

Challenges Facing External Auditor While Auditing Banking Accounting Systems in the Light of the Use of Digital Technologies of Fourth Industrial Revolution in Jordan

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Abstract

The study aimed to clarify the challenges facing the external auditor in light of the fourth industrial revolution using digital technologies in the provision of banking services, as it was divided into two parts. Digital Accounting and it includes challenges related to the nature of accounting systems (disclosure and treatment), internal control systems, evidence (electronic), and audit risks. The second section is challenges related to the element of digital technologies as a tool for implementing the audit process, which includes the use of digital technologies in the implementation of audits and the information technology infrastructure in the audit office and the clients of the audit office (the level of information technology, fees, lack of clarity of the purpose of the audit services, the multiplicity of services (financial audit). Evaluation of electronic systems and challenges related to scientific and practical qualification in digital technologies. The researcher used the inductive-analytical approach through studies referring to previous and theoretical studies in an attempt to formulate these challenges and then the analysis approach by formulating a questionnaire to extrapolate the opinions of the external auditor of the 13 Jordanian banks, where all banks were distributed at 3 for each bank and 36 questionnaires were retrieved. The study has concluded that external auditors working in Jordanian banks face highly a set of challenges related to digital technologies as an element of audit work environment and legislations and laws professional and legislative structure of digital accounting environment) as well as accounting systems (i.e. disclosure and processing), internal control systems, electronic evidence and audit risks in addition to the challenges relating to element of digital technologies as an implementation tool of audit process and the use of digital technologies in implementing audit processes as

well as infrastructure of information technology of audit office and clients (i.e. a level of information technology, fees, a lack of clarity of audit services' goals) and a multiplicity of services (auditing, electronic system evaluation); furthermore, external auditors face the challenges which relate to scientific and practical qualifications of digital technologies.

Keywords

External Audit, Digital Audit Technologies, Banking Accounting Technologies, Fourth Industrial Revolution

1. Introduction and Problem of Study

Fourth industrial revolution has started in Germany in the current century and still continues until the present time. It has offered Germany the chance to maintain a solid position in technological world. Now, Germany possesses the most electronic techniques and innovations. Fourth industrial revolution term describes the developments of technical fields and the transformation of business organization into digital organizations; it also includes the use of artificial intelligence systems and internet of things.

Through digital technologies, fourth industrial revolution has contributed to an increase of data size and computer power as well as an unprecedented processing capacity and a large amount of data storage capacity; these developments have made the processes of financial data's processing and measurement quick and accurate; in addition; they have provided various technical method and have decreased the costs of these processes. Furthermore, communication networks have been used in order to exchange financial data through electronic accounting discourse system which has allowed to view the data anywhere, anytime with a high level of reliability through the sites of company or stock exchange.

Digital technologies are a new environment of accounting work; technology systems become more accurate, complex and advanced; these systems include various technologies such as artificial intelligence, robotics, cloud computing as well as big data, social networks and block chain.

These technologies have imposed on audit profession a necessity of development in a manner that is in line with the requirements of business environment and digital technologies; in addition, the characteristics affecting accounting and control systems shall be understood; furthermore, these technologies shall be necessarily used in implementing audit processes, thereby maintaining audit quality as well as achieving competitive advantage and trust of financial statement users.

Digital technologies which have emerged during fourth industrial revolution have resulted in new technical risks; so that the methods and procedures used for dealing with a new nature of accounting processing must be developed; in addition, techniques of assessing internal control systems and audit risk shall be

developed. Due to digital technologies, nature of audit evidence becomes different since the evidence is totally electronic; the auditor collects the electronic evidence; then, he/she assesses the extent of accuracy and reliability of the evidence. It is worthy to mention that the digital technologies have obligated professional authorities and university education to pay attention to qualify the auditor in order to be able to deal with the variables and mechanism of implementing audit process (Al-Khasawneh, 2019; Oqab, 2017). Consequently, reputation of audit profession is maintained; in addition, audit profession continues playing its role in business environment.

Accordingly, the researcher believes that the digital technologies of the Fourth Industrial Revolution created a set of challenges depending on the nature of the legislation and laws regulating digital means and the use of digital technologies, electronic evidence, control systems and risks in them. It deals with a study where technical and digital means are considered modern in use and have been applied to the most important sectors and the most keeping pace with developments in financial technology and digital technologies in Jordan. Achieving competitive advantage through answering the following main question of the study.

2. Are There Challenges Facing the External Auditor While Auditing the Banking Accounting Systems in the Light of the Use of Digital Technologies of Fourth Industrial Revolution?

2.1. Purposes of Study

Elements used by the auditor in order to audit the outputs of banking accounting systems have fundamentally changes in the light of digital technologies of fourth industrial revolution; and they imposed on the auditor a new reality which needs to develop the skills, knowledge and means used in audit process; in addition, digital means must be legally regulated and responsibilities of auditor must be identified. Hence, this study aims at contributing to the development of audit profession in Jordan through identifying the challenges and difficulties facing the auditor when auditing banking accounting systems in the light of using digital technologies of fourth industrial revolution. Furthermore, the study is to identify the impact of digital technologies on the development of audit profession as well as audit and accounting systems in Jordan.

2.2. Importance of Study

Keeping pace with technical developments and global digital technologies becomes important in order to increase the efficiency and effectiveness of external audit in one of the most important sectors of Jordanian economy; the study is the first one which has touched upon this topic, as far as the researcher knows. Accordingly, this study is important because it may be used by legislative authorities in order to fill the gaps of laws and legislations related to the digital

technologies; it also can be used by professional authorities organizing accounting and audit profession in order to control accounting and internal control systems in the light of the use of the digital technologies of the fourth industrial revolution; in addition, this study may contribute to the development of scientific and practical knowledge of auditor in a manner that improves audit quality and increases the degree of trust of auditor's report as well as moves towards the use of the digital technologies in implementing audit processes.

2.3. Hypotheses of Study

For achieving the purposes of study, following hypotheses have been formulated:

First hypothesis: Jordanian external auditor faces challenges related to the digital technologies as an element of audit work environment when auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution; it includes the following:

- Jordanian external auditor faces the challenges related to the legislations and laws (professional and legislative structure of digital accounting environment) when auditing banking accounting systems in the light of the digital technologies of the fourth industrial revolution;
- Jordanian external auditor faces the challenges related to the nature of banking accounting systems (the digital processing and electronic disclosure) when auditing banking accounting systems in the light of the digital technologies of the fourth industrial revolution;
- Jordanian external auditor faces the challenges related to internal control systems when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution;
- Jordanian external auditor faces the challenges related to (electronic) evidence when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution;
- Jordanian external auditor faces the challenges related to audit risks in the light of the use of the digital technologies of the fourth industrial revolution.

Second hypothesis: Jordanian external auditor faces the challenges related to an element of digital technologies as a tool of implementing the process of auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial; it includes the following:

- Jordanian external auditor faces the challenges related to the use of the digital technologies in order to implement the processes of auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution;
- Jordanian external auditor faces the challenges related to information technology infrastructure in audit office when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution;
- Jordanian external auditor faces the challenges related to audit office's clients

(level of information technology, fees, a lack of clarity of audit services' goals) and a multiplicity of services (auditing and electronic system evaluation in accordance with the Central Bank instructions) when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution;

- Jordanian external auditor faces the challenges related to academic and practical qualifications of the auditor in the digital technologies when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution.

2.4. Theoretical Framework and Previous Studies

Al-Khasawneh study (2019) aimed at identifying the impact of infrastructure development (i.e. human and material resources, software, network and communications) on the effectiveness of accounting information systems; in addition, the study.

Al-Majed's study (2019) aimed at examining whether the auditor in Algeria was negatively affected and whether there have been difficulties of collecting, assessing and preserving the electronic evidence. The study concluded that there have been several limitations and difficulties the auditor may face; these difficulties and limitations are not absolute but relative; this means that they are different from one auditor to another according to the degree of his/her competence of the literatures of information technology. Competence condition, however, may be ineffective if legislative texts, which provide the authenticity of the electronic evidence, are not available. In addition, the study found that the technical complications of electronic evidence are related to the effectiveness of internal control system.

In *Al-Shahed's study (2017)*, a comparison between normal and electronic evidence was conducted; the researcher concluded that electronic information technology environment has been paperless since the information is exchanged without restrictions and obstacles of place and is transferred from one application to another and from one institute to another, or from one country to another through using available electronic networks. In this context, the auditor may be obliged to collect electronic data as evidence in order to implement audit process. In addition, *(Oqab, 2017)* was to determine the role of information and communication technology in achieving control quality in audit offices in Jordan. Furthermore, the study concluded that the developments of information technology infrastructure (human and material resources, software, network and communications) and information security systems affected very highly the effectiveness of accounting information systems. Finally, the study concluded that quality control can be achieved by using information and communication systems

Mazza, Azzali's study (2016) indicated that availability of control quality has decreased audit risks and audit cost, time and effort while using information technology systems. In addition, *Shipeng et al.'s study (2016)* indicated that the increase of information technology investment has contributed to the decrease

of audit risks. Here, the study indicated that there has been a strong correlation with the size of detection risks when auditor issues his/her opinion. In addition, environment of digital environment has affected all types of audit risks such as control risks because of the developments of the procedures and means of control and detection risks in which the auditor shall have scientific and practical qualification of technical system field as well as inherited risks related to the possibility of using the digital control systems.

Furthermore, Haislip, Peteser & Richardson's study (2015) indicated that auditor should have experience in order to decrease the weaknesses of internal control aspects. In addition, contracting with the auditor who has no experience may cause serious damage to the company.

Nofal's study (2015) conducted in Algeria indicated that general control procedures have shortcomings whereas the procedures of control over the applications are good. In addition, the study showed that academic qualification of the employees regarding the procedures of internal control and its importance is insufficient. Furthermore, the researcher believed that internal control has been insufficiently touched upon in the light of the digital technologies because the majority of control systems are software and technical procedures of encryption and protection including computer concepts which require specialized academic qualification and knowledge.

Lahya & Salem's study (2015) aimed at identifying to which extent the external auditor is competent in collecting and assessing the evidence in the light of the environment of computerized information technology systems—an applied study on the auditors practising audit profession in Gaza Strip. For achieving the purpose of the study, the researcher used a descriptive analytical approach. The study reached a set of results. Most importantly, the external auditor possesses high efficient skills which help him/her collect and assess the evidence in the light of the computerized accounting information system environment. In addition, the study indicated that there is a statistically significant relationship between the processes of examining the accounting system and internal control systems performed by the external auditor and the assessment of the risks arising from working in the computerized system environment and the familiarity with international audit standards as well as the competence of external auditor of collecting and assessing the evidence in the light of the computerized accounting information system.

Bogdan & Andreea's study (2015) examined the relationship between information technology and professional standards and legislations in Romanian; it examined descriptively the standards and legislations and identified to which extent they are compatible with technological developments. The study concluded that gaps and inadequacy of legislations and standards applied with the development of information technology field have negatively affected audit profession. In addition, the study found that electronic accounting has been considered a second variable of audit works and has resulted in risks which could be reduced by internal control system.

Francis's study (2013) identified the impacts of the use of information technology on works and stages of accounting cycle. In addition, it found that the software has failed to perform some tasks. In Valentinetti, Rea's study (2013), the researcher examined 353 Italian companies and disclosed them; the study concluded that the companies audited by Big 4 have disclosed more detailed financial data than other companies; and the level of disclosure of these companies is greater than their counterparts on their electronic sites.

Ernest & Ken's study (2012) confirmed that the auditor shall be necessarily aware of XBRL concepts and tools; and unqualified auditor, therefore, can not audit the companies which depend on the language and disclosure.

Furthermore, this study has showed a set of old relevant following studies as follows.

This study is complementary and comprehensive to the previous studies, and what distinguishes it is that it—the first to the researcher's knowledge—addressed the challenges facing the auditor in light of the use of digital technologies and financial technology. One of the most important financial institutions is the banking sector.

After reviewing the previous studies, the researcher has concluded that the challenges facing the external auditor can be divided as follows:

- The challenges related to the digital technologies as an element of audit work environment in the light of the use of the digital technologies: they include legislative structure, a change of the nature of accounting processing as well as an emergence of electronic disclosure, and a difference of the nature of the evidence in addition to a reliance on electronic evidence as well as a diversity of internal control means and procedures in which a huge part becomes electronic and an increase of audit risks;
- The challenges related to the digital technologies as a tool of implementing audit process in the light of the use of the digital technologies;
- The challenges related to the academic and practical qualification of auditor as well as information technology infrastructure of audit office in addition to audit office's clients in the light of the use of the digital technologies.

3. Methodology of Study

For achieving the purposes of study, inductive approach has been used in order to collect and analyse the relevant data, thereby building the theoretical framework related to the challenges facing external audit while auditing banking accounting systems in the light of the use of the digital technologies. Audit literatures touching upon the topic of the obstacles and problems of accounting profession in different countries including Jordan. Furthermore, deductive approach has been used in order to design the questionnaire related to these challenges.

In order to test the hypotheses of study, five-point Likert scale, ranging from strongly agree to disagree, has been employed in order to find out the responses of study sample's respondents; each of five responses has a numerical value as follows: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree and 1 = strongly

disagree. For explaining the results related to the challenges facing the external auditor while auditing banking accounting system in the light of the use of the digital technologies of the fourth industrial revolution, the ranges have been used as follows; 1 - 1.79 means that it is not considered a challenge; 1.8 - 2.59 means that the challenge is low; 2.60 - 3.39 means that the challenge is moderate; 3.40 - 4.19 means that the challenge is high; finally, 4.20 - 5 means that the challenge is very high. Statistical package for the social sciences (SPSS) has been used for analysing the data.

4. Population and Sample of Study

Complete census has been used in order to achieve the purposes of study, population consists of external auditors of accounts in Jordanian banks. The study sample is all 13 Jordanian banks. No bank, whether branches of foreign banks, was excluded. 3 questionnaires were distributed to audit offices approved in banks and through the audit committee in the bank. Distribution by hand to ensure the retrieval of all distributed questionnaires, and 36 questionnaires were retrieved from the original distributed 39.

5. Demographic Characteristics of Respondents of Questionnaire Questions

Table 1 illustrates the demographic characteristics of respondents of questionnaire

Table 1. Demographic characteristics of respondents of questionnaire questions.

Demographic characteristics		Number	Percentage
Sex	Male	30	83.3
	Female	6	16.7
Age	Less than 30	10	27.8
	From 30 to 45	10	27.8
	From 45 to less than 60	16	44.4
Current job	Team leader	10	27.8
	Lead auditor	10	27.8
	Auditor	16	44.4
Professional Certifications	CPA	16	44.4
	JCPA	7	19.4
	CISA	2	13.9
Training Courses of Field of Digital and Electronic Systems	Training courses of electronic audit programs	No one	-
	Training courses of digital technologies such as big data, internet of things and artificial intelligence	No one	-
	Training courses of electronic payment systems	No one	-
	Training courses of electronic banking transactions	10	27.8
	Other	16	44.4

questions as follows:

Table 1 illustrates the demographic characteristics as follows:

- Age: from **Table 1**, it is noted that the largest percentage of study sample have reached the age from 45 to less than 60; their percentage has reached 44%. Accordingly, respondents of study sample have an experience and knowledge in order to be able to answer questionnaire questions.
- Professional certifications: from **Table 1**, it is noted that respondents of questionnaire questions hold a set of various professional certifications such as CPA, ACPA and JCPA. However, 2 respondents of study sample, which is a small percentage, hold CISA certification (Certified Information System Auditor).
- Training Courses: from **Table 1**, it is noted that 16 respondents of study sample, the largest number, have taken other training courses; their percentage has reached 44.4; then, 10 respondents of study sample have taken training courses of electronic banking transactions, their percentage has reached 27.8. Unfortunately, it is noted that audit offices do not pay attention to train their employees on the digital technologies such as artificial intelligence, big data and internet of things. Consequently, audit office shall necessarily develop their training courses covering the digital subjects.

Reliability of study's tool

In order to ensure reliability of study's tool, internal consistency (Cronbach's alpha) coefficient has been calculated. **Table 2** illustrates these coefficients; these

Table 2. Internal consistency (cronbach's alpha) coefficients.

Field	Internal Consistency
The challenges which face Jordanian external auditor and related to the digital technologies as an element of audit work environment while auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution.	
Legislative and professional structure in the light of the use of banking accounting systems of the digital technologies.	0.94
Electronic evidence in the light of the use of banking accounting systems of the digital technologies.	0.95
Internal control in the light of the use of banking accounting systems of the digital technologies.	0.92
Accounting processing and disclosure in the light of the use of banking accounting systems of the digital technologies.	0.96
Audit risks the use of banking accounting systems of the digital technologies.	0.92
The challenges which face Jordanian external auditor and related to the digital technologies as a tool of implementing audit process while auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution.	
The use of the digital technologies in implementing the processes of auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution.	0.96
The challenges related to information technology infrastructure of audit office.	0.97
The challenges related to clients of audit offices (a level of information technology, fees as well as a lack of clarity of audit services' goals) and a multiplicity of services (auditing and electronic system evaluation in accordance with the Central Bank instructions).	0.94
The challenges related to academic and practical qualification of the digital technologies.	0.95

ratios have been considered appropriate for the purposes of this study.

6. Data Analysis and Hypotheses Testing

First Hypothesis Testing

First hypothesis has touched upon the challenges which Jordanian external auditor face and related to the digital technologies as an elements of audit work environment when auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution; it includes the challenges of legislative and professional environment as well as accounting processing and disclosure and internal control systems, electronic evidence and audit risks. Sub-hypotheses are discussed as follows:

First Sub-Hypothesis Testing

This hypothesis has touched upon legislative and professional structure organizing the implementation of audit process as a challenge for the auditor when auditing the banking accounting system in the light of the use of the digital technologies. To test the validity of this hypothesis, arithmetic means and standard deviations of performing of study's sample regarding this hypothesis have been extracted; **Table 3** outlines them.

Table 3 shows arithmetic means and standard deviations of statements of this hypothesis in addition to the orientation of responses of the statements which

Table 3. Arithmetic means and standard deviations of performing of study's sample regarding this hypothesis.

Statements	Arithmetic mean	Standard deviation	Response orientation
Jordanian external auditor face the challenges which are related to the legislations and laws (professional and legislative structure of the digital accounting environment) when auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution due to:			
1 A lack of a legislative legal text controlling auditor's tasks while auditing the digital technologies.	4.50	0.607	Very high
2 A lack of a legislative legal text controlling auditor's responsibilities while auditing the digital technologies.	4.35	0.489	Very high
3 Limited instructions issued by the Central Bank and a lack of clarity of audit works in the digital technology environment.	4.50	0.607	Very high
4 A decrease of audit fees in the light of the digital developments and an increase of audit cost.	4.35	0.587	Very high
5 A shortcoming of audit standards illustrating audit tasks and responsibilities in the light of the digital banking accounting systems.	4.40	0.598	Very high
6 A lack of professional legal and local text illustrating audit tasks and responsibilities in the light of the digital banking accounting systems.	4.30	0.571	Very high
7 A lack of professional text identifying the nature and types of services in the light of the use of the digital technologies in accounting processing of banking transactions.	4.30	0.571	Very high
8 A lack of professional text obliging audit office to obtain a sufficient qualification of auditing electronic and digital systems such as CISA certification.	4.40	0.598	Very high
9 A lack of legislative professional text obliging the auditor to obtain continuous education programs in order to develop the skills required in the field of accounting technologies and digital control.	4.40	0.598	Very high
The auditor faces the challenges which are related to the legislations and laws professional and legislative structure of the digital accounting environment.	4.45	0.641	Very high

form the hypothesis related to legislative and professional structure; Arithmetic means have ranged between 4.30 - 4.50; the statements related to a lack of legislative texts and limited instructions of the central banks have occupied the first rank and arithmetic mean has reached 4.50. Accordingly, the auditor is aware of the importance of legislative existence identifying auditor tasks and the instructions of the Central Bank organizing audit tasks. Furthermore, statement 4—a decrease of audit fees in the light of the digital developments and an increase of audit cost—has occupied the last rank and arithmetic mean has reached 4.30. Total arithmetic mean of all statements has reached 4.45. as a result, the responses of sample study agree very highly that the auditor faces the challenges related to the legislations and laws (professional and legislative structure of the digital accounting environment) when auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution.

In addition, arithmetic mean of the statements which has formed the hypothesis has been compared with standard mark 3—hypothesis acceptance standard—by using t-test as stated in **Table 4**.

Table 4 indicates that there are statistical differences at ($p = 0.05$) between arithmetic mean and standard mark 3; T-value has been 15.485; statistical significance has been 0.000. Thus, this hypothesis, stipulating that Jordanian external auditor faces the challenges related to the legislations and laws (professional and legislative structure of digital accounting environment) when auditing banking accounting systems in the light of the digital technologies of the fourth industrial revolution, has been accepted.

Second Sub-Hypothesis Testing

This hypothesis has touched upon digital accounting processing and electronic disclosure as a challenge for the auditor when auditing the banking accounting system in the light of the use of the digital technologies. To test the validity of this hypothesis, arithmetic means and standard deviations of performing of study's sample regarding this hypothesis have been extracted; **Table 5** outlines them.

Table 5 shows arithmetic means and standard deviations of statements of this hypothesis in addition to the orientation of responses of the statements which form the hypothesis related to the nature of banking accounting systems (the digital processing and electronic disclosure); Arithmetic means have ranged between 4.35 - 4.80; the statement stipulating that understanding the digital accounting technologies which are highly complicated is difficult, has occupied the first rank and arithmetic mean has reached 4.80. Statement stipulating that a

Table 4. Arithmetic Means, Standard Deviations and T-test of Statements which has formed the hypothesis in comparison with Standard Mark 3.

Legislative and professional challenges when auditing banking and accounting systems in the light of the digital technologies.	Arithmetic Mean	Standard Deviation	T-Value	Freedom Degree	Statistical Significance
	4.45	0.641	15.485	19	00.

Table 5. Arithmetic means and standard deviations of performing of study's sample regarding this hypothesis.

Statements	Arithmetic mean	Standard deviation	Response orientation
Jordanian external auditor faces the challenges which are related to the nature of banking accounting systems (digital processing and electronic disclosure) when auditing the banking accounting system in the light of the use of the digital technologies			
1 Understanding the digital accounting technologies which are highly complicated is difficult.	4.80	0.410	Very high
2 Digital accounting technologies which are highly complicated make the process of assessing the digital accounting processing systems difficult for the auditor.	4.35	0.489	Very high
3 Digital accounting technologies which are highly complicated make the process of data extraction difficult for the auditor.	4.55	0.510	Very high
4 Information security risks of the digital accounting technologies hinder auditor work and increase his/her responsibilities.	4.37	0.489	Very high
5 Data corruption or loss or unauthorized access can possibly occur.	4.45	0.605	Very high
6 A physical path of audit process is not provided in the light of the use of the digital accounting technologies.	4.35	0.489	Very high
7 Auditor responsibilities increase due to the assessment of digital accounting applications and technologies which imposed the necessity of obtaining a special qualification on the auditor.	4.65	0.587	Very high
8 Means and methods of electronic disclosure applied in the banks are diversified.	4.45	0.394	Very high
9 Electronic disclosure processes are continuously updated by various methods.	4.65	0.587	Very high
10 Sufficient instructions organizing the process of disclosure and the relevant content are not provided.	4.41	0.34	Very high
The challenges which are related to the nature of banking accounting systems (digital processing and electronic disclosure).	4.49	0.49	Very high

physical path of audit process is not provided in the light of the use of the digital accounting technologies, has occupied the last rank and arithmetic mean has reached 4.35. Total arithmetic mean of all statements has reached 4.49. As a result, the responses of sample study agree very highly that the auditor faces the challenges related to the nature of banking accounting systems (digital processing and electronic disclosure) when auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution.

In addition, arithmetic mean of the statements which has formed the hypothesis has been compared with standard mark 3—hypothesis acceptance standard—by using t-test as stated in **Table 6**.

Table 6 indicates that there are statistical differences at ($p = 0.05$) between

arithmetic mean and standard mark 3; T-value has been 15.485; statistical significance has been 0.000. Thus, this hypothesis, stipulating that Jordanian external auditor faces the challenges related to the nature of banking accounting systems (the digital processing and electronic disclosure) when auditing banking accounting systems in the light of the digital technologies of the fourth industrial revolution, has been accepted.

Third Sub-Hypothesis Testing

This hypothesis has touched upon the challenges which are related to internal control systems when auditing the banking accounting systems in the light of the use of the digital technologies. To test the validity of this hypothesis, arithmetic means and standard deviations of performing of study's sample regarding this hypothesis have been extracted; **Table 7** outlines them.

Table 7 shows arithmetic means and standard deviations of statements of this hypothesis in addition to the orientation of responses of the statements which form the hypothesis related to the challenge of internal control systems when

Table 6. Arithmetic means, standard deviations and t-test of statements which has formed the hypothesis in comparison with standard mark 3.

The challenges related to the nature of banking accounting systems (digital processing and electronic disclosure).	Arithmetic Mean	Standard Deviation	T-Value	Freedom Degree	Statistical Significance
	4.49	0.49	18.757	19	00.

Table 7. Arithmetic Means and Standard Deviations of Performing of Study's Sample Regarding this Hypothesis.

Statements	Arithmetic mean	Standard deviation	Response orientation
Jordanian external auditor faces the challenges which are related to internal control systems when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution because:			
1 Understanding internal control technologies which are highly complicated is difficult.	4.80	0.410	Very high
2 Internal control technologies which are highly complicated make the processes of assessing the digital accounting processing systems and identifying control risks difficult.	4.45	0.489	Very high
3 Digital technologies have imposed new types of internal control such as data security; they are more complicated and their electronic concepts require an experience of electronic field.	4.55	0.510	Very high
4 Traditional methods of assessing the internal control systems are not compatible with digital technologies, thereby hindering the process of understanding these systems.	4.37	0.489	Very high
5 The instructions related to the procedures and methods of internal control systems in the light of digital technologies are insufficient.	4.45	0.605	Very high
The challenges which are related to internal control systems when auditing the banking accounting systems in the light of the use of the digital technologies.	4.524	0.501	Very high

auditing banking accounting systems in the light of the use of the digital technologies; Arithmetic means have ranged between 4.45 - 4.80; the statement stipulating that understanding internal control technologies which are highly complicated is difficult, has occupied the first rank and arithmetic mean has reached 4.80. Statement stipulating that traditional methods of assessing the internal control systems are not compatible with digital technologies, thereby hindering the process of understanding these systems, has occupied the last rank and arithmetic mean has reached 4.45. Total arithmetic mean of all statements has reached 4.524. As a result, the responses of sample study agree very highly that Jordanian external auditor faces the challenges which are related to internal control systems when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution.

In addition, arithmetic mean of the statements which has formed the hypothesis has been compared with standard mark 3—hypothesis acceptance standard—by using t-test as stated in **Table 8**.

Table 8 indicates that there are statistical differences at ($p = 0.05$) between arithmetic mean and standard mark 3; T-value has been 10.757; statistical significance has been 0.000. Thus, this hypothesis, stipulating that Jordanian external auditor faces the challenges related to internal control systems when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution, has been accepted.

Fourth Sub-Hypothesis Testing

This hypothesis has touched upon the challenges which are related to (electronic) evidence when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution. To test the validity of this hypothesis, arithmetic means and standard deviations of performing of study's sample regarding this hypothesis have been extracted; **Table 9** outlines them.

Table 9 shows arithmetic means and standard deviations of statements of this hypothesis in addition to the orientation of responses of the statements which form the hypothesis related to the challenge of (electronic) evidence when auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution. Arithmetic means have ranged between 4.25 - 4.55; the statement stipulating that professional standards illustrating the types of evidence and the methods used to obtain it in the light of digital accounting technologies are insufficient, has occupied the first rank and arithmetic mean has reached 4.55. Statement stipulating that it is difficult to show the

Table 8. Arithmetic means, standard deviations and t-test of statements which has formed the hypothesis in comparison with standard mark 3.

challenges related to internal control systems when auditing the banking accounting systems in the light of the use of the digital technologies	Arithmetic Mean	Standard Deviation	T-Value	Freedom Degree	Statistical Significance
	4.524	0.501	10.757	17	00.

Table 9. Arithmetic means and standard deviations of performing of study's sample regarding this hypothesis.

Statements	Arithmetic mean	Standard deviation	Response orientation
Jordanian external auditor faces the challenges which are related to (electronic) evidence when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution because:			
1 Electronic document does not acquire the characteristics of permanence, stability and constancy; it is erasable and editable.	4.45	0.605	Very high
2 It is difficult to show the authentication of electronic document because it is intangible and needs to advance techniques and modern technical means in order to be appeared.	4.25	0.550	Very high
3 Evidence of digital technologies requires multiple equipment and techniques in order to read the electronic data. And these equipment and techniques needs to an experience of electronic field.	4.35	0.587	Very high
4 Audit path related to the data processed by the digital accounting is not visible and may not be available at the time of auditing; in addition, access to the data may be more difficult.	4.45	0.605	Very high
5 Authorized signature requires appropriate techniques; in addition, special techniques shall be used in order to verify its authenticity.	4.50	0.607	Very high
6 Accounting data recorded electronically can be easily distorted and deleted without leaving tangible traces.	4.35	0.587	Very high
7 There are risks of data loss during the process of data transmission via communication networks.	4.30	0.571	Very high
8 Professional standards illustrating the types of evidence and the methods used to obtain it in the light of digital accounting technologies are insufficient.	4.55	0.605	Very high
9 Evidence proof of the digital accounting documents are not stated in the legislations organizing the professional performance.	4.40	0.598	Very high
	4.40	0.525	Very high

authentication of electronic document because it is intangible and needs to advance techniques and modern technical means in order to be appeared, has occupied the last rank and arithmetic mean has reached 4.25. Total arithmetic mean of all statements has reached 4.40. Accordingly, the responses of sample study agree very highly that Jordanian external auditor faces the challenges which are related to electronic evidence when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution.

In addition, arithmetic mean of the statements which has formed the hypothesis has been compared with standard mark 3—hypothesis acceptance standard—by using t-test as stated in **Table 10**.

Table 10 indicates that there are statistical differences at ($p = 0.05$) between arithmetic mean and standard mark 3; T-value has been 16.657; statistical sig-

nificance has been 0.000. Thus, this hypothesis, stipulating that Jordanian external auditor faces the challenges related to (electronic) evidence when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution, has been accepted.

Fifth Sub-Hypothesis Testing

This hypothesis has touched upon the challenges which are related to audit risks when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution. To test the validity of this hypothesis, arithmetic means and standard deviations of performing of study's sample regarding this hypothesis have been extracted; **Table 11** outlines them.

Table 11 shows arithmetic means and standard deviations of statements of this hypothesis in addition to the orientation of responses of the statements which form the hypothesis related to the challenge of audit risks when auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution. Arithmetic means have ranged between 4.30 -

Table 10. Arithmetic means, standard deviations and t-test of statements which has formed the hypothesis in comparison with standard mark 3.

the challenges which are related to electronic evidence when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution	Arithmetic Mean	Standard Deviation	T-Value	Freedom Degree	Statistical Significance
	4.40	0.525	16.657	16	00.

Table 11. Arithmetic Means and Standard Deviations of Performing of Study's Sample Regarding this Hypothesis.

Statements	Arithmetic mean	Standard deviation	Response orientation
Jordanian external auditor faces the challenges which are related to audit risks when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution because:			
1 Assessing audit risks at the lowest value contributes to the increase of auditor responsibility due to the risks of digital accounting technologies.	4.50	0.607	Very high
2 Assessing audit risks at the lowest value contributes to the increase of audit cost due to the risks of digital accounting technologies.	4.35	0.587	Very high
3 Using the digital technologies in the accounting contributes little to an assessment of audit risks.	4.40	0.598	Very high
4 Using the digital technologies in the accounting has increasingly affected the inherited risks and internal control.	4.33	0.571	Very high
5 Experts of field of risks related to the accounting digital technologies are required.	4.30	0.571	Very high
The challenges which are related to audit risks when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution.	4.37	0.586	Very high

4.50; the statement stipulating that assessing audit risks at the lowest value contributes to the increase of auditor responsibility due to the risks of digital accounting technologies, has occupied the first rank and arithmetic mean has reached 4.50. The statement stipulating that experts of field of risks related to the accounting digital technologies are required, has occupied the last rank and arithmetic mean has reached 4.30. Total arithmetic mean of all statements has reached 4.37. Accordingly, the responses of sample study agree very highly that Jordanian external auditor faces the challenges which are related to audit risks when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution.

In addition, arithmetic mean of the statements which has formed the hypothesis has been compared with standard mark 3—hypothesis acceptance standard—by using t-test as stated in **Table 12**.

Table 12 indicates that there are statistical differences at ($p = 0.05$) between arithmetic mean and standard mark 3; T-value has been 19.607; statistical significance has been 0.000. Thus, this hypothesis, stipulating that Jordanian external auditor faces the challenges related to audit risks in the light of the use of the digital technologies of the fourth industrial revolution, has been accepted.

First Hypothesis Testing

Arithmetic mean of the statements which has formed the hypothesis has been compared with standard mark 3—hypothesis acceptance standard—by using t-test as stated in **Table 13**.

Table 13 indicates that there are statistical differences at ($p = 0.05$) between arithmetic mean and standard mark 3; T-value has been 16.252; statistical significance has been 0.000. Thus, this hypothesis, stipulating that Jordanian external auditor faces challenges related to the digital technologies as an element of audit work environment when auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution, has been accepted.

Second Main Hypothesis Testing

This hypothesis has touched upon the axes of the challenges related to the element of the digital technologies as a tool of implementing audit process; and it includes the following axes:

- The challenges related to the use of the digital technologies in order to implement audit processes in the light of the use of the digital technologies;
- The challenges related to information technology infrastructure in audit;

Table 12. Arithmetic means, standard deviations and t-test of statements which has formed the hypothesis in comparison with standard mark 3.

Jordanian external auditor faces the challenges which are related to audit risks when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution	Arithmetic Mean	Standard Deviation	T-Value	Statistical Significance
	4.37	0.586	19.607	000.

Table 13. Arithmetic means, standard deviations and t-test of statements which has formed the hypothesis in comparison with standard mark 3.

The challenges related to the digital technologies as an element of work environment when auditing the banking accounting systems	Arithmetic Mean	Standard Deviation	T-Value	Freedom Degree	Statistical Significance
Legislative and professional challenges in the light of the digital technologies.	4.45	0.641	15.485	19	0.000
The challenges related to the nature of the banking accounting systems (digital processing and electronic disclosure).	4.49	0.49	18.757	19	0.000
The challenges related to the internal control systems in the light of the use of the digital technologies.	4.524	0.501	10.757	17	0.000
The challenges related to the electronic evidence in the light of the use of the digital technologies.	4.40	0.525	16.657	16	0.000
The challenges related to audit risks in the light of the use of the digital technologies.	4.37	0.586	19.607	16	0.000
Total	4.44	0.548	16.252	17	0.000

- The challenges related to audit office's clients (level of information technology, fees, a lack of clarity of audit services' goals) and a multiplicity of services (auditing and electronic system evaluation in accordance with the Central Bank instructions) when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution;
- The challenges related to scientific and practical qualifications of digital technologies.

These axes are discussed as follows:

First Sub-Hypothesis Testing

This hypothesis has touched upon the challenges related to the use of the digital technologies in order to implement audit processes when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution. To test the validity of this hypothesis, arithmetic means and standard deviations of performing of study's sample regarding this hypothesis have been extracted; **Table 14** outlines them.

Table 14 shows arithmetic means and standard deviations of statements of this hypothesis in addition to the orientation of responses of the statements which form the hypothesis related to the challenges of the use of digital technologies in implementing audit processes when auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution. Arithmetic means have ranged between 4.35 - 4.65; the statement stipulating that appropriate knowledge of using the digital technologies of audit (such as artificial intelligence systems and decision support systems) is not available, has occupied the first rank and arithmetic mean has reached 4.65. The

statement stipulating that the technologies used in the companies subjected to the audit process are diversified, has occupied the last rank and arithmetic mean has reached 4.35. Total arithmetic mean of all statements has reached 4.52. Accordingly, the responses of sample study agree very highly that Jordanian external auditor faces the challenges which are related to the use of digital technologies in implementing audit processes when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution.

In addition, arithmetic mean of the statements which has formed the hypothesis has been compared with standard mark 3—hypothesis acceptance standard—by using t-test as stated in **Table 15**.

Table 15 indicates that there are statistical differences at ($p = 0.05$) between arithmetic mean and standard mark 3; T-value has been 16.687; statistical significance has been 0.000. Thus, this hypothesis, stipulating that Jordanian external auditor faces the challenges related to the use of the digital technologies in

Table 14. Arithmetic means and standard deviations of performing of study's sample regarding this hypothesis.

Statements	Arithmetic mean	Standard deviation	Response orientation
Jordanian external auditor faces the challenges related to the use of the digital technologies in audit process when auditing the banking accounting systems in the light of the use of digital technologies of the fourth industrial revolution because:			
1 Appropriate audit software is not available in Jordanian market and audit offices.	4.55	0.510	Very high
2 The technologies used in the companies subjected to the audit process are diversified.	4.35	0.489	Very high
3 Appropriate knowledge of using the digital technologies of audit (such as artificial intelligence systems and decision support systems) is not available.	4.65	0.605	Very high
4 Traditional audit systems such as obtaining printed documents are still used.	4.40	0.489	Very high
5 Using the digital technologies in audit processes is not adopted.	4.64	0.587	Very high
The challenges related to the use of the digital technologies in implementing audit processes	4.52	0.536	Very high

Table 15. Arithmetic means, standard deviations and t-test of statements which has formed the hypothesis in comparison with standard mark 3.

Jordanian external auditor faces the challenges which are related to the use of the digital technologies in implementing audit processes when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution	Arithmetic Mean	Standard Deviation	T-Value	Statistical Significance
	4.52	0.536	16.687	00.

order to implement the processes of auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution, has been accepted.

Second Sub-Hypothesis Testing

This hypothesis has touched upon the challenges related to information technology infrastructure in audit office. To test the validity of this hypothesis, arithmetic means and standard deviations of performing of study's sample regarding this hypothesis have been extracted; **Table 16** outlines them.

Table 16 shows arithmetic means and standard deviations of statements of this hypothesis in addition to the orientation of responses of the statements which form the hypothesis related to the challenges of information technology infrastructure in audit offices. Arithmetic means have ranged between 4.25 - 4.25; the statement stipulating that no modern and diverse laboratories and software of audit field are available in audit offices, has occupied the first rank and arithmetic mean has reached 4.77. The statement stipulating that no experts and auditor specialized in electronic audit systems are employed in audit offices, has occupied the last rank and arithmetic mean has reached 4.25. Total arithmetic mean of all statements has reached 4.48. Accordingly, the responses of sample study agree very highly that Jordanian external auditor faces the challenges related to information technology infrastructure in audit office.

In addition, arithmetic mean of the statements which has formed the hypothesis has been compared with standard mark 3—hypothesis acceptance standard—by using t-test as stated in **Table 17**.

Table 17 indicates that there are statistical differences at ($p = 0.05$) between arithmetic mean and standard mark 3; T-value has been 14.667; statistical significance has been 0.000. Thus, this hypothesis, stipulating that Jordanian external

Table 16. Arithmetic means and standard deviations of performing of study's sample regarding this hypothesis.

Statements	Arithmetic mean	Standard deviation	Response orientation
Jordanian external auditor faces the challenges related to information technology infrastructure in audit office when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution because:			
1 No modern and diverse laboratories and software of audit field are available in audit offices.	4.77	0.410	Very high
2 A connection network in which audit processes can be remotely followed up by audit office and the company subjected to the audit is not available.	4.35	0.489	Very high
3 No modern devices for performing audit processes are available in audit offices.	4.55	0.510	Very high
4 No experts and auditor specialized in electronic audit systems are employed in audit offices.	4.25	0.489	Very high
The challenges related to information technology infrastructure in audit office	4.48	0.47	Very high

auditor faces the challenges related to information technology infrastructure in audit office when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution, has been accepted.

Third Sub-Hypothesis Testing

This hypothesis has touched upon the challenges related to the challenges related to audit office's clients (level of information technology, fees, a lack of clarity of audit services' goals) and a multiplicity of services auditing and electronic system evaluation in accordance with the Central Bank instructions. To test the validity of this hypothesis, arithmetic means and standard deviations of performing of study's sample regarding this hypothesis have been extracted; **Table 18** outlines them.

Table 18 shows arithmetic means and standard deviations of statements of this hypothesis in addition to the orientation of responses of the statements which form the hypothesis related to the challenges of the clients of audit offices. Arithmetic means have ranged between 4.60 - 4.77; Total arithmetic mean of all

Table 17. Arithmetic means, standard deviations and t-test of statements which has formed the hypothesis in comparison with standard mark 3.

Jordanian external auditor faces the challenges related to information technology infrastructure in audit office	Arithmetic Mean	Standard Deviation	T-Value	Statistical Significance
	4.48	0.47	14.667	00.

Table 18. Arithmetic means and standard deviations of performing of study's sample regarding this hypothesis.

Statements	Arithmetic mean	Standard deviation	Response orientation
Jordanian external auditor faces the challenges related to audit office's clients (level of information technology, fees, a lack of clarity of audit services' goals) and a multiplicity of services (auditing and electronic system evaluation in accordance with the Central Bank instructions) when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution because:			
1 The digital technologies used in the companies subject to audit process are different and disparate.	4.67	0.410	Very high
2 Audit fees decrease.	4.77	0.489	Very high
3 The purposes of audit—financial, operational or technical—are not clarified in the light of the digital accounting technologies.	4.60	0.510	Very high
4 Audit services are centralized in large-sized audit offices particularly in the light of the use of the digital technologies.	4.65	0.489	Very high
5 Security systems are available in the company subjected to the audit process.	4.64	0.510	Very high
6 The companies subjected to the audit process are not aware of the importance of audit services in the digital technology environment.	4.63	0.489	Very high
The challenges related to the clients of audit offices.	4.66	0.478	Very high

statements has reached 4.66. Accordingly, the responses of sample study agree very highly that Jordanian external auditor faces the challenges related to the clients of audit office.

In addition, arithmetic mean of the statements which has formed the hypothesis has been compared with standard mark 3—hypothesis acceptance standard—by using t-test as stated in **Table 19**.

Table 19 indicates that there are statistical differences at ($p = 0.05$) between arithmetic mean and standard mark 3; T-value has been 12.656; statistical significance has been 0.000. Thus, this hypothesis, stipulating that Jordanian external auditor faces the challenges related to audit office's clients (level of information technology, fees, a lack of clarity of audit services' goals) and a multiplicity of services (auditing and electronic system evaluation in accordance with the Central Bank instructions) when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution, has been accepted.

Fourth Sub-Hypothesis Testing

This hypothesis has touched upon the challenges related to the challenges related to academic and practical qualifications of digital technologies in the light of the use of the digital technologies of the fourth industrial revolution. To test the validity of this hypothesis, arithmetic means and standard deviations of performing of study's sample regarding this hypothesis have been extracted; **Table 20** outlines them.

Table 21 shows arithmetic means and standard deviations of statements of this hypothesis in addition to the orientation of responses of the statements which form the hypothesis related to the challenges of academic and practical qualification of the digital technologies. Arithmetic means have ranged between 4.60 - 4.77. Total arithmetic mean of all statements has reached 4.65. Accordingly, the responses of sample study agree very highly that Jordanian external auditor faces the challenges related to the academic and practical qualification of the digital technologies.

In addition, arithmetic mean of the statements which has formed the hypothesis has been compared with standard mark 3—hypothesis acceptance standard—by using t-test as stated in **Table 22**.

Table 22 indicates that there are statistical differences at ($p = 0.05$) between arithmetic mean and standard mark 3; T-value has been 18.666; statistical significance has been 0.000. Thus, this hypothesis, stipulating that Jordanian external auditor faces the challenges related to academic and practical qualifications of the auditor in the digital technologies when auditing the banking accounting

Table 19. Arithmetic means, standard deviations and t-test of statements which has formed the hypothesis in comparison with standard mark 3.

Jordanian external auditor faces the challenges related to the clients of audit office	Arithmetic Mean	Standard Deviation	T-Value	Statistical Significance
	4.66	0.478	12.656	000.

Table 20. Arithmetic means and standard deviations of performing of study's sample regarding this hypothesis.

Statements	Arithmetic mean	Standard deviation	Response orientation
Jordanian external auditor faces the challenges related to academic and practical qualifications of digital technologies when auditing the banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution because:			
1 No training courses on the digital technologies (accounting by using the digital tools) are held.	4.67	0.410	Very high
2 Auditors are not trained for the use of the digital information technology tools in audit.	4.64	0.510	Very high
3 Authorities organizing audit profession in Jordan do not oblige the auditor to train for the digital technologies within the professional training programs.	4.63	0.489	Very high
4 Jordanian Exam of practice audit profession certificate does not include the topics of the digital technology.	4.77	0.489	Very high
5 University education curricula are not compatible with the requirements of auditing in the digital accounting environment.	4.60	0.510	Very high
6 No training on the concepts, procedures, methods and assessment of internal control is held.	4.65	0.489	Very high
The challenges related to the academic and practical qualification of the auditor.	4.65	0.478	Very high

Table 21. Arithmetic means, standard deviations and t-test of Statements which has formed the hypothesis in comparison with standard mark 3.

Jordanian external auditor faces challenges related to the academic and practical qualification of the digital technologies	Arithmetic Mean	Standard Deviation	T-Value	Statistical Significance
	4.66	0.478	18.666	0.000

Regarding the table number, it was a wrong numbering and I corrected it, but there is an error in the place and the format of table number 4 needs reformatting.

Table 22. Arithmetic means, standard deviations and t-test of statements which has formed the hypothesis in comparison with standard mark 3.

Jordanian external auditor faces the challenges related to the academic and practical qualification of the digital technologies	Arithmetic Mean	Standard Deviation	T-Value	Statistical Significance
	4.66	0.478	18.666	000.

systems in the light of the use of the digital technologies of the fourth industrial revolution, has been accepted.

Second Main Hypothesis Testing

Arithmetic mean of the statements which has formed the hypothesis has been compared with standard mark 3—hypothesis acceptance standard—by using t-test as stated in **Table 23**.

Table 23 indicates that there are statistical differences at ($p = 0.05$) between

Table 23. Arithmetic means, standard deviations and t-test of statements which has formed the hypothesis in comparison with standard mark 3.

The challenges related to the digital technologies as a tool of implementing audit process	Arithmetic Mean	Standard Deviation	T-Value	Statistical Significance
The challenges related to the use of the digital technologies in audit process.	4.52	0.536	16.687	0.000
The challenges related to information technology infrastructure.	4.48	0.47	14.667	0.000
The challenges related to the clients of audit office.	4.66	0.478	12.656	0.000
The challenges related to the academic and practical qualification of the auditor in the digital technologies.	4.66	0.478	18.666	0.000
Total	4.58	0.490	15.666	0.000

arithmetic mean and standard mark 3; T-value has been 15.666; statistical significance has been 0.000. Thus, this hypothesis, stipulating that Jordanian external auditor faces the challenges related to an element of digital technologies as a tool of implementing the process of auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution, has been accepted.

7. Results and Recommendations

The study has concluded that in the environment of banking accounting systems, external auditor faces a set of challenges which are classified as follows:

First: Jordanian external auditor faces the challenges related to the digital technologies as an element of audit work environment when auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial revolution; it includes the following:

- The legislations and laws (professional and legislative structure of digital accounting environment): the study has concluded that the laws and legislations organized the profession or the digital transactions are insufficient and are not amended;
- The challenges related to the nature of banking accounting systems (the digital processing and electronic disclosure): using the digital systems in the accounting processing has resulted in the disappearance of audit path; and the nature of account cycle has become different; the nature and the methods of electronic disclosure are considered one of the challenges the external auditor faces;
- The challenges related to internal control systems: digital technologies have imposed a new control environment and requirements which are different from the traditional one, particularly regarding data security and safety as well as data encryption;
- The challenges related to (electronic) evidence: Disappearance of audit path has contributed to the difference of the nature and the characteristics of the

evidence; and it becomes difficult to judge the objectivity of the evidence due to distortion and amendment risks; and it becomes difficult to detect modification processes;

- The challenges related to audit risks in the light of the use of the digital technologies; the challenges have contributed to the increase of audit risks due to high probability of exiting substantial error; digital banking accounting information system may expose to various types of risks.

Second: Jordanian external auditor faces the challenges related to an element of digital technologies as a tool of implementing the process of auditing banking accounting systems in the light of the use of the digital technologies of the fourth industrial; it includes the following:

- The challenges related to unavailability of audit programs used for implementing the process of auditing the banking accounting systems in the light of the digital technologies: using information technologies in audit services is limited to planning and correspondence with the companies through internet (e-mail); and electronic site of the company is used only for the purposes of marketing;
- The challenges related to information technology infrastructure in audit office: infrastructure of information technology is limited; no computer laboratories for training and performing audit works is available in audit offices; in addition, information networks which can be used to complete remotely audit works and exchange the information among various audit teams are not provided;
- The challenges related to audit office's clients (level of information technology, fees, a lack of clarity of audit services' goals) and a multiplicity of services (auditing and electronic system evaluation in accordance with the Central Bank instructions): the nature and level of the digital services provided in the Jordanian banks are different and diversified; this is a challenge the auditor faces because audit fees and nature of service provided by the audit will also be different;
- In the light of the use of the digital technologies, accounting information systems have created a modern and advanced work environment; the auditor, therefore, is obliged to obtain the qualification specialized in the digital technology profession; in addition, the exam of practicing the profession shall be reconsidered and topics of information technology and internal control shall be included in the exam's vocabulary; and certified information systems auditor (CISA) shall be approved.

Recommendations

The study has reached a set of recommendations as follows:

- Legislative and professional environment of auditing shall necessarily be developed in order to be compatible with the development of the digital business environment;
- The auditor shall be involved in the processes of developing and updating the

digital systems;

- Clear instructions of digital banking accounting information systems as well as the terms and methods of electronic disclosure shall necessarily be provided;
- Training courses of the internal control system, particularly in the fields of confidentiality, encryption and data security shall be held since this system is different from the traditional one;
- Great attention shall be paid to electronic evidence proof and the auditor shall be trained in order to be able to obtain it;
- Electronic systems of audit programs shall be necessarily developed and the digital technologies shall necessarily be used in the processes of exchanging the data and performing audit works;
- Continuous training plans which must include the topics of the digital technologies shall be developed.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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