruction during the various stages of its processing or internal exchange or during its exchange with other parties outside the entity.
(4) Evaluate the internal control procedures of protecting computers and the physical components of information systems and keep backup copies of data and information for use when needed.
(5) Evaluate the senior management's commitment to support the implementation of information systems security measures and spread the culture of maintaining data confidentiality among the employees.
(6) Providing recommendations to management regarding ways to provide adequate protection for information, using several methods, such as data encryption, ensuring the identity of users by assigning a password to each user, and using appropriate protection methods such as anti-virus programs.

3.1.3 Human Resources:

Human resources represent the third mechanism of the implementation of digital transformation. A work team is required to be responsible for implementing and following up the implementation of digital transformation mechanisms, with the need for appropriate qualifications and adequate professional experience, especially in the field of information technology. **So, Internal Audit should:**
* Evaluate the availability of sufficient and appropriate financial and human resources to implement the digital transformation plan.
* Evaluate the adequacy of the resources available for training employees about implementing digital transformation.

3.1.4 Operations:

Finally, regarding to operations, the steps to implement digital transformation should include the implementation of various policies and procedures that cover all activities and operations of the entity in a coherent manner, to achieve the benefits arising from the

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implementation of digital transformation. **Therefore, Internal Audit should play many important roles, such as:**

- Evaluate the changes in the entity's control environment because of applying the digital transformation mechanisms.
- Evaluate efficiency and effectiveness of internal control procedures in light of applying the digital transformation.
- Evaluate the need to make any adjustments in the internal control procedures or to apply additional control procedures related to applying digital transformation.
- Evaluate the efficiency of designing the new internal control procedures and the effectiveness of their application.
- Expand the scope of the risk assessment process carried out by the internal audit activity to include the risks arising as a result of applying the digital transformation mechanisms.
- Evaluate the ability of the entity's management to adequately and effectively identify and manage the risks associated with digital transformation and provide the necessary recommendations to assist the management in managing these risks and mitigating their effects.
- Evaluate the risks associated with modifying the work system and creating /canceling some operations and activities because of applying the digital transformation.
- Increasing interest in assessing fraud risks for the main operations and activities, especially the operations that underwent modifications as a result of applying the digital transformation.
- Evaluate the risks related to the entity's relationship with external parties, such as customers and suppliers, as a result of applying the digital transformation.

- Assess the impact of applying the digital transformation mechanisms on the entity's performance and its financial reports, and provide recommendations for appropriate corrective actions
- Conducting a post review and preparing a report on the most important observations experiences about implementing the digital transformation, which can be relied upon in developing plans in the future.

3.2 Challenges of Applying Digital Transformation for Internal Auditors:

Despite the benefits achieved from digital transformation, there are some difficulties and challenges that businesses face in order to implement it, the most important of which are (Kiel et al., 2017; Vogelsang et al., 2019; Warner & Wager, 2019):

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- Lack of knowledge and a clear strategy and vision for digital transformation for the management of many enterprises.
- Absence of reference standards and frameworks for digital transformation, the difficulty of applying this modern technology and integrating it into the various operational activities of the entity, and the difficulty of achieving compatibility and integration between it and the systems applied before.
- Digital transformation requires the necessity of making fundamental changes in operating methods and restructuring business enterprises.
- Employees' resistance to change, and the absence of an appropriate organizational culture that supports new developments.
- Difficulty of convincing customers of the benefits and advantages of digital transformation due to concerns they have about the security and confidentiality of data.
- Lack of sufficient capabilities and skills of workers to deal with modern technology.
- High costs of implementing digital transformation, and lack of sufficient financial resources and appropriate infrastructure for many companies to implement digital transformation.

Also, the internal auditors face many challenges because of the digital transformation and the rapid global developments in the field of information technology, the most important of these challenges are (Abdel-Aal, 2020):

- Developing audit standards should be in line with developments in the field of information technology, and in line with the application of digital transformation mechanisms because there has been a significant development in the methods of performing the audit process (for example: auditors can now conduct a comprehensive audit of all the organization's operations up-to-date using some modern methods instead of reliance on auditing samples, however, the internal audit team will still be required to take samples in accordance with the audit standards, which will result in duplication of work and inefficiency in utilizing the resources available for the internal audit activity.
- Verifying the validity and integrity of the data considering the disappearance of the paper review process (the disappearance of records and the difficulty of collecting electronic evidence), especially considering the multiple risks to which electronic information systems are exposed, especially the risks related to the security and confidentiality of information and the high risk of loss or distortion.
- Availability of a large amount and variety of data and information (overload information) that may negatively affect the judgment and estimates of the auditors
- Lack of funding and material resources and the unavailability of trained human resources.

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- Poor infrastructure and the lack of adequate technological equipment to collect and analyze data.

3.3 Suggested Solutions to overcome the challenges of applying Digital Transformation Mechanism for Internal Auditors:

The following are some suggested solutions to overcome the challenges that may face the internal auditors because of applying digital transformation mechanism in Egyptian business enterprises:

1- Increasing the Qualifications and Professional Experience of the Internal Audit Team.

The Chief Audit Executive and his team must have appropriate qualifications and practical experience to provide required assurance and consulting services to meet the needs of stakeholders, regarding the various aspects of the performance of the enterprise, and the internal audit team should be selected according to certain criteria, such as (IIA, 2016):

(a) The competence of internal auditors, especially in the field of modern technology, with the assistance of external specialists when needed.

(b) The availability of certain characteristics in the internal audit team such as: Deep knowledge of the nature of the activity and operations of the enterprise and the characteristics of the industrial sector to which it belongs, the ability to think analytically and critically, predictability and long-term planning, effective communication skills and positive behavior and leadership of change in the enterprise.

(c) The need to hold training sessions on an ongoing basis for the members of the internal audit team, with an introduction to the nature of the assurance and consulting roles of the internal audit.

2- Expanding the Scope of Internal Audit and Continuous Communication with Stakeholders.

The focus of internal audit has previously been on assessing the effectiveness of internal control and compliance with legal requirements, but now the board of directors and the audit committee are looking for more from the internal audit activity, so internal audit should expand its work and increase diversity in its roles and services to cover emerging types of risk, especially the risks associated with the organization's decision to implement digital transformation.

Senior management also needs to rely on internal audit activity to obtain specialized advice on certain matters, as well as ideas and recommendations to solve current problems, and

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improve the company's performance continuously. So, internal audit should consider the expectations and needs of the board of directors, the audit committee and other stakeholder groups (IIARF,2011c).

3- The Support of Senior Management and the Board for the Internal Audit Activity.

Based on the importance of the role of internal audit in recent times, the senior management should increase supporting the internal audit activity and provide the necessary and appropriate resources to perform its assurance and consulting roles. So, the senior management should provide the financial, human and modern technological equipment and software needed to develop the performance of the internal audit team, save time and efforts, and help internal auditors to perform their work efficiently and effectively to maximize the added value to the enterprise and stakeholders.

4- Using Modern Methods to develop the performance of the Internal Audit activity considering implementing Digital Transformation:

Several studies (IIARF,2011b; KPMG,2018; PWC,2018) have recommended increasing the reliance on technology and using modern methods and tools of auditing and data analytics in planning and implementing audit tasks, which contributes to better conclusions, reduces the costs of performing internal audit activities, excludes activities that do not add value to the enterprise, and enables internal audit to expand its consulting role to help management to improve the efficiency of operations, increase profits, prepare for growth and achieve the objectives of the enterprise. **These studies also concluded that using modern methods and tools of auditing achieves many advantages**:

- Increase the speed and efficiency of the audit process - expanding the scope of internal audit and increasing coverage
- Easy to identify data models and trends and relationships among them and increase the ability to monitor and monitor risks.
- Reducing the time, effort and number of auditors needed to implement the audit programs.
- Increase the productivity of the internal audit team and increase the quality of the services it provides.
- Saving the time and effort of the internal audit team and guiding it to find solutions and recommendations to treat weaknesses and shortcomings in the performance of the entity.

(5) Paying attention to information technology governance and developing control procedures for the security of electronic information systems.

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(6) Developing internal audit standards to suit the changes and requirements of the modern business environment, especially the applying of digital transformation in business enterprises.

(7) Developing the skills of employees in Egyptian business enterprises, including internal auditors, and developing their experience in dealing with modern technology by paying attention to training programs.

4. Research Methodology and Field Study:

The research relied on using the positive approach through using the deductive method to analyze previous studies related to the research subject and derivation of research hypotheses, and using the inductive method to test the validity of research hypotheses in practice in the Egyptian business environment, through a field study conducted to provide a practical evidence from the Egyptian business environment on the agreement of internal auditors and users of internal audit reports (represented in academics) on the roles that internal audit activity should play to support applying digital transformation mechanisms in Egyptian business enterprises, and the challenges that may face the internal auditors during performing these roles, in addition to discussing some suggested solutions to overcome these challenges .

4.1 Sample Description and Data Collection:

The sample of the study included two categories: academics represented in the professors of auditing in the faculties of commerce in Egyptian universities, and internal auditors of some of the companies listed on the Egyptian stock exchange which operating in different economic sectors. The data was collected through a questionnaire designed and distributed to 120 individuals with 60 questionnaires for each category. The number of valid responses was 98 (81.7 %). The following tables shows the number of valid responses that have been used in statistical analysis for each category, and the qualifications and practical experience of the sample:

Table (1): The Number of Valid Responses for Each Category

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	academics	50	37.0	51.0	51.0
	internal auditors	48	35.6	49.0	100.0

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	Total	98	72.6	100.0	
Missing	System	37	27.4		
Total		135	100.0		

Table (2): The Qualifications of the Sample:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	bachlor	5	3.7	5.1	5.1
	diploma	27	20.0	27.6	32.7
	master	33	24.4	33.7	66.3
	phd	33	24.4	33.7	100.0
	Total	98	72.6	100.0	
Missing	System	37	27.4		
Total		135	100.0		

Table (3): The Practical Experience of the Sample:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 5 years	14	10.4	14.3	14.3
	5-10 years	20	14.8	20.4	34.7
	10 - 20 years	54	40.0	55.1	89.8
	more than 20 years	10	7.4	10.2	100.0
	Total	98	72.6	100.0	
Missing	System	37	27.4		
Total		135	100.0		

Also, the responses were subjected to reliability analysis through calculating The Cronbach's Alpha coefficient to test the credibility and internal consistency of the study questions and variables. This test reflects the reliability of the sample responses to the questionnaire, the validity of the data for statistical analysis, and the extent to which the results obtained from the sample can be generalized to the study community (Al-Baladawi, 2007).

As shown in the table no. (4), the Alpha Cronbach's coefficient was 0.9٢٨, and the value of the coefficient is higher than the statistically accepted 60 %, which reflect a high degree of

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consistency and credibility in the data and indicating that the data collected can be relied upon to complete the post-statistical examinations and hypotheses tests.

Table (4): Result of Reliability Analysis

Cronbach's Alpha	N of Items
.928	50

4.2 Research Hypotheses: The study tested three hypotheses, as follows:

First Hypothesis: There is agreement between the study samples groups about the importance of the roles the internal audit activity should play to support applying digital transformation mechanisms in Egyptian business enterprises.

Second Hypothesis: There is agreement between the study sample groups about the challenges that face the internal auditors during performing their roles to support applying digital transformation mechanisms in Egyptian business enterprises.

Third Hypothesis: There is agreement between the study sample groups about the suggested solutions to overcome the challenges of applying digital transformation mechanisms in Egyptian business enterprises.

4.3 Results of Research Hypotheses Test:

The research hypotheses were tested through data analysis using the Statistical Package for Social Science (SPSS) to perform the necessary statistical analyses and tests at a level of confidence equal 95%. The researchers used statistical tests that are appropriate to the nature of the data collected, and the following is the results of the research hypotheses tests:

4.3.1 Results of The First Hypothesis Test:

The first hypothesis examined the agreement between the study sample groups about the importance of the roles that internal audit activity should play to support applying digital transformation mechanisms in Egyptian business enterprises, this hypothesis has been formulated for statistical testing in the form of null and alternative hypothesis as follows:

Null Hypothesis (H0): There is no agreement between the study sample groups about the importance of the internal audit roles to support the applying of digital transformation mechanisms in Egyptian business enterprises.

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Alternative Hypothesis (H1): There is agreement between the study sample groups about the importance of the internal audit roles to support the applying of digital transformation mechanisms in Egyptian business enterprises.

This hypothesis was tested by analyzing the answers of the sample's two groups on the first and the second question in the questionnaire. The first question measured the importance of the internal audit roles to support the applying of digital transformation mechanisms in Egyptian business enterprises. represented by variables from X_{1-1} to $X_{1-26.}$ The Five Leckert scale was used in the first question, and the following weights have been allocated to the response of the sample members: (5) very important, (4) important, (3) neutral, (2) not important, (1) not important at all.

While the second question aimed to determine if there are other roles which internal auditors should perform to support the applying of digital transformation mechanisms in Egyptian business enterprises, beside the roles mentioned in the first question, represented by variable X_2.

The descriptive statistics of the responses to the first and the second questions were calculated and analyzed using the One Sample T-test, and the results in the table no.(5) revealed that all variables have a mean greater than the default mean of the Leckert scale which is equal to (3), which reflects the agreement of the sample groups about the importance of the internal audit roles to support applying the digital transformation mechanisms in Egyptian business enterprise, which is likely to accept the alternative hypothesis.

To test the validity of the first hypothesis, the Independent-Samples T-test was used to compare the means of two independent samples , to determine the significance of the differences between the means of the answers of the first group (Academics) and the means of the answers of the second group (Internal Auditors) for the variables of the first and second questions at a confidence level of 95%.

The results in the table no.(5) showed that there were no statistically significant differences between the responses of the sample two groups , where the calculated P-value were greater than 0.05 for all variables except X_{1-1} , X_{1-4} , X_{1-5} , X_{1-10} , Which indicates the agreement between the study sample groups about the importance of the internal audit roles in supporting the applying of digital transformation mechanisms in Egyptian business enterprise, and then makes it likely to reject the null hypothesis and accept the alternative hypothesis .

Table (5): The Results of One Sample T-test and Independent-Samples T-test for the First Hypothesis.

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VAR.	Variable Description	Mean	One Sample T-test		Independent-Samples T-test	
			t	Sig.	t	Sig.
X_{1-1}	Helping management in planning to implement digital transformation.	4.479	23.891	0.000	3.103	0.003
X_{1-2}	Assisting management in developing a digital transformation strategy.	4.653	31.485	0.000	1.306	0.195
X_{1-3}	Assisting decision-makers in directing investments towards technologies, processes, and selecting human resources appropriate to the conditions and capabilities of the enterprise.	4.174	21.602	0.000	1.649	0.103
X_{1-4}	Providing necessary knowledge and recommendations to the board of directors and the audit committee regarding the most recent developments and pioneering experiences in digital transformation plans at the industry level, both internationally and locally.	3.888	9.944	0.000	-2.707	0.008
X_{1-5}	Providing support for other activities in the entity through the experiences that internal audit team has in various fields.	3.480	4.158	0.000	-2.160	0.033
X_{1-6}	Evaluating the adequacy and effectiveness of control procedures related to protecting the information security and confidentiality and preventing penetration and unauthorized access.	4.163	19.066	0.000	0.956	0.342
X_{1-7}	Evaluating the adequacy and effectiveness of the plans and procedures related to ensuring the	3.939	11.474	0.000	-1.764	0.081

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	continuity of the proper functioning of electronic information systems and facing the risks which may lead it to stop working.					
X_{1-8}	Assuring that information is correct and not subject to modification or destruction during the various stages of its processing or internal exchange or during its exchange with other parties outside the entity.	4.194	18.109	0.000	-0.833	0.407
X_{1-9}	Evaluating the internal control procedures of protecting computers and the physical components of information systems and keep backup copies of data and information for use when needed.	4.235	19.631	0.000	-0.237	0.813
X_{1-10}	Evaluating the senior management's commitment to support the implementation of information systems security measures and spread the culture of maintaining data confidentiality among the employees.	4.500	27.395	0.000	2.692	0.008
X_{1-11}	Providing recommendations to management regarding the ways to provide adequate protection for information, such as data encryption, ensuring the identity of users by assigning a password to each user, and using anti-virus programs.	3.959	10.883	0.000	-0.683	0.496
X_{1-12}	Evaluating the availability of sufficient and appropriate human resources to implement the digital transformation plan.	4.367	21.984	0.000	0.208	0.836
X_{1-13}	Evaluating the adequacy of the resources available for training	4.296	16.531	0.000	1.096	0.276

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	employees about implementing digital transformation.					
$X_{1\text{-}14}$	Providing support to management and other activities in the firm depending on the internal audit team's multiple experiences in different fields, which contributes to success the implementing of digital transformation.	4.194	14.629	0.000	-0.923	0.358
$X_{1\text{-}15}$	Evaluating the changes in the entity's control environment as a result of applying the digital transformation mechanisms.	4.398	24.293	0.000	0.389	0.698
$X_{1\text{-}16}$	Evaluating efficiency and effectiveness of internal control procedures in light of applying the digital transformation.	4.480	23.891	0.000	-1.667	0.099
$X_{1\text{-}17}$	Evaluating the need to make any adjustments in the internal control procedures or to apply additional control procedures related to applying digital transformation.	4.449	24.879	0.000	-1.212	0.229
$X_{1\text{-}18}$	Evaluating the efficiency of designing the new internal control procedures and the effectiveness of their application.	4.255	18.744	0.000	-0.839	0.404
$X_{1\text{-}19}$	Expanding the scope of the risk assessment process carried out by the internal audit activity to include the risks arising as a result of applying the digital transformation mechanisms.	4.194	14.403	0.000	-0.415	0.679
$X_{1\text{-}20}$	Evaluating the ability of management to adequately and effectively identify and manage the risks associated with digital transformation.	4.316	19.528	0.000	0.357	0.722
$X_{1\text{-}21}$	Providing necessary recommendations to assist management in managing digital transformation risks and mitigating their	4.296	20.385	0.000	0.385	0.701

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	effects.					
X_{1-22}	Evaluating the risks associated with modifying the work system and creating /canceling some operations and activities because of applying digital transformation	4.225	18.631	0.000	-0.069	0.945
X_{1-23}	Increasing interest in assessing fraud risk for the main operations and activities, especially the operations that underwent modifications as a result of applying digital transformation.	4.429	25.430	0.000	0.207	0.836
X_{1-24}	Evaluating risks related to the entity's relationship with external parties, such as customers and suppliers, as a result of applying digital transformation.	4.347	23.141	0.000	1.285	0.202
X_{1-25}	Assessing the impact of applying digital transformation mechanisms on the entity's performance and its financial reports, and provide recommendations for appropriate corrective actions.	4.408	24.395	0.000	-0.144	0.886
X_{1-26}	Conducting a post review and preparing a report on the most important observations and experiences about implementing the digital transformation, which can be relied upon in developing plans in the future.	4.194	18.109	0.000	1.339	0.184
X_2	Other roles of the internal audit activity about implementing digital transformation.	0.214	-66.864	0.000	0.139	0.890

Based on the previous results, the null hypothesis was rejected, and the alternative hypothesis was accepted, which states that there is agreement between the two study groups about the importance of the internal audit roles to support the applying of digital transformation mechanisms in Egyptian business enterprises.

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4.3.2 Results of the second Hypothesis Test:

The second hypothesis examined the agreement between the study sample groups about the challenges that face the internal audit activity during performing its roles to support applying digital transformation mechanisms in Egyptian business enterprises, this hypothesis has been formulated for statistical testing in the form of null and alternative hypothesis as follows:

Null Hypothesis (H0): There is no agreement between the study sample groups about the challenges that face the internal auditors during performing their roles to support applying digital transformation mechanisms in Egyptian business enterprises

Alternative Hypothesis (H1): There is agreement between the study sample groups about the challenges that face the internal auditors during performing their roles to support applying digital transformation mechanisms in Egyptian business enterprises

This hypothesis was tested by analyzing the answers of the sample's two groups on the third and the fourth question in the questionnaire. The third question measured the agreement between the study sample groups about the challenges that face the internal audit activity during performing its roles to support applying digital transformation mechanisms in Egyptian business enterprises, represented by variables from $X_{3\text{-}1}$ to $X_{3\text{-}14}$. The Five Leckert scale was used in the third question, and the following weights have been allocated to the response of the sample members: (5) strongly agree, (4) agree, (3) neutral, (2) not agree, (1) not agree at all.

While the fourth question aimed to determine if there are any other challenges that may face the internal auditors during performing their roles to support applying digital transformation mechanisms in Egyptian business enterprises, beside the challenges mentioned in the third question, represented by variable X_4.

The descriptive statistics of the responses to the third and the fourth questions were calculated and analyzed using the One Sample T-test, and the results in the table no.(6) revealed that all variables have a mean greater than the default mean of the Leckert scale which is equal to (3), which reflects the agreement of the sample groups about the challenges that face the internal auditors during performing their roles to support applying the digital transformation mechanisms in Egyptian business enterprises, which is likely to accept the alternative hypothesis.

To test the validity of the second hypothesis, the Independent-Samples T-test was used to compare the means of two independent samples, to determine the significance of the differences between the means of the answers of the first group (academics) and the means

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of the answers of the second group (Internal Auditors) for the variables of the third and the fourth questions at a confidence level of 95%.

The results in the table no.(6) showed that there were no statistically significant differences between the responses of the sample two groups, where the calculated P-value were greater than 0.05 for all variables, Which indicates the agreement between the study sample groups about the challenges that face the internal auditors during performing their roles to support applying digital transformation mechanisms in Egyptian business enterprises, and then makes it likely to reject the null hypothesis and accept the alternative hypothesis .

Table (6): The Results of One Sample T-test and Independent-Samples T-test for the second Hypothesis.

VAR.	Variable Description	Mean	One Sample T-test		Independent-Samples T-test	
			t	Sig.	t	Sig.
X_{3-1}	Lack of knowledge and a clear strategy for digital transformation for the management of many enterprises.	4.010	15.384	0.000	-0.158	0.875
X_{3-2}	Absence of reference standards and frameworks for digital transformation.	4.184	18.553	0.000	0.260	0.795
X_{3-3}	Difficulty of applying modern technology and integrating it into various operational activities of the entity.	4.286	18.483	0.000	-1.563	0.121
X_{3-4}	Digital transformation requires the necessity of making fundamental changes in operating methods and restructuring business enterprises.	4.286	22.160	0.000	-0.101	0.920
X_{3-5}	Employees' resistance to change, and the absence of an appropriate organizational culture that supports new developments.	4.092	17.230	0.000	-0.190	0.850
X_{3-6}	Difficulty of convincing customers of the benefits and advantages of	4.184	15.327	0.000	-0.575	0.567

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	digital transformation due to the security and confidentiality of data.					
X_{3-7}	Lack of sufficient capabilities and skills of employees to deal with modern technology.	4.306	20.440	0.000	-0.419	0.676
X_{3-8}	High costs of implementing digital transformation, and lack of sufficient financial resources and appropriate infrastructure for many companies to implement digital transformation	4.184	24.226	0.000	0.339	0.735
X_{3-9}	Developing audit standards should be in line with developments in information technology, and in line with the application of digital transformation mechanisms.	4.051	18.481	0.000	-0.197	0.844
X_{3-10}	Difficulty of verifying the validity and integrity of data in light of disappearance of the paper review process (the disappearance of records and the difficulty of collecting electronic evidences).	4.051	34.652	0.000	1.663	0.100
X_{3-11}	Multiple and high risks related to electronic information systems a, especially the risks of security and confidentiality of information and the high risk of loss or distortion.	4.092	17.700	0.000	-0.856	0.394
X_{3-12}	Availability of a large amount and variety of data and information (overload information) that may negatively affect the judgment and estimates of the auditors.	4.214	22.177	0.000	-1.007	0.317
X_{3-13}	Lack of funding and material resources and trained human resources.	4.306	27.911	0.000	-1.897	0.061
X_{3-14}	Poor infrastructure and the lack of adequate technological equipment to	4.245	20.195	0.000	0.579	0.564

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	collect and analyze data.					
X_4	Other challenges facing the internal audit activity about implementing digital transformation.	0.214	-66.864	0.000	0.628	0.532

Based on the previous results, the null hypothesis was rejected, and the alternative hypothesis was accepted, which states that there is agreement between the two study groups about the challenges that face the internal auditors during performing their roles to support applying digital transformation mechanisms in Egyptian business enterprises.

4.3.3 Results of the third Hypothesis Test:

The third hypothesis examined the agreement between the study sample groups about the suggested solutions to overcome the challenges that face the internal auditors during performing their roles to support applying digital transformation mechanisms in Egyptian business enterprises, this hypothesis has been formulated for statistical testing in the form of null and alternative hypothesis as follows:

Null Hypothesis (H0): There is no agreement between the study sample groups about the suggested solutions to overcome the challenges that face the internal audit activity during performing its roles to support applying digital transformation mechanisms in Egyptian business enterprises

Alternative Hypothesis (H1): There is agreement between the study sample groups about the suggested solutions to overcome the challenges that face the internal audit activity during performing its roles to support applying digital transformation mechanisms in Egyptian business enterprises

This hypothesis was tested by analyzing the answers of the sample's two groups on the fifth and the last question in the questionnaire. The fifth question measured the agreement between the study sample groups about the suggested solutions to overcome the challenges that face the internal audit activity during performing its roles to support applying digital transformation mechanisms in Egyptian business enterprises, represented by variables from $X_{5\text{-}1}$ to $X_{5\text{-}7}$ .The Five Leckert scale was used in the fifth question, and the following weights have been allocated to the response of the sample members: (5) strongly agree, (4) agree, (3) neutral, (2) not agree, (1) not agree at all.

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While the last question aimed to determine if there are any other suggested solutions to overcome the challenges that may face the internal audit activity during performing its roles to support applying digital transformation mechanisms in Egyptian business enterprises, beside the suggested solutions mentioned in the fifth question, represented by variable X_6.

The descriptive statistics of the responses to the fifth and the last questions were calculated and analyzed using the One Sample T-test, and the results in the table no.(7) revealed that all variables have a mean greater than the default mean of the Leckert scale which is equal to (3), which reflects the agreement of the sample groups about the suggested solutions to overcome the challenges that face the internal audit activity during performing its roles to support applying digital transformation mechanisms in Egyptian business enterprises, which is likely to accept the alternative hypothesis.

To test the validity of the third hypothesis, the Independent-Samples T-test was used to compare the means of two independent samples, to determine the significance of the differences between the means of the answers of the first group (Academics) and the means of the answers of the second group (Internal Auditors) for the variables of the third and the fourth questions at a confidence level of 95%.

The results in the table no.(7) showed that there were no statistically significant differences between the responses of the sample two groups, where the calculated P-value were greater than 0.05 for all variables ,Which indicates the agreement between the study sample groups about the suggested solutions to overcome the challenges that face the internal audit activity during performing its roles to support applying digital transformation mechanisms in Egyptian business enterprises, and then makes it likely to reject the null hypothesis and accept the alternative hypothesis .

Table (7): The Results of One Sample T-test and Independent-Samples T-test for the third Hypothesis

VAR.	Variable Description	Mean	One Sample T-test		Independent-Samples T-test	
			t	Sig.	t	Sig.
X_{5-1}	Expanding the scope of assurance and advisory services provided by internal auditors regarding the applying of digital transformation, and continuous communication with management and stakeholders to determine their needs	4.051	31.261	0.000	1.503	0.136

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	for these services.					
X_{5-2}	Developing the qualifications and practical experience of internal auditors in the field of information technology.	4.143	24.916	0.000	0.380	0.705
X_{5-3}	Increasing reliance on using modern technology in performing internal audit tasks, and provide training for internal auditors about using it.	4.143	27.857	0.000	0.923	0.358
X_{5-4}	Providing support of senior management to implementing digital transformation in Egyptian business enterprises, by providing financial and human resources and appropriate infrastructure to implement digital transformation.	4.275	28.118	0.000	-1.249	0.215
X_{5-5}	Paying attention to information technology governance and developing control procedures for the security of electronic information systems.	4.214	23.919	0.000	-0.682	0.497
X_{5-6}	Developing internal audit standards to suit the changes and requirements of the modern business environment, especially the applying of digital transformation in business enterprises.	4.224	28.903	0.000	0.372	0.711
X_{5-7}	Developing the skills of employees in Egyptian business enterprises, including internal auditors, and developing their experience in dealing with modern technology by paying attention to training programs	4.122	28.709	0.000	1.512	0.134
X_6	Other suggestions	0.214	-66.864	0.000	0.628	0.532

Based on the previous results, the null hypothesis was rejected, and the alternative hypothesis was accepted, which states that there is agreement between the two study groups about the suggested solutions to overcome the challenges that face the internal

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auditors during performing their roles to support applying digital transformation mechanisms in Egyptian business enterprises.

5. Research Limitations:

The research was limited to study the internal audit activity's roles and challenges related to applying digital transformation mechanisms in Egyptian business enterprises, as an internal (in-house) activity, and didn't address the other sources for internal audit services such as outsourcing or co-sourcing. Also, the field study was limited to two groups: Academics as interested parties (users) of Internal Audit reports, and Internal Auditors as responsible for providing assurance and consulting services and preparing internal audit reports.

6. Conclusion:

Digital transformation is considered one of the most important topics that have captured the attention of researchers in recent times. Digital transformation is based on using modern technology to achieve major breakthroughs in the way business is done by improving relationships with customers, achieving operational efficiency and creating new business models such as digital platforms.

Briefly, digital transformation is a strategy to create a competitive advantage using modern technology in all activities of the entity, starting from changing the design and specifications of products, methods of performing operations and business models, and even marketing methods and after-sales services. So, it becomes clear the importance of digital transformation and the benefits it achieves that contribute to improving the standard of living of community members and improving the quality of products and services provided to them.

The effective applying of digital transformation requires adoption of a set of mechanisms that include technologies, data, human resources, and processes. Business enterprises need to make more investments to support and develop these mechanisms and to continuously improve them. On the other hand, the internal audit activity has an important assurance and consulting role in implementing each of these mechanisms. So, the internal audit should communicate continuously with the audit committee, board of directors and key stakeholders to determine their needs for assurance and consulting services related to applying the digital transformation mechanisms.

So, this research aimed to clarify the assurance and consulting roles of internal audit activity to support management in applying digital transformation mechanisms in Egyptian business enterprises, and to assist management to face the associated risks and reducing its impact. The research also aimed to discuss the most important difficulties and challenges

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that face internal auditors under applying digital transformation mechanisms. Finally, the research aimed to present some suggested solutions that can be employed and used to overcome these challenges.

To achieve these goals, the research relied on using positive approach using the deductive approach to analyze the previous studies the related to the research topic and derive the research hypothesis, In addition to use the inductive approach to test the validity of the research hypothesis in the real practice in the Egyptian business environment. This was done by conducted a field study on a sample of 120 individuals divided in two groups: academics represented in the professors of auditing in Egyptian universities, and internal auditors of some stock Companies listed on the Egyptian Stock Exchange. Statistical tests were used Commensurate with the nature of the data Collected.

And based on the results of the field study, the first hypothesis was accepted, which states that there is agreement between the study sample groups about the importance of the internal audit roles to support applying the digital transformation mechanisms in Egyptian business enterprises. Also, the second hypothesis was accepted , Which states that there is agreement between the study sample groups about the challenges that may face the internal auditors during performing their roles to support applying digital transformation mechanisms in Egyptian business enterprises , as well as the third hypothesis which states that there is agreement between the study sample groups about the suggested solutions to overcome the challenges of applying digital transformation mechanisms in Egyptian business enterprises.

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