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The Impact of The Digital Revolution on The Efficiency of Auditors in Auditing Computerized Programs

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Abstract: This study aimed to research the impact of the digital revolution and its various fields, secrets, and ramifications on the auditor's efficiency in auditing computerized programs that precede auditing financial statements, and to ensure their integrity to give an impartial technical opinion. To achieve the study objectives, a questionnaire comprising of 16 sections was created and distributed to two groups: auditors in Jordan and computerized program administrators. Each group was allocated 100 questionnaires, with 70 and 80 questionnaires retrieved from the first and second group respectively. Statistical analysis using the SPSS program was conducted to extract the mean and standard deviation, and Chi-square analysis was employed to obtain the study results. The results of the study indicate that there isa statistically significant positive impact of the digital revolution on the efficiency of auditors from the point of view of auditors, while there is no impact of the digital revolution on the efficiency of auditors. A discrepancy is noted in the views of both samples. Therefore, the study recommended boosting research on the efficiency of auditors in auditing information technology systems in light of the digital revolution, in addition to the need for training and qualification courses in information technology auditing.

1 Introduction

The digital revolution has greatly influenced the accounting field and was a major reason for fundamental changes in the accounting work system, as manual processes were automated by digital tools, which led to increased professional accounting efficiency and reduced accounting errors. One of the most important accounting developments is the emergence of cloud computing, as it is now possible to host accounting programs in the cloud, which saves time accessing financial data anywhere, as well as big data analytics. It is now possible to analyze accounting data on a much larger scale, which allows us to make correct decisions. Also, the increasing use of mobile devices and their applications allows accountants to access financial data and perform tasks on the go. Digital tools have made collaboration between team members better and easier, enabling them to work together in real-time from different locations. In general, the digital revolution has had a significant impact on the accounting field, making it more efficient, effective, and accessible.

However, with all these additions that have affected accounting work, there are difficulties in the audit process and in obtaining audit evidence through computerized programs (Ana,2023) [12]. Therefore, a clear and specific methodology has been developed for auditing accounting information systems or auditing information technology systems since accounting is an integral part of these systems. These systems require specialized auditing skills that differ from the accounting skills that are used in auditing financial statements (Al-Ramahi, 2016) [10], as there are many electronic procedures followed to audit computerized programs. Therefore, the auditor must be sufficiently acquainted with information technology so as not to be exploited through the gaps in technology. The problem statement of this study tries to answer the following questions:

Is the auditor qualified to examine and evaluate information systems?

Does the auditor conduct an examination and evaluation of information systems prior to the start of the audit?

Are there any obstacles preventing the auditor from carrying out information systems audit procedures?

The purpose of the study is to ensure that auditors practice all the necessary procedures to ensure the authenticity and accuracy of the financial statements, for the integrity of the auditor's report. Alsoto cope with the constant need to keep abreast of technological developments and increase the efficiency and effectiveness of the role of accounting and auditing in the application of modern technologies.

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2 Literature Review

Many studies have tackled the impact of adherence to computerized systems auditing procedures on the efficiency of the auditing profession. One of these studies is (Hassan & Yousef,2019) [1], which dealt with the importance of applying (IAs620) in evaluating accounting information systems. The study concluded that adherence to the application of computerized systems auditing rules increases the quality of financial reports, as well as the efficiency of the auditing profession, and improves the level of the auditing profession in Sudan. (Abedalmqsoud, 2022) [2] studied the impact of the Fourth Industrial Revolution technologies on the auditing and accounting professions. It concluded that the Fourth Industrial Revolution changed the concepts of planning and analysis of accounting information systems, improved the quality of financial reports and accounting estimates, and improved the evaluation of analytical audits. Moreover, new areas emerged such as audit by exception, automatic audit, and financial analysis of big data, significantly reducing the traditionally manual tasks of the accountant and the internal and external auditor and replacing them with analytical and advisory tasks and the exchange of roles between humans and robots in conducting audit tasks. (Moffittet al, 2018) [8] Explained that robotic technology provides more reliability for auditing, makes optimal audit trails, and raises security degrees if the training that enables robots to perform audit and audit tasks without errors is provided. (Li ,2018) [9] addressed the auditor's task when using robotic technology in Accounting Information Systems to be able to corporate governance and distinguish between some automated processes given the risk inherent in the process, the degree of complexity in the process, and the degree of variation in the results. The auditor should be aware that robots may not always comply with what we need and till now they do not think like humans. Auditors should also be aware that robot rules may be updated due to a change in the company's business model or operating environment and therefore errors may occur.

Regarding Block Chain technology, many studies have addressed the importance of this technology for accounting, showing its advantages in accounting, including that it will force accountants to enhance their use of automation and will increase the demand for analytical skills. (Cangemi & Brennan, 2019) [5]. It will also increase the automation of traditional accounting functions to transfer accounting from double entry to automatic triple entry, thus compromising principles on which accounting was based (Mahir & Hambiralovic, 2018) [5]. Others addressed the impact of blockchain on the audit process. Charlotte (20190[7] pointed out that the audit process will become less expensive than the current cost. Erica (Pimentel et al, 2018) [6] noted that auditing would become more complicated since the audit process will expand to include reviewing the codes and symbols used in the blockchain to ensure that they are safe and compliant.

Through the previous studies, the researcher concludes that the advantages of the Fourth Industrial Revolution (digital transformation) over accounting and auditing are worth noting, but it may also pose great risks if the accountant or auditor is not sufficiently familiar with information technology.

3 Theoretical frameworks

The IT audit process is defined as the process of evaluating information technology (IT) systems, processes, and infrastructure to ensure that they meet the organization's goals and objectives, that they are secure, and comply with regulations and standards. An IT audit may include the following areas:

- Network security: the security of an organization's network and data is evaluated, including access controls, firewalls, and encryption.

- Application controls: the established controls are evaluated to ensure the accuracy and reliability of the data processed by the organization's applications.

- The organization's database management systems, data backup, and recovery processes are evaluated.

- Infrastructure: the organization's IT infrastructure is evaluated, including servers, storage, and data center operations.

- Project management: the organization's project management processes are evaluated, including risk management and change management.

- Compliance: the organization's compliance with relevant laws and regulations is assessed, such as the payment card industry data security standard (PCI DSS(Ana-2023) [12].

Cloud accounting is considered a part of information technology. It is subject to evaluation in the same way as other IT systems. The cloud accounting audit process can be defined as the process of reviewing the accuracy, completeness, and security of financial records stored in cloud-based systems, with the aim of ensuring that financial transactions are properly and securely recorded in the cloud environment, and identifying any potential security risks or data breaches that could affect the integrity of financial records (Shaqqour et al., 2021) [11]. The audit process may include a review of

controls, access management, backup, and recovery operations. The audit aims to confirm that the financial information stored in the cloud is accurate and secure (Hezam,2023) [14].

Cloud accounting systems audit procedures include assessing the security, monitoring, and accuracy of financial information processed and stored in a cloud computing environment. The following are the main areas to consider when auditing cloud-based accounting systems (Hassan and &Youssef ,2019) [1]:

- Security: evaluation of the security measures in place to protect financial information, including access controls, encryption, and disaster recovery processes.

- Data privacy: the organization's compliance with data privacy regulations, such as the General Data Protection Regulation (GDPR), is assessed.

- Control environment: evaluating the controls in place to ensure the accuracy and reliability of financial information processed in the cloud, including the separation of duties, audit trails, and change management processes.

- Service level agreements (SLAs): a review of the service level agreements with the cloud service provider to ensure that they meet the organization's needs and provide appropriate levels of security and control.

- Data backup and recovery: evaluating the processes in place to ensure financial information is backed up and can be recovered in the event of a disaster.

Therefore, it is necessary to conduct an audit of the accounting systems and the technology used in advance of the audit process, to ensure the fairness of the financial statements and to give an impartial technical opinion. From the above, the researcher concludes that the auditor must have sufficient knowledge of auditing information technology systems in order to verify the correctness of the programs and systems he dealt with, as any defect in Information Systems results in an imbalance in the results of financial accounts and activities, and therefore an imbalance in financial statements, which in turn leads to an imbalance in the results of the company's business, being itself the most important part in the audit process.

4 Methodologies

The study used the descriptive analytical approach to test the validity of the study hypotheses.

4.1 Study sample and population:

The study population consisted of auditors in Jordan, as well as Computerized program administrators. In Public share holding companies listed on the Amman Stock Exchange.

Study hypotheses:

The first hypothesis: there is no statistically significant Impact at the level of (a≤ 0.05) of the digital revolution on the efficiency of auditors in auditing business information systems from the point of view of auditors.

The second hypothesis: there is no statistically significant impact at the level of (a≤ 0.05) of the digital revolution on the efficiency of auditors in auditing business information systems from the point of view of Computerized program administrators in Public shareholding Companies.

4.2 Methods of data collection

The data was collected through a questionnaire containing 16 paragraphs, directed to the study sample members to measure the impact of the digital revolution on the efficiency of auditors in business technology audits. 200 questionnaires were distributed evenly to the sample individuals: 100 questionnaires for auditors, and 100 questionnaires for Computerized program administrators in Public shareholding Companies. 70 questionnaires were recovered from auditors, i.e., 70% recovery, and 80 questionnaires from Computerized program administrators, i.e., 80% recovery. Likert quintet model was used.

Stability of the study tool:

The level of stability of the study tool was measured through the Cronbach Alpha test as shown in Table No. 1. The Cronbach Alpha coefficient of the study tool measured (72), which is a high enough value to approve the results of the questionnaire. (Raykov et al,2019) [13].

Table 1: Stability test of the study tool

Part	Variables	Number of paragraphs	Cronbach Alpha
Auditors	Information technology audit	16	73

Computerized software administrators	Information technology audit	16	71
The tool as a whole		**32**	**72**

The results of the questionnaire were analyzed for each category of the study sample separately and then answers were compared to determine whether there are significant differences between the results of the two study samples' responses.

Questionnaire paragraphs: the opinions of the sample members were surveyed through the questionnaire paragraphs as shown in Table No. 2.

<div align="center">Table 2: Questionnaire paragraphs</div>

No.	Paragraph
1	The auditor builds his point of view on the level of security of computerized programs through his experience and the testing methods that he applies
2	The auditor builds his point of view on the security level of computer programs by explaining the members of the IT teams in the company itself
3	The auditor builds his point of view on the level of security of computer programs by resorting to an independent, impartial, and expensive specialist before the auditor himself
4	The auditor obtains the required information samples himself.
5	The auditor resorts to Information Technology teams in obtaining the required information samples.
6	The auditor makes sure that no information is hidden by the company or IT teams.
7	The auditor checks data integrity through the database and reviews the register of changes.
8	The powers of program users are checked, and no conflicts of interest are ensured.
9	The powers of users of computer programs are checked to make sure that these powers are not misused.
10	The powers of the IT teams on computerized systems are checked.
11	The powers of IT systems developers are checked
12	All the development and modification procedures carried out by the developers of information systems are proven.
13	Assessment of the enterprise's compliance with relevant laws and regulations
14	The organization's database management systems, data backup and recovery processes are evaluated.
15	Compliance with established controls is ensured to ensure the accuracy and reliability of financial information processed in the cloud.
16	Separation of duties, audit trails, and change management processes is ensured.

4.3 Hypothesis testing analysis

The study hypotheses were analyzed using descriptive statistical methods of arithmetic mean, standard deviation, and order of relative importance, as well as the use of heuristic statistics from the Chi2test to determine the validity of the research hypotheses as follows:

Testing the first hypothesis:

The first hypothesis: there is no statistically significant Impact the level of ($a \leq 0.05$) of the digital revolution on the efficiency of auditors in auditing business information systems from the point of view of auditors. Table No. (3) Shows the results of the analysis of the auditors ' responses to the questionnaire paragraphs.

<div align="center">Table 3: auditors ' response on the resolution paragraphs</div>

No.	Auditors		Degree of approval	Chi testing^2		Order
	Arithmetic mean	**Standard Deviation**		**Chi^2 value**	**Level of Significance**	
1	4.1	0.89	Agree	24.5	0.12	5
2	2.5	0.92	Disagree	26.5	0.23	11
3	3.1	1.26	Agree	29.1	0.13	10
4	3.8	0.75	Agree	28.1	0.25	7
5	2.4	0.45	Disagree	21.7	0.35	12
6	4.2	0.56	Agree	23	0.11	4
7	3.9	0.82	Agree	23.6	0.13	6
8	4.5	0.96	Agree	24.1	0.21	2
9	3.9	1.2	Agree	23.3	0.14	6
10	3.7	0.66	Agree	20.25	0.15	8
11	2.4	1.12	Disagree	24.5	0.12	12

12	3.6	0.49	Agree	23.25	0.11	9
13	4.6	0.5	Agree	19.8	0.123	1
14	4.6	0.55	Agree	25.2	0.39	1
15	4.3	0.56	Agree	22.6	0.32	3
16	4.1	0.45	Agree	21.2	0.16	5
Total	**3.725**	**0.75875**	Agree			

Table (3) shows that the auditors` degree of approval on the questionnaire paragraphs was mostly "agree", except for some paragraphs that were "disagree", namely paragraph (2), which states that "the auditor builds his point of view on the level of security of computerized programs by explaining the members of the IT teams in the company itself." This answer is logical because this paragraph contradicts the first paragraph. Paragraph (5), which states that "the auditor resorts to the IT teams in obtaining the required information samples" is contrary to paragraph (4). Paragraph (11) stating that "the powers of information technology systems developers are audited" came also with a "disagree" does not contradict any other paragraph and indicates that auditors are not interested in reviewing the powers of developers of Information Systems, which may cause a malfunction in the audit task resulting from software developers exceeding the powers, which affects the results of financial reports.

We also note that the overall average response to the first hypothesis is 3.725 with a standard deviation of 0.759, that is, the auditors perform all IT audit tasks efficiently and that the value of the significance level of the Chi^2 testfor all paragraphs was greater than the significance level of (a≤ 0.05),which indicates acceptance of the hypothesis that the digital revolution has not changed the efficiency of auditors.

Testing the second hypothesis

The second hypothesis: there is no statistically significant impact at the level of (a≤ 0.05), of the digital revolution on the efficiency of auditors in auditing business information systems from the point of view of computerized systems administrators in Public shareholding Companies.

Table 4: response of computerized systems administrators in Public shareholding companies on the questionnaire paragraphs

No.	Administrators of computerized accounting programs		Degree of approval	Chi testing^2		Order
	Arithmetic mean	**Standard deviation**		**Chi^2 value**	**Level of Significance**	
1	2.1	1.02	Disagree	12.5	0.00	8
2	4.5	0.56	Agree	10.6	0.00	1
3	2.4	1.32	Disagree	14.36	0.00	5
4	2	0.9	Disagree	12.35	0.00	9
5	4.3	0.53	Agree	19.2	0.042	2
6	2.1	1.4	Disagree	16.2	0.00	8
7	1.4	1.3	Disagree	12.54	0.036	11
8	2.3	1.1	Disagree	10.2	0.00	6
9	1.9	0.75	Disagree	10.001	0.041	10
10	2.2	0.78	Disagree	11.2	0.026	10
11	2.4	0.88	Disagree	10.12	0.00	5
12	2.1	1.4	Disagree	12.32	0.00	8
13	4	0.56	Agree	14.25	0.00	3
14	4	0.64	Agree	18.23	0.00	3
15	3.5	1.45	Agree	13.2	0.00	4
16	2.1	1.2	Disagree	12.5	0.00	8
Total	**2.70625**	**0.986875**	Disagree			

Tabulated Chi^2= 9.49 at the level of significance 5%

Table (4) shows that the degree of approval of the computer systems administrators in Public shareholding companies on the questionnaire paragraphs was mostly "disagree" except for paragraphs (2) and (5) and as we pointed out earlier that these two paragraphs contradict the preceding paragraphs, so the response is logical. Also, paragraphs (13), (14), and (15), showing approval, came opposite to most of the questionnaire answers. These paragraphs indicate that the auditor evaluates the compliance of an institution with the relevant laws and regulations and that the organization's database management systems are evaluated, as well as the data backup and recovery processes, and compliance with established controls is ensured to maintain the accuracy and reliability of financial information processed in the cloud. However, the arithmetic means of the response of computerized systems administrators in Public shareholding Companies to the

paragraphs of the questionnaire came "disagree", with an arithmetic mean of (2.7) and a standard deviation of (0.987), and this is contrary to the opinions of the sample auditors, as this result shows the negative performance of auditors in the audit of computerized programs, hence a negative impact for the digital revolution on auditors is noted. By analyzing the Chi 2 value, it is found that its values are greater than the value of the tabulated Chi^2, thus the null hypothesis is rejected, and the alternative is accepted. In addition, all paragraphs are significant at the level of (a≤ 0.05), so this results in the acceptance of the alternative hypothesis which states that (there is a statistically significant impact at the level of (a≤ 0.05) significance of the digital revolution on the efficiency of auditors in auditing business information systems from the point of view of computerized systems administrators in Public shareholding Companies).

5 Discussion of results:

The statistical analysis and hypotheses testing indicate that there is a conflict in the opinions of both samples, and it was as follows:

1. The result of the first hypothesis showed that there is no statistically significant effect at a significant level of 5% of the digital revolution on the efficiency of auditors in auditing business information systems from the auditors' point of view auditors' responses to the questionnaire and the analysis of these responses concludes that there is no statistically significant impact of the digital revolution on the efficiency of auditors, as auditors carry out audit procedures for all business technology systems and accounting systems optimally without resorting to technology teams.

2. The results of the second hypothesis showed that there is a statistically significant effect at the level of significance of 5%, the digital revolution, on the efficiency of auditors in checking business information systems from the point of view of officials of computerized systems in public shareholding companies, the analysis of the second sample responses (accounting systems administrators) indicates the auditors rely to a large extent on technology teams in obtaining systems data, and they do not follow up on these systems in terms of powers, modification, the performance of developers, and their powers.

Thus, the discrepancy in opinions between the two samples is evident, as auditors praise their performance, while computerized program administrators confirm that there is a significant impact of the digital revolution on the performance of auditors.

6 Recommendations:

Based on the discussion and the findings of the study, the study recommends the need to ensure the efficiency of auditors in auditing business technology systems, and not rely on their statements. This can be achieved through direct and immediate tests to confirm their competence, in addition to the need to enhance auditors to obtain courses and certificates in auditing business technology to confirm their abilities and the safety of their performance, since recently all computerized programs rely on the technologies of the digital revolution in all its forms and dimensions.

The study also recommends conducting further research on the expected effects of the digital revolution on all academic and business fields in all their forms.

Conflict of interest

The authors declare that there is no conflict regarding the publication of this paper.

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