The Impact of Digitalization on the Accountancy and Audit Profession in Sudan (Applied Study on External Audit Firms in Sudan)

Mahmoud Ibrahim Mohamed Ahmed [1] , Salah Babiker Eisa[2] , Musa Fadlalla Ali[3]

Sallam O. F. Khairy[4]*

[1]PhD in Accounting and Finance, FCCA, Khartoum - Sudan

[2]College of Business Administration, Open University of Sudan, Sudan

[3,4]College of CEMIS, University of Nizwa, Sultanate of Oman

***Corresponding Author**

DOI: https://doi.org/10.51244/IJRSI.2026.1311000018

Received: 02 November 2026; Accepted: 07 November 2026; Published: 19 November 2026

ABSTRACT

This study examines the impact of digitalization on the accountancy and audit profession in Sudanese companies and audit firms. Using a two-part questionnaire distributed to 97 auditors, with 61 responses (69% response rate), the research tested five hypotheses examining links between digitalization and company characteristics, technological influence, auditor competences, and obstacles. Findings reveal that despite expectations of high adoption, the actual use of digital tools remains limited, with reliance on basic technologies such as online tax returns, Excel spreadsheets, and occasional CAAT applications. The study concludes that digitalization in Sudan's audit profession is at a low level and recommends forming a task force committee, expanding training initiatives, establishing a government liaison committee, revising university curricula, and strengthening the government's role in driving digital transformation through public service digitalization and removal of barriers.

Keywords : Digitalization , Accounting profession, Auditing profession, External Audit Firms

INTRODUCTION

Accounting is an information system for the purpose of measuring business activities by recording, summarising, analysing and communicating the organisation's financial information. After recording financial transactions and events whenever they happen, accounting gathers the financial information into meaningful and useful reports to enable the decision-makers to have an overall picture of the organization and its financial position. As automation is changing all aspects of our lives from working, playing, socialising**,** it is also bringing considerable change to accounting profession. In the last decades, there is strong and fast movement towards digital transformation of the accounting information system.

The accounting profession has started to adapt to the new technologies, since it is in its early age, when computers were used for bookkeeping in place of pens and manual ledgers. In 1961, Professor Richard Mattessich developed the first computer-based spreadsheets for use in accounting functions (Power, 2004). The technological developments continued with the invention and use of accounting software and an important achievement happened in the year 1985 with the introduction of Microsoft Excel application and spreadsheet which has saved a lot of time and effort in recording transactions and carrying accurate calculations and more. Companies after some hesitation and resistance regarding reliability and security, started to accept the new technology and understood the importance of the technological developments for data processing, data security, storage and analysis to provide financial information.

IASB (2014) explained that professional competence goes beyond knowledge of principles, standards, concepts, facts and procedures. It is the integration and application of technical competence, professional skills and professional values, ethics and attitudes. Modern day accountants have to face the challenges of modern day business and that the problem is that many of our ideas about the role of knowledge in decision making is based on the notion that we can do the same things as we did before, and which we intend to do tomorrow.

2. Study Problem

Technology is advancing rapidly which impacts professions such as accounting and auditing. Such rapid development has brought significant change in electronic accounting systems which made it necessary for audit clients and audit firms to shift from traditional electronic accounting systems to digitalised automated accounting systems as shown in Figure.1. Technological advancement in clients' accounting and information systems and real time accounting has put pressure on audit firms to coop with these changes by implementing digital automated auditing such as computer assisted audit techniques (CAAT) software, audit data analytics software, big data and artificial intelligence software. It is thought that it is high time for accounting and audit profession to change its business model. This change in accounting and audit systems and its consequences on accounting and auditing has not been explored yet sufficiently in Sudan.

Research problem has focused on the current accounting and auditing digital transformation level in Sudanese companies and audit firms, compared to the current international digital technologies and the threats, awareness and preparedness of accounting and auditing profession in Sudan for these forthcoming challenges, the expected opportunities, the expected obstacles, skills gap and their plans and strategies to make such transformation possible and fill the skills gap.



Figure.1. Digital Transformation Cycle in Accounting and Audting

3. The Significance of Study

The study scientific significance originates from its ability to fill the skills gap by learning new IT skills. Moreover, it serves to prompt scholars to engage in further exploration to extend the theoretical knowledge by discussing, explaining and giving information on how digitalization impacts the accountancy and audit

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VIII October 2026

profession in Sudan, and how to preserve the quality, efficiency, reliability of the financial information and reduce effort, time and cost by raising competences and skills. The outcomes of this study to raise concern, alert and attention of accountants and auditors and helps them to understand the impact of digitalization on accountancy and audit profession in Sudan by giving practical insights of how to apply digital technologies in the provision of accounting and auditing services and how they can prepare themselves in advance for changes that are definitely coming and going to reshape the profession and bring overall change to the profession and how to turn challenges into opportunities and the threat into a companion.

4. The Objectives of Study

The study aims to achieve the following objectives:

1. To identify the impact of financial digitalization on the accountancy profession.
2. To clarify the influence of financial digitalization on the auditing profession.
3. To direct the attention of the regulator of accounting and auditing profession in Sudan to the skills gap which is a huge threat to the profession.

5. Study Hypotheses

The following hypotheses are tested in accordance with the study's stated problem and related objectives as shown in Figure.2.:

Hypothesis 1: The actual level of digitalisation in accountancy and audit profession in Sudan is high and the profession is observing and implementing the new digital technologies.

Hypothesis2: There is a statistically significant relationship between the level of digitalisation in accounting and auditing in Sudan and the company's characteristics including age, size, sector and foreign ownership.

Hypothesis3: There is a statistically significant relationship between the level of digitalisation in accounting and auditing in Sudan and the influence of digitalisation technologies on the profession.

Hypothesis4: There is a statistically significant relationship between the level of digitalisation in accounting and auditing in Sudan and the competences needed by auditors.

Hypothesis5: There is a statistically significant relationship between the level of digitalisation in accounting and auditing in Sudan and the obstacles to digitalisation.

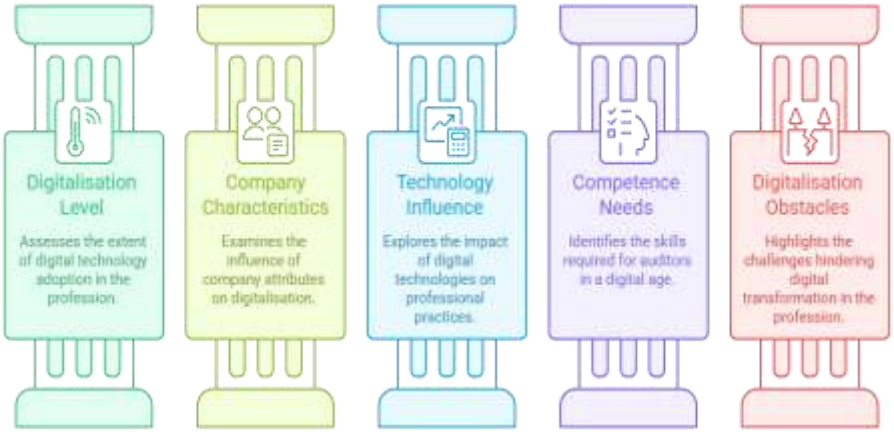


Figure.2. The Study Hypotheses

6. Study Structure

The study is organized into many sections to achieve its goals and evaluate its hypotheses: an overview of the study's scope, the theoretical foundation of digitalization and review of previous studies about digitalization , a detailed examination of on the external audit firms in Sudan as a case study and concluding with the presentation of findings and recommendations.

LITERATURE REVIEW

7.1 Definition of Digitalization

Digitalisation or digital transformation is a new topic and continuously developing and evolving . Max Neufeind, et.al, (2018), highlighted that there is enormous growth in the rate of IT computing power, storage capacity, connectedness and software applications transforming employment, disrupting businesses and challenging labour. Business Standards Magazine, accessed (30, November 2023, 09:13 AM,) has reported that, our jobs could be different and our skill sets may need a lift. So will be the case in audit. While we will continue to need the basic skills for accounting and auditing, working on the analytics component is the next stage of what we do, adding that, technology will allow us the freedom to move from our desks and engage more with customers and regulators. In this fast changing environment, it became challenging for dominant companies to remain competitive, because changes initiated by digital transformation has led to higher competition, as new entrants from other industries can become competitors because information and technologies are easily accessible to anyone, previous entry barriers become less significant (Vial, 2019). Nwankpa and Roumani, (2016) mentioned that, organizations are constantly transforming and evolving in response to changing business landscape, ushering unique changes in business operations, business processes and value creation. Karimi and Walter (2015), described digital transformation technologies as a disruptive one in consumer behavior and expectations, competitive landscape, and the availability of data. Digital technologies have an enormous effect on customers and shareholders who will have access and active dialogue with the organization (Yoo et al. 2010).

Digitalisation in contrast has been defined in Gartner IT Glossary (2016) as the process of changing from analog to digital form by encoding information into zeroes and ones so that computers can store, process and transmit data. Brennen and Kreiss (2016) defined digitalization as the use of digital technologies to change a business model to provide new revenue and value-adding opportunities. Autio (2017) defined digitalization to be the application of digital technologies and infrastructures in businesses, economy and society to change a business model to provide new revenue and value-adding opportunities and the application of digital technologies and infrastructures in businesses, economy and society.

Digitalisation is of great benefit to businesses by giving them a competitive advantage to perform well in providing a competitive market mix in the form of product, price and place by increasing productivity, lower costs and have a better design for products and know the patterns of customers needs. Digitalisation is also needed by governments for enabling them to provide better service to their citizens, and to the accounting profession to increase its abilities, efficiency and improve decision making process and to increase accountants' self confidence by eliminating delay and mistakes and improve their morale by getting rid of repetitive tasks and processes and giving them more time to learn and obtain new skills and participate in decision making, (Gartner 2016).

7.2 Previous Studies

Savić and Pavlović (2023) investigated the impact of digitalization on the accounting profession, aiming to provide a comprehensive understanding of how business digitalization reshapes the roles and competencies of accountants. With ongoing technological advancements, all aspects of accounting as a business function have either undergone or are expected to undergo significant transformation. Similarly, Angeles et al. (2023) examined the perceived benefits and challenges of digitalization within the audit profession, one of the fields

most directly affected by these changes. Their findings confirmed that auditors anticipate digitalization becoming increasingly prevalent in the future, without leading to job losses.

Ionescu-Feleagă et al. (2022) analyzed the development and digitalization of professional services in accounting and finance, comparing indicators across European countries. The study also identified international drivers of professional growth, concluding that high-income countries tend to offer a broader range of accounting and membership services. Awang et al. (2022) explored how accountants perceive digitalization as both an opportunity and a risk, while also assessing gender differences in these perceptions. The results revealed that digitalization presents significant opportunities and challenges for future accountants, though no notable gender-based differences were observed.

Fotoh and Lorentzon (2023) synthesized empirical studies and surveys conducted by accounting bodies to evaluate the future impact of digitalization on auditing. They proposed a transitional framework to help the audit profession remain competitive, highlighting that digitalization will likely have a profound influence on the field. In a similar vein, Sabuncu (2022) examined how professional accountants respond to digital transformation, identifying their needs and strategies for managing this process. The study emphasized that accountants must adapt quickly to digital transformation to ensure professional and economic survival. Quraishi and Islam (2025) focused on Bangladesh, exploring the transformative consequences of digitalization on accounting and auditing practices. Their findings showed that while digitalization enhances operational efficiency, transparency, and automation, it also introduces challenges such as financial and technical constraints, knowledge gaps between IT professionals and accountants, and cybersecurity concerns. Shuhidan et al. (2023) investigated the relationship between future accountants' technological knowledge and readiness for digitalization, concluding that greater technological preparedness directly improves adaptability to industry changes.

Ogaluzor (2019) described digitalization as a pressing issue in the business world, stressing that accountants must acquire new skills to meet evolving demands and overcome fears of change. The study found that digitalization positively affects accountants' work, serving as a supportive tool rather than a threat. Ghorbani (2019) examined the adoption of new technologies in accounting, noting that while these innovations can improve performance, firms sometimes adopt "trendy" technologies that ultimately prove unsuitable for their employees or organizational size.

Finally, Keskinen and Tarwireyi (2019) studied the impact of automation on audit processes in Swedish firms. Their findings indicated that automation enhances audit quality and efficiency by reducing human error and accelerating processes, while also enabling auditors to draw stronger conclusions. However, the study emphasized that auditors will continue to require strong competencies, with IT knowledge becoming increasingly vital as technology integrates further into auditing. The execution stage of the audit process was identified as the most affected by automation.

MATERIAL AND METHODS:

The study adopts a descriptive analytical approach encompassing the explanation of study variables, data collection, analysis, presentation and conclusion drawing.

1. **Study population and sample:** The study population consist of certified accountants and auditors, who are practicing in Sudan in the years 2022 to 2024, with different academic and professional qualifications, which consist of about 100 practicing auditors with registered offices, this exclude trainees and unauthorized auditors. This study sample was chosen is purposive sampling. From the sample chosen consisting of 97 auditors, 8 auditors apologized for being not in audit practice now and 30 auditors did not respond to the questionnaire, with 61 auditors have sent their responses which represents about 69% of the sample selected, with one participant rejected for little experience and lack of consistency in answers. The remainder 60 responses have been analyzed.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VIII October 2026

2. **Study tool:** The researchers used the questionnaire as a main tool for collecting primary data from the study sample. A letter was attached with the questionnaire to the respondents in which they were oriented about the title of the study and the purpose of the questionnaire.

3. **The statistical methods used were:** Because the sample is purposive and small, The Statistical Package for Social Sciences (SPSS) has not been used to analyse the data gathered from the sample through the questionnaire. Also Chi-squared test has not been used because it is used with large samples. Therefore, the data has been analysed mathematically by using Excel functions and formulas . Linear regression method was used to test the hypotheses, where the nominal variables (strongly agree, agree, neutral, disagree, strongly disagree) were transformed into quantitative variables (4, 5, 3, 2, 1), respectively to achieve the objectives of the study and verify its hypotheses.

9. Descriptive Analysis Of Variables :

9.1 Descriptive Analysis of the Personal Variables of the Study Sample as shown in Table.1.

Table 1. Shows the frequencies and percentages of the personal variables in the sample.

Description		Frequencies	Percentages
variable	change categories		
Academic Specialization	Accounting	52	86%
	Business Administration	4	7%
	Finance	3	5%
	Other	1	2%
	Total	**60**	**100%**
Academic Qualification	Bachelor	28	64.5%
	High Diploma	4	4.4%
	Master	16	17.8%
	PhD	9	10%
	Other	3	3.3%
	Total	**60**	**100%**
Professional Qualification	ACCA	43	71.7%
	CPA	4	6.7%
	CIA	1	1.6%
	CISSA	2	3,3%
	CMA	2	3,3%
	Other	7	11.8%
	None	1	1.6%
	Total	**60**	**100%**
Job Position	Partner	11	18.3%
	Audit Manager	15	25%
	Senior Auditor	13	21.7%
	Auditor	6	10%
	Audit Assistant	4	6.7%
	Other	11	18.3%
	Total	**60**	**100%**
Experience	Less than 5 years	0	0%
	5 - 10 years	4	6.7%
	10 – 15 years	11	18.3%
	15 – 20 years	8	13.3%
	More than 20 years	37	61.7%
	Total	**60**	**100%**

9.2 The Descriptive Statistical Analysis of Basic Data

9.2.1 Analysis of dependent variable 1 : a

(i) The Digitalisation level in Sudan

The level of digitalisation in Sudan has been measured using the mean and the standard deviation of the questions of the variables in the self-completed questionnaire. it was clear that, the majority of participants indicated that they do not have sufficient experience in most accounting function digital technologies. There were only two technologies in which the number of participants who have sufficient experience were more than those who have insufficient experience were tax application and process automation.

The researcherst found that the majority number of participants have indicated that they have insufficient experience in all audit digital technologies except for Excel spreadsheets. This was a clear expression of the level of digitalisation of auditing in Sudan. In conclusion, out of 16 digital technologies, participants said they have sufficient experience in only 3 (two in accounting and one in auditing) and have insufficient experience in the remainder 13 technologies.

Fig. 3 and Fig.4 for show the ranking means of the digitalization level for accounting and audting professions.

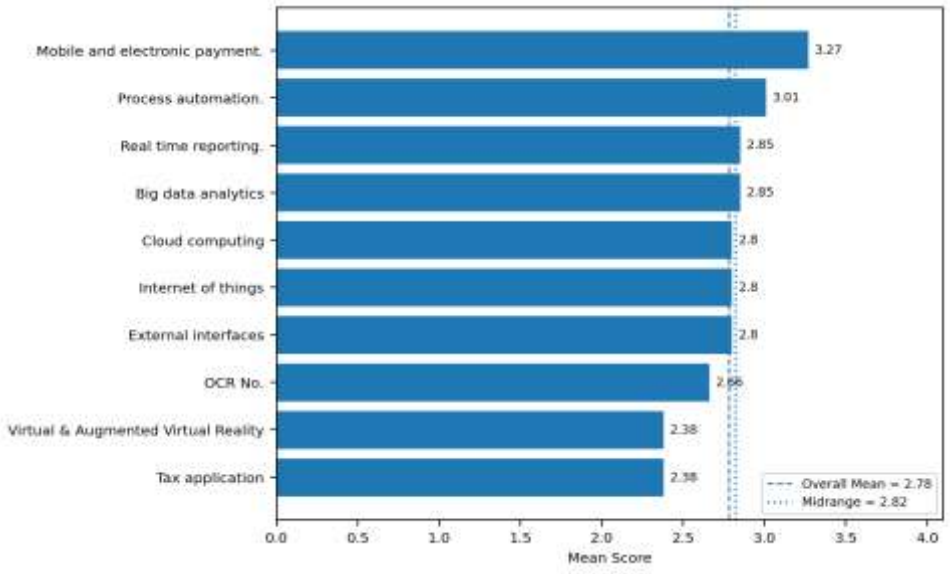


Figure.3. Digitalisation Level – Ranking of Means of Accounting

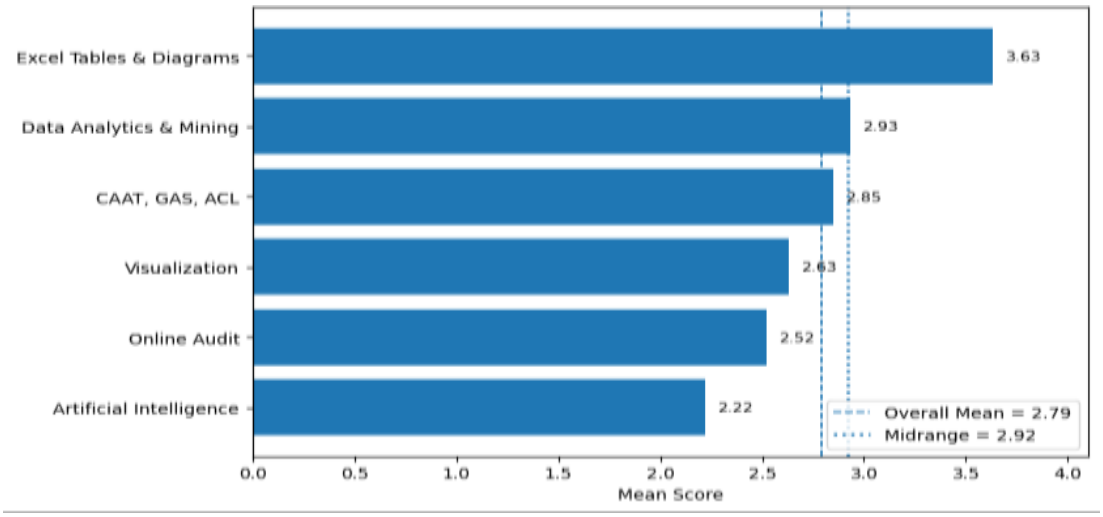


Figure.4. Digitalisation Level – Ranking of Means of Auditing

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VIII October 2026

From Figures 4 and 5 above, the means of accounting technologies and audit technologies were approximately similar, 2.78 and 2.80 respectively, which indicated that the level of digitalisation and experience in the two functions is nearly similar. The whole variable (Dependent variable 1: the level of digitalisation in accounting and auditing in Sudan) is 2.79 which has been well below the midrange of the Likert Scale which is 1 + 5 / 2 = 3 and also below the midrange of the means of all questions in this variable which is the highest value + the lowest value / 2 = 2.22 + 3.63/2 = 5.85/2 = 2.93, which indicated that the researched sample has not agreed to the particular statements or questions asked to them and they stated that they do not have sufficient experience in the technologies mentioned.

Table 4: Digitalisation Level –Ranking of Means Accounting and Auditing Ascending

No.	Statement	Ranking of Means
1	Artific. intelligence	2.22
2	Tax application	2.38
3	Virtual & Augmented Virtual Reality	2.38
4	Online audit	2.52
5	Visualization	2.63
6	OCR No.	2.66
7	Cloud computing	2.8
8	Internet of things	2.8
9	External interfaces	2.8
10	Real time reporting.	2.85
11	Big data analytics	2.85
12	(CAAT), GAS, (ACL)	2.85
13	Data analyt&Mining	2.93
14	Process automation.	3.01
15	Mobile and electronic payment.	3.27
16	Excel tables and diagrams	3.63
	Total of all Means	44.58
	Whole Variable Mean = TTL/16	2.79

From Table 4 above, it has been clear that technologies in which participants have insufficient experience in most of digital technologies tested were, artificial intelligence, tax application, Virtual Reality and Augmented Virtual Reality, online audit, optical character recognition for external documents, visualization, and cloud computing respectively. The midrange of above means was equal to 2.22 + 3.63/2 = 2.92. Of the 16 digital technologies tested, participants have low experience in 13 technologies, low than the midrange of the means of the digital technologies tested which was 2.92 and also the midrange of Likert Scale which was 3. One technology, process automation, has scored exactly the same mean as the midrange and for only two technologies participants have said that they have sufficient experience which was above the midrange of 3, and these two technologies were mobile and electronic payment and Excel tables and diagrams and the researcher believed that this finding was true and described the situation where only limited, old and basic digital financial technologies still prevailing and have domination in accountancy and audit profession in Sudan in an era of a digital technologies revolution.

(ii) Standard deviation of digitalisation level

Table 5: Standard Deviation of digitalisation level

No.	Statement	Statements Means x	Variable Mean x	Variance (x-x)	Sq.Var. $(x - x)^2$
1	Cloud computing	2.80	2.79	0.01	0.0001
2	Internet of things	2.80	2.79	0.01	0.0001

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VIII October 2026

3	Real time reporting.	2.85	2.79	0.06	0.0036
4	Big data analytics	2.85	2.79	0.06	0.0036
5	OCR No,	2.66	2.79	-0.13	0.0169
6	External interfaces	2.80	2.79	0.01	0.0001
7	Tax application	2.38	2.79	-0.41	0.1681
8	Mobile and electronic payment.	3.27	2.79	0.48	0.2304
9	Virtual & Augmented Virtual	2.38	2.79	-0.41	0.1681
10	Process automation.	3.01	2.79	0.22	0.0484
11	Excel tables and diagrams	3.63	2.79	0.84	0.7056
12	(CAAT), GAS, (ACL)	2.85	2.79	0.06	0.0036
13	Online audit	2.52	2.79	-0.27	0.0729
14	Data analyt&Mining	2.93	2.79	0.14	0.0196
15	Artf.Intelligence	2.22	2.79	-0.57	0.3249
16	Visualization	2.63	2.79	-0.16	0.0256
	Total	**44.58**	**2.79**		**1.7916**

As measures of central tendency like the mean indicate the most representative value of a distribution , they do not give how it is dispersed around the mean and therefore standard deviation has been calculated to measure dispersion. The standard deviation is calculated as follows :

Standard Deviation (S) = Sq.Root of variations = sigma $\sqrt{(x - x)^2 / N}$

$$S = \sqrt{\frac{\Sigma(x - x)^2}{N}}$$

From Table 4/2/2/8 above :

$$S = \sqrt{\frac{\Sigma(x - x)^2}{N}}$$

S = 1. 3385/16 = 0.0836

Standard deviation is about 8 percent which means that there is a chance that digitalisation mean which we calculated to be 2.79 could increase or decrease by 8 percent around this mean. As standard deviation is 8, the mean has been accepted as representing the distribution and also the sample studied.

9.2.2 Analysis of independent variable 2 : company characteristics

(i) The Mean and Midrange of company characteristics

The researchers found that 56 participants out of 60 representing (93%) of participants agreed and strongly agreed that telecommunication companies are implementing accounting and auditing digital technologies, followed by banking companies 53 participants representing (88%), then big size companies 49 participants representing (82%) and foreign or partly foreign companies with 48 participants representing (80%) of participants. The other kinds of companies were implementing these technologies to some extent, for example insurance companies, 27 participants agreed they were implementing digital technologies which were 45% of participants, and manufacturing companies 25 participants which was 42%. Participants did not agree that old companies are capable of implementing digital technologies with only 14 participants indicated their agreement out of 60.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VIII October 2026

9.2.3 Analysis of independent variable 3 : Influence of digital technologies

(i) The Mean and Midrange of influence of digitalisation

The researchers found that , the highest influence of digitalisation on Accounting and Auditing has been on time saving with a Mean of 4.20, then on the increase in reporting speed with a Mean of 4.18, then improvement in data quality Mean 4.17, then the ability to provide new services Mean of 4.07 and easy storing and retrieval of data and documents Mean of 4.02. The least influence was on requesting continuous auditing, reduction in know your client risks, cost reduction and reduction in detection risks, which are core areas of influence which participants thought are not influenced by digitalisation of accounting and auditing till now. Participants responded that digitalisation influence on time saving, reporting speed and data quality was great than the other influences. Of course these influences highly rated by them looked like general influences rather than real and specific influences like audit risks and fraud reduction, cost and staff reduction, competences increase and so on. Although participants identified some influences to be more experienced by them than other influences, but the overall differences between all influences was not so wide, which indicated that all influences were nearly or approximately similar and this was clear from the chart in figure 18 below.

(ii) Standard deviation of digital technology influence

The researchers found that ,the Standard deviation is about 7 percent which means that there is a chance that digital technologies influence on accounting and auditing mean which we calculated to be 3.81 could increase or decrease by 7 percent around this mean. As standard deviation is 7 percent, the mean has been accepted as representing the distribution and also the sample studied.

(iii) Correlation between digitalisation influence and accounting digitalisation level

Table 10 : Correlation between influence of digitalisation and level of digitalisation

No.	Influence of Digitalisation	(x)	Digitalisation Level	(y)	$(x)^2$	$(y)^2$	Xy
1	Our clients are asking for continuous automated auditing	3.07	Artific. intelligence	2.22	9.42	4.93	6.82
2	Know your client risks are reduced	3.35	Tax application	2.38	11.22	5.66	7.97
3	Audit cost is reduced	3.37	Virtual & Augmented Virtual Reality	2.38	11.36	5.66	8.02
4	Entire population audit has reduced sampling and detection risks	3.53	Online audit	2.52	12.46	6.35	8.90
5	Operations and staff cost is reduced	3.58	Visualization	2.63	12.82	6.92	9.42
6	Capability of fraud detection has increased	3.68	OCR No.	2.66	13.54	7.08	9.79
7	Tedious month-end and year-end work removed	3.73	Cloud computing	2.8	13.91	7.84	10.44
8	The way of collection of audit evidence has improved	3.88	Internet of things	2.8	15.05	7.84	10.86
9	Audit process is more efficient and reliable	3.92	External interfaces	2.8	15.37	7.84	10.98
10	Staff competence has increased	3.93	Real time reporting.	2.85	15.44	8.12	11.20
11	Speed and quality of audit has improved	3.98	Big data analytics	2.85	15.84	8.12	11.34

12	Digital financial reporting now is possible	4	(CAAT), GAS, (ACL)	2.85	16.00	8.12	11.40
13	Processes are streamlined	4	Data analyt&Mining	2.93	16.00	8.58	11.72
14	Easy secure storing and retrieval of data and documents	4.02	Process automation.	3.01	16.16	9.06	12.10
15	We can provide new services	4.07	Mobile and electronic payment.	3.27	16.56	10.69	13.31
16	Data quality has improved	4.17	Excel tables and diagrams	3.63	17.39	13.18	15.14
	Total	**60**		**45**	**229**	**126**	**169**

9.2.4 Analysis of independent variable 4 : Digital Competences Needed

(i) The Mean and Midrange of digital competences needed in Sudan

Table 11: Competences needed in accounting and auditing - Frequency and Percentages

No	Statement/Scale	5 Strongly agree	4 Agree	3 Neutral	2 Disagree	1 Strongly Disagree	TTL
1	University courses are not adequate	23	32	4	1	0	60
	University courses are not adequate %	38	53	7	2	0	100%
	Score(No. x Scale)	115	128	12	2	0	257
2	We need IT- based courses	35	25	0	0	0	60
	We need IT- based courses %	58	42	0	0	0	100%
	Score(No. x Scale)	175	100	0	0	0	275
3	We need big data analytics courses	34	25	1	0	0	60
	We need big data analytics courses %	56	42	2	0	0	100%
	Score(No. x Scale)	170	100	3	0	0	273
4	We need cloud computing courses	31	27	1	1	0	60
	We need cloud computing courses %	51	45	2	2	0	100%
	Score(No. x Scale)	155	108	3	2	0	268
5	We need Internet of things course	27	30	3	0	0	60
	We need Internet of things course %	45	50	5	0	0	100%
	Score(No. x Scale)	135	120	9	0	0	264
6	We need programming languages courses	22	21	10	7	0	60
	We need programming languages courses %	36	35	17	12	0	100%
	Score(No. x Scale)	110	84	30	14	0	238
7	We need real time accounting and reporting courses	31	26	2	1	0	60
	We need real time accounting and reporting courses %	52	43	3	2	0	100%
	Score(No. x Scale)	155	104	6	2	0	267
8	We need digital audit courses	32	27	1	0	0	60
	We need digital audit courses %	53	45	2	0	0	100%
	Score(No. x Scale)	160	108	3	0	0	271

9	Work place learning is not adequate	18	26	12	4	0	60
	Work place learning is not adequate %	30	43	20	7	0	100%
	Score(No. x Scale)	90	104	36	8	0	238
10	We need cyber security courses	31	22	6	1	0	60
	We need cyber security courses	52	36	10	2	0	100%
	Score(No. x Scale)	155	88	18	2	0	263

Table 12: Competences needed in Accounting and Auditing – Means

No	Statement/Scale	TTL Score (Scale x No.)	Participants No.	Means (Score/No.)
1	University courses are not adequate	257	60	4.28
2	We need IT- based courses	275	60	4.48
3	We need big data analytics courses	273	60	4.55
4	We need cloud computing courses	268	60	4.47
5	We need Internet of things course	264	60	4.4
6	We need programming languages courses	238	60	3.97
7	We need real time accounting and reporting courses	267	60	4.45
8	We need digital audit courses	271	60	4.52
9	Work place learning is not adequate	238	60	3.97
10	We need cyber security courses	263	60	4.38
	Total			**43.47**
	Variable Mean(total/10)	**43.47/10**		**4.35**

From Table 12 above, participants have agreed and strongly agreed that the most competences required in Sudan in accounting and auditing functions are big data analytics courses, digital audit courses, I-T based courses, cloud computing courses, real time accounting and reporting courses and Internet of things courses. The least competences required by participants are programming languages courses, work place learning, university courses, cypersecurity courses. The analysis of competences courses required by participants correlates and explain the low level of digitalisation analysed and discussed above.

(ii) Standard deviation of digital competences needed by auditors

Table 13: Standard Deviation of Digital Technologies Needed by Auditors

No.	Statement	Statements Means x	Variable Mean x	Variance x-x	Sq.Var. $(x - x)^2$
1	We need programming languages	3.97	4.35	-0.38	0.1444
2	Work place learning is not	3.97	4.35	-0.38	0.1444
3	University courses are not adequate	4.28	4.35	-0.07	0.0049
4	We need cyber security courses	4.38	4.35	0.03	0.0009
5	We need Internet of Things courses	4.40	4.35	0.05	0.0025
6	We need real time accounting and	4.45	4.35	0.1	0.01
7	We need cloud computing courses	4.47	4.35	0.12	0.0144
8	We need IT- based courses	4.48	4.35	0.13	0.0169
9	We need digital audit courses	4.52	4.35	0.17	0.0289
10	We need big data analytics courses	4.55	4.35	0.2	0.04
	Total				**0.4073**

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VIII October 2026

Standard Deviation (S) = Sq.Root of variations = sigma $\sqrt{(x - x)^2 / N}$

$$S = \sqrt{\frac{\Sigma(x - x)^2}{N}}$$

From Table 4/2/2/13 above :

$$S = \sqrt{\frac{\Sigma(x - x)^2}{N}}$$

$S = \sqrt{0.4073/10} = 0.0638$

Standard deviation is about 6 percent which means that there is a chance that digital competences required in accounting and auditing mean which we calculated to be 4.35 could increase or decrease by 6 percent around this mean. As standard deviation is 6 percent, the mean has been accepted as representing the distribution and also the sample studied.

(iii) Correlation between digital competences needed and accounting digitalisation

Table 14: Correlation between digital competences needed and accounting level of digitalisation

No.	Competences required	(x)	Digitalisation Level	(y)	$(x)^2$	$(y)^2$	xy
1	We need programming languages courses	3.97	Virtual & Augmented Virtual Reality	2.38	15.76	5.66	9.45
2	Work place learning is not adequate	3.97	Tax application	2.38	15.76	5.66	9.45
3	University courses are not adequate	4.28	OCR No	2.66	18.32	7.08	11.38
4	We need cyber security courses	4.38	Cloud computing	2.8	19.18	7.84	12.26
5	We need Internet of Things courses	4.4	Internet of things	2.8	19.36	7.84	12.32
6	We need real time accounting and	4.45	External interfaces	2.8	19.80	7.84	12.46
7	We need cloud computing courses	4.47	Real time reporting.	2.85	19.98	8.12	12.74
8	We need IT- based courses	4.48	Big data analytics	2.85	20.07	8.12	12.77
9	We need digital audit courses	4.52	Process automation.	3.01	20.43	9.06	13.61
10	We need big data analytics courses	4.55	Mobile and electronic payment.	3.27	20.70	10.69	14.88
	Total	**43**		**28**	**189**	**78**	**121**

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VIII October 2026

9.2.5 Analysis of independent variable 5 : Obstacles to Digitalisation

(i) The Mean and Midrange of obstacles to digitalisation

Table 15: Obstacles to digitalisation in accounting and auditing - Frequency and Percentages

No	Statement/Scale	5 Strongly agree	4 Agree	3 Neutral	2 Disagree	1 Strongly Disagree	TTL
1	4G Internet speed is low	17	30	6	7	0	60
	4G Internet speed is low %	28	50	10	12	0	!00%
	Score(No. x Scale)	85	120	18	14	0	237
2	Frequent shutdown of Internet	29	22	6	3	0	60
	Frequent shutdown of Internet %	48	37	10	5	0	100%
	Score(No. x Scale)	145	88	18	6	0	257
3	Electricity shortage	33	24	2	1	0	60
	Electricity shortage %	55	40	3	2	0	100%
	Score(No. x Scale)	165	96	6	2	0	269
4	Internet cost is unaffordable	12	20	16	11	1	60
	Internet cost is unaffordable %	20	33	27	18	2	100%
	Score(No. x Scale)	60	80	48	22	1	211
5	Privacy and security concerns are high	17	24	14	5	0	60
	Privacy and security concerns are high %	28	40	24	8	0	100%
	Score(No. x Scale)	85	96	42	10	0	233
6	Too high risks	12	16	22	10	0	60
	Too high risks %	20	27	37	16	0	100%
	Score(No. x Scale)	60	64	66	20	0	210
7	Staff low digital competences	22	29	5	4	0	60
	Staff low digital competences %	37	48	8	7	0	100%
	Score(No. x Scale)	110	116	15	8	0	249
8	Technologies are complex	5	20	17	17	1	60
	Technologies are complex %	8	33	28	29	2	100%
	Score(No. x Scale)	25	80	51	34	1	191
9	Regulations are not up to date	23	21	11	4	1	60
	Regulations are not up to date %	38	35	18	7	2	100%
	Score(No. x Scale)	115	84	33	8	1	241
10	Technology and software cost is high	17	30	6	7	0	60
	Technology and software cost is high %	28	50	10	12	0	100%
	Score(No. x Scale)	85	120	18	14	0	237
11	Lack of governmental role and political commitment	29	22	7	1	1	60
	Lack of governmental role and political commitment %	48	36	12	2	2	100%
	Score(No. x Scale)	145	88	21	2	1	257

Table 16 : Obstacles in Implementing Accounting and Auditing Digitalisation – Means				
No	Statement/Scale	TTL Score (Scale x No.)	Participants No.	Means (Score/No.)
1	4G Internet speed is low	237	60	3.95
2	Frequent shutdown of Internet	257	60	4.28
3	Electricity shortage	269	60	4.48
4	Internet cost is unaffordable	211	60	3.52
5	Privacy and security concerns are high	233	60	3.88
6	Too high risks	210	60	3.5
7	Staff low digital competences	249	60	4.15
8	Technologies are complex	191	60	3.18
9	Regulations are not up to date	241	60	4.02
10	Technology and software cost is high	237	60	3.95
11	Lack of governmental role and political commitment	257	60	4.28
	Total			**43.19**
	Variable Mean(total/10)			**3.923**

From Table 16 above, participants agreed that the most five obvious obstacles to digitalisation of accounting and auditing in Sudan are electricity shortage, lack of governmental role and political commitment, frequent shutdown of internet, staff low digital competences and regulations. Most of these obstacles are the responsibility of authorities and mainly failing to avail continuous facilities like electricity and internet and driving, overseeing and managing the change for a digital public services and private sector digitalisation.

The obstacles which participants thought as not important in precluding the digitalisation of accounting and audit profession in Sudan were complexity of technologies, risks associated with digitalisation, internet cost, privacy and security issues and low speed 4G internet.

(ii) Standard deviation of obstacles to digitalisation

Table 17: Standard Deviation of Obstacles to Digitalisation

No.	Statement	Statements Means x	Variable Mean x	Variance x-x	Sq.Var. $(x - x)^2$
1	Technologies are complex	3.18	3.92	-0.74	0.5476
2	Too high risks	3.50	3.92	-0.42	0.1764
3	Internet cost is unaffordable	3.52	3.92	-0.4	0.1600
4	Privacy and security concerns are	3.88	3.92	-0.04	0.0016
5	4G Internet speed is low	3.95	3.92	0.03	0.0009
6	Technology and software cost is	3.95	3.92	0.03	0.0009
7	Regulations are not up to date	4.02	3.92	0.1	0.0100
8	Staff low digital competences	4.15	3.92	0.23	0.0529
9	Frequent shutdown of Internet	4.28	3.92	0.36	0.1296
10	Lack of governmental role and	4.28	3.92	0.36	0.1296
11	Electricity shortage	4.48	3.92	0.56	0.3136
	Total				**1.5231**

Standard Deviation (S) = Sq.Root of variations = sigma $\sqrt{(x - x)^2 / N}$

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VIII October 2026

$$S = \sqrt{\frac{\Sigma(x - x)^2}{N}}$$

From Table 4/2/2/13 above :

$$S = \sqrt{\frac{\Sigma(x - x)^2}{N}}$$

$S = \sqrt{1.5231/11} = 0.11219$

Standard deviation is about 11 percent which means that there is a chance that obstacles of digitalisation impeding digitalisation of accountancy and audit profession in Sudan mean which we calculated to be 3.92 could increase or decrease by 1 1 percent around this mean. As standard deviation is 11 percent, the mean has been accepted as representing the distribution and also the sample studied.

(iii) Correlation between obstacles to digitalisation and accounting digitalisation level

Table 18: Correlation between obstacles to digitalisation and accounting level of digitalisation

No.	Obstacles to Digitalisation	(x)	Digitalisation Level	(y)	$(x)^2$	$(y)^2$	Xy
1	Too high risks	3.5	Virtual & Augmented	2.38	12.25	5.66	8.33
2	Internet cost is unaffordable	3.52	Tax application	2.38	12.39	5.66	8.38
3	Privacy and security concerns	3.88	OCR No	2.66	15.05	7.08	10.32
4	4G Internet speed is low	3.95	Cloud computing	2.8	15.60	7.84	11.06
5	Technology and software cost is	3.95	Internet of things	2.8	15.60	7.84	11.06
6	Regulations are not up to date	4.02	External interfaces	2.8	16.16	7.84	11.26
7	Staff low digital competences	4.15	Real time reporting.	2.85	17.22	8.12	11.83
8	Frequent shutdown of Internet	4.28	Big data analytics	2.85	18.32	8.12	12.20
9	Lack of governmental role	4.28	Process automation.	3.01	18.32	9.06	12.88
10	Electricity shortage	4.48	Mobile and electronic	3.27	20.07	10.69	14.65
	Total	**40**		**28**	**161**	**78**	**112**

(iv) Correlation between obstacles to digitalisation and auditing digitalisation level

Table 19: Correlation between obstacles to digitalisation and auditing level of digitalisation

No.	**Obstacles to Digitalisation**	(x)	**Digitalisation Level**	(y)	$(x)^2$	$(y)^2$	xy
1	Internet cost is unaffordable	3.52	Artific. intelligence	2.22	12.25	5.66	8.33

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VIII October 2026

2	Privacy and security concerns are high	3.88	Online audit	2.52	12.39	5.66	8.38
3	4G Internet speed is low	3.95	Visualization	2.63	15.05	7.08	10.32
4	Staff low digital competences	4.15	(CAAT), GAS, (ACL)	2.85	15.6	7.84	11.06
5	Frequent shutdown of Internet	4.28	Data analyt&Mining	2.93	15.6	7.84	11.06
6	Electricity shortage	4.48	Excel tables and diagrams	3.63	16.16	7.84	11.26
	Total	**24**		**17**	**87**	**42**	**60**

10. Hypthosises Testing

10.1 First hypothesis Test :

The first hypothesis proposed was that the The actual level of digitalisation in accountancy and audit profession in Sudan is high and the profession is observing and implementing the new digital technologies. However, the survey results revealed a different reality. Most participants indicated that they lacked sufficient experience with digital technologies in accounting and auditing. This was measured by the frequency of responses across 16 technologies. Out of 60 participants in the sample:

297 responses (31%) stated they had sufficient experience with these technologies.447 responses (46%) indicated insufficient knowledge.217 responses (23%) were neutral or expressed unfamiliarity.

When comparing the number of participants who reported sufficient experience 297 with those who reported insufficient experience 447, it became evident that, for most technologies, the majority lacked adequate expertise. The only exceptions were in tax applications, process automation, and the use of Excel tables and diagrams, where participants showed relatively stronger familiarity.

Based on this analysis, the researchers concluded that the overall impact and level of digitalisation in Sudan's accountancy and audit profession remains very low. The profession is still largely dependent on basic tools such as Excel and tax applications, and it is not keeping pace with the adoption of modern financial digital technologies.

10.2 Second HypothesisTest

The second hypothesis is as follows:There is a statistically significant relationship between the level of digitalisation in accounting and auditing in Sudan and the company's characteristics including age, size, sector and foreign ownership.

As the correlation coefficient between company characteristics and the accounting function digitalisation level is 0.650 and the correlation between company characteristics and the auditing function digitalisation level is 0.764, there is a positive nearly strong correlation between company characteristics and the level of digitalisation in accounting and company characteristics and also a positive strong correlation between company characteristics and the level of digitalisation in auditing. From the result of the analysis, it can be said that company characteristics are strongly positively correlated with the level of digitalisation in accounting and auditing and that any increase in any one of them leads to an increase in the other. Therefore company characteristics can determine the level of digitalisation of accounting and auditing in Sudan, specially in banking sector, foreign and partly foreign, big companies and telecommunication sector.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue VIII October 2026

10.3. Third Hypothesis Test

The third hypothesis is as follows:There is a statistically significant relationship between the level of digitalisation in accounting and auditing in Sudan and the influence of digitalisation technologies on the profession.

As the correlation coefficient is 0.17, there is a low or weak correlation between digitalisation level in accounting and the influence of digital technologies on accounting and auditing, which has indicated that any change in one of them may not lead to a change in the other. In other words, the influence of digitalisation can not determine the level of digitalisation of accounting and auditing in Sudan.

10.4. Fourth Hypothesis Test

The fourth hypothesis is as follows:There is a statistically significant relationship between the level of digitalisation in accounting and auditing in Sudan and the competences required.

As the correlation coefficient is 0.469, there is a moderate correlation between digitalisation level in accounting and auditing and the competences needed by auditors, which indicated that there is positive approximately moderate relationship between these tow variables as measured from participant's responses, In other words, competences needed by auditors can determine to a moderate extent the level of digitalisation of accounting and auditing in Sudan.

10.5. Fifth Hypothesis Test

The fourth hypothesis is as follows: There is a statistically significant relationship between the level of digitalisation in accounting and auditing in Sudan and the obstacles to digitalisation.

As the correlation coefficient is 0.0, the relationship between digitalisation level in both accounting and auditing and obstacles of digitalisation is in no linear relationship, For the relationship between digitalisation obstacles and the level of digitaisation in accounting and auditing, the coefficient is – 1., which is an inverse correlation and indicated a perfect negative relationship and explains how the two variables move in opposite directions and any increase in obstacles is associated with and of course will lead to a decrease in the level of digitalisation.

In addition to hypotheses testing, if we compare the Means of the five variables, the comparison has revealed which one of the variables has a Mean above the Likert 5 Scale calculated Mean which is 1 + 5 / 2 = 3. Therefore, a Mean above 3 will indicate that the participants tend to agree to the variable statements and a Mean below 3 will indicate that participants tend to disagree to the variable. As shown below, adoption of digital technologies has scored the least mean and participants tend to disagree to the variable that there is sufficient experience in digital technologies in Sudan, whereas they tend to agree that influence of technologies is high, digital competences are needed, obstacles are high and company characteristics determine the level of adoption of digital technologies in accounting and auditing in Sudan.

Table 20 : Variables Means

Variable No. and name	Variable Mean
V 1: Adoption of digital technologies in Sudan	2.79
V 2: Company characteristics	3.57
V 3: Influence of digital technologies on accounting and auditing	3.81
V 4: Competences needed in accounting and auditing in Sudan	4.35
V 5: Obstacles to digitalisation in Sudan	3.92

CONCLUSION AND RECOMMENDATION

We have highlighted a number of important results in light of the study's findings. Firstly, our research has concluded that there is low level of digitalization in accounting and auditing profession in Sudan and that the profession is still struggling and locked in the old technologies such as Excel sheets and tables and that some old technologies in the audit function such as CAAT, GAS, ACL software are still not used or implemented by auditors in Sudan. Furthermore, the profession is suffering from this prolonged backwardness and needs all efforts of its members and government to change this inherited backwardness by implementing the latest digital financial technologies so as to overcome the difficulties and avoid the threats which the researcher thinks are so imminent.

We provide a number of recommendations based on these findings. Firstly, it is essential for Accountancy bodies to form a task force to assess the current situation and what is needed to bring the profession up-to-date in technology and the technologies which are readily and easily usable by the members and make them compulsory within a specified short period of time. Secondly, we advocate for a heightened interest within the accounting and auditing firms to increase and intensify training courses, forums and workshop in personal or virtual through webinars and other means. Thirdly, forming a liaison committee with government authorities to facilitate the importation and implementation of the digital technologies hardware and software. Lastly. encouraging cooperation with international accounting bodies to bridge the gap between international adoption of digital technologies and the local adoption.

REFERENCES:

1. Angeles, E. J. A. A., Mabazza, G. B. M., Pascua, A. E. G. B. P., Salta, K. E. S., Santiago, Z. J. V. S., Marquez, J. M., & Catacutan, K. J. (2023). Shift to digital audit: A study investigating the benefits and challenges of digitalization on the audit profession. Asian Journal of Management Analytics, 2(4), 415–440. https://doi.org/10.55927/ajma.v2i4.6294
2. Autio, E. (2017). Digitalisation, ecosystems, and entrepreneurship. In N. Foss & T. Saebi (Eds.), Business model innovation: The organizational dimension (pp. 119–144). Oxford University Press.
3. Awang, Y., Shuhidan, S. M., Taib, A., Rashid, N., & Hasan, M. S. (2022, October). Digitalization of accounting profession: An opportunity or a risk for future accountants? In Proceedings (Vol. 82, No. 1, p. 93). MDPI. https://doi.org/10.3390/proceedings2022082093
4. Brennen, J. S., & Kreiss, D. (2016). Digitalization. In J. D. Pooley & R. T. Craig (Eds.), The International Encyclopedia of Communication Theory and Philosophy (pp. 1–11). Wiley & Sons.
5. Fotoh, L. E., & Lorentzon, J. I. (2023). Audit digitalization and its consequences on the audit expectation gap: A critical perspective. Accounting Horizons, 37(1), 43–69. https://doi.org/10.2308/HORIZONS-2021-027
6. Gartner. (2016). IT glossary. www.gartner.com
7. Ghorbani, N. (2019). Determinants of digitalisation in accounting function: A quantitative study (Master's thesis, Umeå University, Sweden).
8. https://www.diva- portal.org/smash/get/diva2:1501918/FULLTEXT01.pdf
9. International Accounting Education Standards Board (IAESB). (2014). Factsheet. https://www.ifac.org
10. Ionescu-Feleagă, L., Dragomir, V. D., Bunea, Ș., Stoica, O. C., & Barna, L. E. L. (2022). Empirical evidence on the development and digitalization of the accounting and finance profession in Europe. Electronics, 11(23), 3970. https://doi.org/10.3390/electronics11233970
11. Karimi, J., & Walter, Z. (2015). The role of dynamic capabilities in responding to digital disruption: A factor-based study of the newspaper industry. Journal of Management Information Systems, 32(1), 39–81.
12. Keskinen, M., & Tarwireyi, R. C. (2019). Automation and transformation of the audit process: A qualitative research on the impact of automation on the audit process (Master's thesis).
13. https://www.diva-portal.org/smash/record.jsf?pid=diva2%3A1324510&dswid=6255
14. Neufeind, M., O'Reilly, J., & Ranft, F. (2018). Work in the digital age: Challenges of the Fourth Industrial Revolution. Rowman & Littlefield International Ltd.

15. Nwankpa, J. K., & Roumani, Y. (2016). IT capability and digital transformation: A firm performance perspective. In Proceedings of the International Conference on Information Systems (pp. 4–5).
16. Ogaluzor, O. I. (2019). Digitizing and the job of the accountant: A threat or a companion? International Journal of Business Marketing and Management, 4(11), 28–39. https://www.ijbmm.com
17. Power, D. J. (2004). A brief history of spreadsheets. DSS Resources, 3(6). www.dssresources.com
18. Quraishi, M. K., & Islam, M. A. (2025). Adoption of digital accounting and auditing in developing countries: A case of Bangladesh. Interciencia Journal, 50(11, Part 1), 62–76. https://doi.org/10.82044/ICUES
19. Sabuncu, B. (2022). The effects of digital transformation on the accounting profession. Ömer Halisdemir Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 15(1), 103–115. http://doi.org/10.25287/ohuiibf.974840
20. Savić, B., & Pavlović, V. (2023). Impact of digitalization on the accounting profession. In Digital Transformation of the Financial Industry: Approaches and Applications (pp. 19–34). Springer International Publishing. https://doi.org/10.1007/978-3-031-23269-5_2
21. Shuhidan, S. M., Awang, Y., Taib, A., Rashid, N., & Hasan, M. S. (2023). Technology readiness among future accountants towards digitalization of accounting profession. Indonesian Journal of Sustainability Accounting and Management, 7(S1), 1–12. https://ijsam.org/index.php/ijsam
22. Vial, G. (2019). Understanding digital transformation: A review and a research agenda. Journal of Strategic Information Systems, 28(2), 118–144.
23. Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). The new organizing logic of digital innovation: An agenda for information systems research. Information Systems Research, 1–22. www.researchgate.net