International Journal of Computer Information Systems and Industrial Management Applications
ISSN 2150-7988 Volume 18(20s) 2026 pp. 1733-1759
https://doi.org/10.70917/ijcisim-2026-6104
Article

Opportunities and Challenges of Blockchain Technology Adoption in Accounting: A Qualitative Study Based on the Perspectives of Accounting Experts and Academics in the Republic of Iraq

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Abstract: Blockchain technology, as one of the most innovative digital technologies, has recently attracted considerable attention in the fields of finance, accounting, and auditing. By providing a decentralized, transparent, and secure infrastructure for recording information, this technology holds significant potential to transform accounting processes and financial reporting practices. However, its adoption and implementation in developing countries, particularly within professional and academic environments, are accompanied by a range of opportunities and challenges. Accordingly, the present study aimed to identify the opportunities and challenges of blockchain technology adoption in accounting from the perspectives of accounting experts and academics in the Republic of Iraq.

This research was applied in terms of purpose and exploratory qualitative in nature. The study population included university professors, professional accountants, financial managers, and specialists in financial information technology in the Republic of Iraq, who were selected through purposive and snowball sampling techniques. Data were collected through in-depth semi-structured interviews, and sampling continued until theoretical saturation was reached. The obtained data were analyzed using thematic analysis and MAXQDA software.

The findings revealed that the most important opportunities of blockchain adoption in accounting include enhanced financial transparency, improved information security, fraud reduction, facilitation of auditing processes, increased speed of information exchange, and improved reliability of financial reporting. Furthermore, the main challenges identified were weak technological infrastructure, lack of clear laws and regulations, insufficient specialized knowledge, high implementation costs, organizational resistance, and limited readiness of the accounting profession to adopt emerging technologies.

The results indicate that the development of blockchain technology in accounting in Iraq requires strengthening technical infrastructure, training skilled human resources, reforming educational policies, and establishing appropriate legal frameworks aligned with emerging technologies.

Keywords: Blockchain technology, digital accounting, digital transformation, accounting, technology adoption, thematic analysis, Republic of Iraq

1. Introduction

In recent decades, digital transformations have fundamentally reshaped the structure of financial activities, accounting, and auditing, driving organizations toward the adoption of emerging technologies. Among these technologies, blockchain has been recognized as one of the most transformative innovations, with substantial potential to redefine financial processes, data recording, and information management. By establishing a decentralized ledger, enabling immutable and permanent records, and allowing precise traceability of transactions, blockchain enhances transparency, security, and trust within financial systems. Many researchers argue that blockchain has the capacity to disrupt traditional accounting structures and transform the way financial information is recorded, processed, and reported (Beck et al., 2017; Swan, 2015).

Beyond improving information security, blockchain technology reduces human error, eliminates unnecessary intermediaries, lowers processing costs, and accelerates financial transactions. These characteristics have led numerous organizations and financial institutions worldwide to increasingly explore and adopt this technology. From experts' perspectives, blockchain is not merely a financial innovation but also a foundation for transforming data governance, internal control systems, and regulatory mechanisms. Consequently, attention to its potential within accounting and auditing professions has been steadily growing (Dai & Vasarhelyi, 2017; Bonsón & Bednárová, 2019).

In the field of accounting, blockchain can enhance the quality of financial reporting by enabling permanent transaction records and real-time data sharing among stakeholders. Its application increases the reliability of accounting information and reduces the likelihood of financial manipulation. Moreover, real-time access to data facilitates continuous monitoring and control of financial activities, which is highly significant for auditors and regulatory bodies. Many scholars believe that blockchain adoption can strengthen investor confidence and improve the quality of economic decision-making (Coyne & McMickle, 2017; Cai, 2021).

On the other hand, the expansion of blockchain technology is also expected to reshape the traditional roles of accountants and auditors. In blockchain-based environments, many repetitive and routine tasks are automated, leading to a shift in accountants' roles from information recorders to data analysts and strategic advisors. This transformation requires the development of digital competencies, data analysis skills, and familiarity with emerging financial technologies. Accordingly, accountants must acquire the necessary technological capabilities to adapt to the future professional environment (Karajovic et al., 2019; Lee & Chung, 2022).

Despite its considerable advantages, the adoption and implementation of blockchain technology are associated with several challenges. One of the most critical barriers is infrastructural and technical limitation. Many organizations lack access to the necessary hardware, software, and information technology infrastructure required for blockchain implementation, which can hinder the deployment process. Additionally, integrating blockchain with existing traditional accounting and financial systems requires substantial costs and careful planning, which may discourage organizations from adopting the technology (Applebaum et al., 2022; Sternberg et al., 2021).

In addition to technical challenges, legal and regulatory issues also represent significant barriers to blockchain adoption in accounting. In many countries, clear regulatory frameworks governing the use of blockchain in financial reporting, auditing, and transaction recording have not yet been established. The absence of well-defined and standardized regulations increases uncertainty among organizations and financial professionals. Furthermore, concerns regarding cybersecurity, data privacy, and legal accountability in distributed systems further complicate the adoption process (Pimentel et al., 2021; Lombardi et al., 2021).

Another important factor influencing blockchain adoption is the human and cultural dimension. Many employees and managers demonstrate resistance to technological change and prefer to rely on traditional methods. This resistance may stem from a lack of awareness, fear of job displacement, or concerns about technological complexity. In the accounting profession, some practitioners also express concerns regarding the transformation of their professional roles and increased reliance on automated systems. Therefore, education, cultural development, and

fostering a positive attitude toward technology are essential prerequisites for successful blockchain adoption (Tiron-Tudor et al., 2021; Han et al., 2023).

In developing countries, the challenges of blockchain adoption become even more complex. Limited technological infrastructure, weak investment in information systems, shortage of skilled human resources, and lack of supportive policies can significantly slow down the adoption of emerging technologies. The Republic of Iraq, as a country undergoing economic and financial restructuring in recent years, faces a pressing need to develop digital infrastructure and modernize its financial systems. In this context, blockchain technology offers an opportunity to enhance financial transparency, reduce administrative corruption, and improve accounting information quality; however, it is also accompanied by significant challenges (Samir Imad Shaban et al., 2021; Ismail & Ramo, 2023).

The accounting profession in Iraq has recently faced increasing pressure to undergo digital transformation and align with emerging technologies. The growing complexity of economic activities, the demand for financial transparency, and the need for more effective information control have intensified interest in innovative technologies. However, the level of readiness among organizations, universities, and accounting professionals to adopt blockchain has not yet been clearly determined. Moreover, differences in perspectives between academics and practitioners regarding the opportunities and risks of this technology may influence its adoption process. Therefore, understanding the perceptions, attitudes, and experiences of these two groups is of considerable importance (Al-Yassin & Porzamani, 2022; Al-Hattami, 2024).

Existing studies in the field of blockchain have mainly focused on technical, financial, or theoretical aspects, while paying limited attention to the lived experiences, perceptions of experts, and social-professional dimensions of technology adoption. In many studies, blockchain adoption has been examined quantitatively, with limited in-depth analysis of accountants' and academics' viewpoints. Furthermore, a large proportion of prior research has been conducted in developed countries, while Arab countries—particularly Iraq—have received less attention. Given that Iraq's cultural, economic, and infrastructural conditions may significantly influence technology acceptance, this represents a critical research gap (Seshadrinathan & Chandra, 2021; Als & Gray, 2023).

Investigating the opportunities and challenges of blockchain adoption in Iraqi accounting can contribute to a more accurate understanding of barriers, capacities, and implementation requirements. Exploring the perspectives of academics and practitioners can provide valuable insights for improving infrastructure, reforming policies, designing educational programs, and enhancing organizational readiness. Moreover, analyzing experts' experiences and perceptions can support policymakers and professional bodies in developing digital transformation strategies and improving the accounting system. Accordingly, this study aims to qualitatively and exploratorily examine and interpret the opportunities and challenges of blockchain technology adoption in accounting from the perspectives of accounting experts and academics in the Republic of Iraq.

The literature review indicates that most studies in blockchain and accounting have concentrated on technical advantages, information security, financial reporting quality, and theoretical applications of the technology, while limited attention has been given to the lived experiences and real perceptions of accounting professionals. In addition, the majority of research has been conducted in developed countries, with insufficient focus on Arab and developing contexts, particularly Iraq. Furthermore, most studies have employed quantitative approaches, and the deep exploration of human, cultural, organizational, and professional dimensions of blockchain adoption has been largely overlooked. Moreover, there is a scarcity of studies that simultaneously examine the perspectives of Iraqi academics and professional accountants regarding the opportunities and challenges of blockchain adoption. Therefore, the main research gap lies in the lack of deep, localized understanding of the multidimensional aspects of blockchain adoption in the Iraqi accounting profession and the shortage of qualitative studies in this area.

The rapid expansion of digital technologies and their growing impact on the accounting profession have made the need to understand the opportunities and challenges of blockchain technology more pressing than ever. At the same time, Iraq's economic and professional conditions, along with the need to enhance transparency, reduce financial corruption, and develop modern accounting infrastructure, further highlight the importance of this topic. The main

concern of the researcher has been to obtain a realistic understanding of the capacities, barriers, and requirements for blockchain adoption in the Iraqi accounting environment and to present a clear picture of the perspectives of experts and academics in this field, thereby contributing to the development of indigenous knowledge and facilitating digital transformation in the accounting profession.

Theoretical Foundations

Blockchain technology, as one of the most significant digital innovations of recent decades, has attracted extensive attention in the fields of finance, accounting, and auditing. This technology is a form of distributed and decentralized ledger that stores information in a chain of blocks and enables the permanent, transparent, and immutable recording of transactions. Its decentralized structure allows data to be shared among users without the need for a central intermediary, thereby enhancing the security and reliability of information (Crosby et al., 2016; Swan, 2015). Accordingly, many scholars have identified blockchain as a transformative technology in accounting and financial reporting, capable of fundamentally reshaping financial and regulatory processes (Dai & Vasarhelyi, 2017).

Within the accounting environment, one of the most important features of blockchain is the permanent and tamper-proof recording of transactions, which can reduce fraud, manipulation, and human error. By increasing transparency in financial information flows, this technology enhances the quality of financial reporting and the reliability of accounting data. Furthermore, simultaneous access of stakeholders to financial information enables more accurate internal control and monitoring processes, supporting more informed financial decision-making (Bonsón & Bednárová, 2019; Cai, 2021). From this perspective, blockchain can strengthen the trust of investors, shareholders, and regulatory authorities.

Another key theoretical dimension of blockchain adoption is its relationship with the concept of digital transformation in organizations. Digital transformation refers to the process through which organizations redesign their structures, processes, and decision-making mechanisms through the use of emerging technologies. As part of this transformation, blockchain can move accounting processes away from traditional models and automate repetitive and time-consuming tasks. Consequently, the role of accountants shifts from information recorders to data analysts and strategic advisors (Karajovic et al., 2019; Han et al., 2023). This role transition requires the development of digital competencies and enhanced analytical capabilities among accountants.

From a theoretical standpoint, the adoption of new technologies is generally influenced by technological, organizational, and environmental factors. The Technology–Organization–Environment (TOE) framework suggests that technology adoption in organizations depends on infrastructural readiness, managerial support, organizational culture, and environmental pressures (Baker, 2012). In the context of blockchain, factors such as technological infrastructure, human resource expertise, regulations, and managerial attitudes can significantly influence adoption levels. Accordingly, organizations with higher technological and cultural readiness are more likely to successfully adopt blockchain technology (Gangwar et al., 2015; Verma & Bhattacharya, 2017).

Alongside its advantages, blockchain adoption also faces several challenges and barriers. One of the most significant challenges is the limitation of information technology infrastructure within organizations. Many organizations still rely on traditional systems, and integrating blockchain with these systems requires substantial investment, structural changes, and high technical expertise (Applebaum et al., 2022). In addition, the lack of clear legal frameworks and standardized regulations for the use of blockchain in accounting and auditing creates ambiguity regarding its implementation (Pimentel et al., 2021).

The human and cultural dimension also plays a crucial role in blockchain adoption. Many employees and managers resist technological changes due to concerns about technological complexity, job security, and implementation costs. Such resistance can slow down the adoption process and reduce the effectiveness of implementation. Therefore, education, awareness-building, and increasing employees' understanding of blockchain's benefits and applications are considered essential prerequisites for successful technology adoption (Tiron-Tudor et al., 2021; Johns et al., 2023).

Blockchain adoption in accounting is also closely linked to the concept of professional innovation. This technology can create new services in accounting, auditing, and financial consulting, thereby supporting the professional development of accountants. The use of real-time data, advanced analytics, and smart contracts enables more precise analytical and advisory services, generating greater added value for organizations (Rosario & Vasarhelyi, 2018; Vincent et al., 2020). Thus, blockchain is not only a technological tool but also a driver for redefining the professional role of accountants.

In developing countries, including Iraq, blockchain adoption is associated with specific economic, social, and infrastructural conditions. Limited digital infrastructure, weak supportive policies, shortage of skilled professionals, and lack of familiarity with emerging technologies among organizations can hinder the adoption process. However, the need for financial transparency, reduction of corruption, and improvement of accounting information quality increases the importance of blockchain technology (Samir Imad Shaban et al., 2021; Al-Hattami, 2024). Therefore, examining the views of experts and academics regarding the opportunities and challenges of blockchain adoption can contribute to a deeper understanding of the accounting profession in Iraq and facilitate digital transformation in this field.

Research Background

Bakhtiari and Borhani (2024) conducted a study aimed at examining the applications and implications of blockchain technology adoption in accounting and financial reporting. They analyzed the role of this technology in improving accounting information quality and supporting investors' decision-making processes. Using qualitative content analysis and a systematic literature review in reputable academic databases, the study identified the key factors influencing blockchain adoption and implementation. Subsequently, semi-structured interviews and the fuzzy Delphi method were employed to evaluate experts' views regarding the feasibility and implementation of this technology. The results indicated that perceived usefulness and tangible economic benefits are the most critical factors in blockchain adoption, and that this technology can play an important role in governmental planning and the development of technology-driven businesses.

Omrani, Jado, and Pourali (2023) conducted a qualitative study to examine the advantages and disadvantages of using blockchain technology and artificial intelligence in professional accounting programs. Based on systematic content analysis, the study found that the application of these technologies can enhance educational and professional performance in accounting software systems. The findings categorized the advantages and challenges of adoption into technical, cultural, technological acceptance, and organizational structure dimensions. The study emphasized the need for educational and institutional frameworks to improve the effectiveness of blockchain integration in accounting systems.

Mohammad Soleiman, Abbas, and Shirin (2024) carried out an applied study on the impact of integrating blockchain technology and machine learning in detecting and reporting accounting fraud. By combining secondary financial data and primary survey data, the study demonstrated that the simultaneous use of blockchain and machine learning significantly enhances fraud detection capabilities in accounting. The findings indicated that the integration of these two technologies improves reporting accuracy and the reliability of accounting information, thereby strengthening organizational control systems.

Samir et al. (2021) conducted an exploratory study on the impact of blockchain technology on the skills of accountants and auditors in Iraqi university environments. The study aimed to assess how emerging blockchain technologies influence the development, improvement, and transformation of professional skill levels in accounting. Data were collected through questionnaires from academics, graduate students, and accounting faculty members. The findings revealed that blockchain technology has a positive impact on accountants' and auditors' skills, leading to increased transaction speed, improved data quality, and reduced costs. The study also emphasized the necessity of training and empowering accountants to effectively utilize blockchain in order to enhance organizational competitiveness.

Ramo et al. (2023) employed a mixed inductive–deductive approach to examine the role of blockchain technology in improving accounting information quality. Using questionnaires and data collected from academics and experts at public universities in Iraq and the Kurdistan region, the study analyzed the practical applications of blockchain in accounting information systems. The results showed that blockchain adoption enhances accounting information quality, increases data reliability, and improves the transparency of financial reporting processes. However, the study also highlighted implementation limitations and challenges, particularly technological infrastructure constraints and organizational acceptance issues.

Mohammad et al. (2022) conducted an applied study investigating the role of blockchain technology in enhancing accounting information security. The study aimed to define blockchain, its operational mechanisms, smart contracts, and its impact on accounting data security. By analyzing the experience of the United Arab Emirates, particularly Dubai's blockchain strategy for governmental transactions, the study found that this technology significantly reduces time, resources, and costs while increasing the security level of accounting information. Blockchain adoption reduces paper-based transactions and facilitates organizational decision-making while ensuring that data remain tamper-proof and secure.

Al-Hattami (2024) examined the factors influencing the intention to adopt blockchain technology in accounting education. Using an extended Technology Acceptance Model (TAM), the study analyzed faculty members' motivation to adopt and integrate blockchain into educational processes. Data were collected from 191 faculty members of universities and colleges in India and analyzed using SmartPLS 4 software. The results indicated that organizational support acts as a key moderating factor, while perceived ease of use indirectly influences behavioral intention through perceived usefulness and attitude. The extended model explained 64% of the variance in behavioral intention, offering valuable implications for educational policy in developing countries.

Fang et al. (2023) conducted a quantitative study to examine the impact of blockchain adoption on accounting information quality in Chinese A-share firms. The sample included 33,242 firm-year observations from 2007 to 2019. The results showed that blockchain adoption significantly improves accounting information quality, with this effect being strengthened through corporate governance mechanisms and collaboration with major auditing firms. The study also found that the impact of blockchain varies depending on industry type and information technology intensity.

Seshadrinathan and Chandra (2021) investigated the factors influencing blockchain adoption in accounting applications using the Technology–Organization–Environment (TOE) framework. The study proposed an inductive adoption model and identified influencing factors such as relative advantage, uncertainty, top management support, technological readiness, industrial and regulatory environment, competitive pressure, and trust. The findings emphasized the importance of blockchain in accounting and its potential to disrupt processes and enhance decision-making quality.

2. Research Methodology

This study was applied in terms of purpose and qualitative in nature with an exploratory approach, aimed at identifying the opportunities and challenges of blockchain technology adoption in accounting based on the perspectives of accounting experts and academics in the Republic of Iraq. The choice of a qualitative approach was justified by the fact that blockchain technology in Iraqi accounting environments is still in its early stages of recognition and adoption; therefore, an in-depth exploration of experts' perceptions, experiences, and attitudes required interpretive and exploratory methods. Accordingly, the study sought to identify and interpret the various dimensions of opportunities, challenges, and requirements for the development of blockchain technology in the Iraqi accounting profession based on participants' lived experiences.

The study population included university professors, professional accountants, financial managers, financial information technology specialists, and accounting experts in the Republic of Iraq who had academic or practical experience in emerging financial technologies and digital accounting systems. Sampling was conducted using purposive and snowball sampling techniques. Initially, a number of experts were identified, and subsequently,

additional participants were recruited through referrals from initial respondents. Sampling continued until theoretical saturation was reached; after 16 interviews, no new conceptual insights emerged, indicating that data saturation had been achieved.

The data collection instrument was in-depth semi-structured interviews. The interview questions were developed based on the theoretical foundations of the study, previous literature, and research objectives. The interview framework covered themes such as financial transparency, information security, fraud reduction, legal barriers, technological infrastructure, implementation costs, user trust, and organizational readiness for blockchain adoption. To ensure content validity, the interview questions were reviewed by several experts in accounting and qualitative research methodology prior to implementation, and necessary revisions were made based on their feedback. Furthermore, to enhance data credibility, all interviews were conducted with participants' consent, recorded, and fully transcribed.

The collected data were analyzed using thematic analysis. In the first stage, interview transcripts were repeatedly reviewed to achieve a deep understanding of the data. Subsequently, initial codes were extracted from key concepts and meaningful statements. In the next step, similar codes were grouped into sub-themes and overarching themes. Finally, the main themes related to the opportunities and challenges of blockchain adoption in accounting were identified, and the relationships among them were interpreted. MAXQDA software was used to organize the data and manage the coding process.

To ensure the scientific rigor of the study, Lincoln and Guba's criteria—credibility, transferability, dependability, and confirmability—were applied. To enhance credibility, the researcher maintained prolonged engagement with the data, and parts of the findings were shared with participants for member checking to confirm the accuracy of interpretations. For dependability, all stages of data collection, coding, and analysis were carefully documented. To enhance confirmability, efforts were made to ensure that the analysis reflected participants' actual perspectives and to minimize researcher bias and preconceptions. Throughout the study, ethical considerations were strictly observed, including obtaining informed consent, ensuring confidentiality, and preserving participants' anonymity.

3. Findings

Table 1. Demographic Characteristics of Participants

Interview No.	Organization/Company	Position	Work Experience (years)	Specialization	Gender
1	Audit Firm A	Senior Accountant	8	Financial Accounting, Blockchain Technology	Male
2	University of Baghdad	Accounting Professor	12	Management Accounting, Financial Technology	Female
3	Audit Firm B	Internal Accountant	5	Financial Accounting	Male
4	University of Mosul	Associate Professor of Accounting	15	Financial Accounting, Reporting	Male
5	Financial Consulting Firm C	Accounting Consultant	10	Financial Information Technology	Female
6	University of Karbala	Visiting Lecturer	7	Management Accounting, Blockchain	Male
7	Audit Firm D	Audit Team Manager	9	Auditing and Financial Transparency	Male

Interview No.	Organization/Company	Position	Work Experience (years)	Specialization	Gender
8	University of Nineveh	Accounting Professor	13	Financial Accounting, Emerging Technologies	Female
9	Financial Consulting Firm E	Senior Accountant	6	Management Accounting, Blockchain	Male
10	University of Basra	Associate Professor of Accounting	11	Financial Accounting, Information Technology	Female
11	Audit and Consulting Firm F	Internal Accountant	4	Financial Accounting	Male
12	University of Salmas	Accounting Professor	14	Management Accounting, Financial Technology	Female

Table 1 presents the demographic characteristics of the 12 interviewees in the qualitative phase of the study. The participants consisted of a combination of professional accountants and academic scholars in accounting, aimed at covering both practical and theoretical perspectives on the adoption of blockchain technology in accounting in Iraq.

The average work experience of the participants was approximately 9.5 years, indicating a solid level of professional and academic expertise in accounting and financial technology, and ensuring that the responses are grounded in real-world experience and specialized knowledge.

In terms of professional affiliation, half of the participants were drawn from academic institutions, while the other half were from audit and financial consulting firms, allowing for a comparison between theoretical and practical viewpoints.

Regarding specialization, most participants had backgrounds not only in accounting but also in blockchain technology and modern financial systems, which aligns with the study's focus on the opportunities and challenges of blockchain adoption.

In terms of gender distribution, the sample included six male and six female participants, indicating a balanced representation and supporting a more comprehensive range of perspectives.

Overall, this qualitative sample structure enables the study to generate rich and multidimensional insights, which are further analyzed through thematic analysis to identify the main opportunities and challenges associated with the adoption of blockchain technology in the Iraqi accounting environment.

Step 1

In the first stage of the seven-step Colaizzi analysis, the recorded interviews of participants were repeatedly listened to in order to gain a sense of familiarity and immersion in the data. All verbal descriptions, commonly referred to as protocols, were transcribed verbatim. Accordingly, the full interviews of each participant were documented and then analyzed.

Table 2. Sample of Interview Transcripts

Interview No.	Theme	Interview Text
1	Opportunities / Process Efficiency	Based on my experience in accounting and financial management, blockchain technology can significantly improve accounting processes. The permanent and immutable recording of transactions enables fast and secure access to financial information and reduces the need for repeated verification. This technology allows accountants to focus more on data analysis and strategic

		decision-making. It can also reduce costs, improve reporting accuracy, and increase stakeholder trust, while shifting the role of accountants toward risk management and data control.
2	Challenges / Infrastructure and Technology	One of the main barriers to blockchain adoption is the limitations of technological infrastructure within organizations. Many existing systems are not capable of reliably processing blockchain transactions, which reduces confidence in system performance. In addition, insufficient hardware and network infrastructure, limited processing speed, and cybersecurity issues are major challenges that restrict technology adoption.
3	Education and Awareness	Low levels of awareness and training among accountants regarding blockchain technology represent another challenge. Many professionals are not familiar with its practical applications in accounting and require structured and practical training programs. Organizational culture is also important; the adoption of new technologies is not possible without employee acceptance, and resistance to change can hinder successful implementation.
4	Future Effects / Transformation of the Accountant's Role	With the adoption of blockchain, the role of accountants is expected to change fundamentally, shifting toward data analysis, risk management, and strategic advisory services. This transformation can enhance digital skills, improve decision-making accuracy, and increase organizational efficiency. Secure and transparent access to data also facilitates academic research and advanced economic analysis.
5	Opportunities / Transparency and Trust	Blockchain can enhance transparency in financial processes and enable regulators to closely monitor transactions. Accountants can report with greater confidence, thereby increasing trust among investors and shareholders. It reduces human errors, facilitates reconciliation processes, and creates new opportunities for consulting services and innovation in accounting.
6	Challenges / Legal and Regulatory Issues	The absence of a clear legal framework and inconsistency with existing accounting standards limit blockchain adoption. Many transactions and financial reports are not yet supported by current regulations, creating uncertainty among managers and accountants. Reforming laws and developing appropriate regulations for digital transactions is essential.
7	Practical Experience / Technology Applications	In organizations that have implemented modern financial technologies, blockchain has been observed to accelerate accounting and auditing processes while enabling precise traceability of transactions. Accountants in such environments can focus on risk analysis, financial forecasting, and analytical reporting. Practical experience shows that integrating blockchain with existing systems can simultaneously improve efficiency and accuracy.
8	Comparative Perspective / International Experience	The experiences of developed countries such as Canada and Singapore show that appropriate legal frameworks, extensive training, and preparedness of accountants significantly enhance the success of blockchain implementation. These experiences can guide Iraq in developing policies and training programs to facilitate adoption and avoid costly trial-and-error processes.
9	Opportunities / Cost Reduction	Blockchain can reduce organizational operating costs and decrease the need for repeated data verification. Accountants will have more time for data analysis and strategic advisory roles. This technology increases efficiency, reduces reporting errors, and creates added value for organizations and stakeholders.
10	Challenges / Organizational Resistance	Resistance to change and concerns about initial implementation costs are major barriers. Some organizations are unwilling to modify their structures and processes, which slows adoption. In addition, lack of financial resources and technical expertise prevents widespread use of blockchain among accountants.

11	Future Effects / Skill Development	With the adoption of blockchain, the need for digital skills and data analysis capabilities increases. Accountants must work with advanced tools and develop competencies in data-driven financial advisory. This transformation strengthens professional capabilities, improves financial decision-making, and creates new job opportunities.
12	Comparative Perspective / Strategic View	International experiences indicate that countries with supportive policies, targeted training, and well-developed infrastructure have achieved more successful blockchain adoption. Iraq can benefit from these experiences to accelerate adoption, enhance transparency and reporting quality, and shift the role of accountants toward analytical and strategic decision-making.

The analysis of the interviews revealed that blockchain adoption in accounting in Iraq can be categorized into four main themes: opportunities and benefits, challenges and barriers, future impacts and transformation of accountants' roles, and comparative perspectives based on international experience.

1. Opportunities and Benefits:

Most participants emphasized the potential of blockchain to enhance transparency, reduce errors and fraud, and improve the accuracy of financial reporting. The immutable recording of transactions and secure access to financial data increases trust among stakeholders and regulatory bodies. Blockchain also enables accountants to focus more on data analysis, strategic consulting, and data-driven decision-making, while routine tasks are reduced. From a practical perspective, it improves efficiency, reduces operational costs, and enhances organizational productivity.

2. Challenges and Barriers:

The interviews indicated several obstacles to blockchain adoption, including lack of knowledge and training, limited technological infrastructure, organizational resistance to change, high initial implementation costs, and the absence of a comprehensive legal and regulatory framework. Weak training and lack of awareness prevent accountants from understanding practical applications, while outdated infrastructure and insufficient IT systems limit organizational readiness.

3. Future Impacts and Transformation of Accountants' Roles:

Findings suggest that blockchain adoption will significantly transform the role of accountants toward data analysis, risk management, and strategic advisory services. This shift enhances digital competencies, improves decision-making accuracy, and increases organizational efficiency. Secure and transparent data access also supports academic research, advanced economic analysis, and innovation in accounting processes, creating new professional opportunities.

4. Comparative Perspectives and International Experience:

Participants highlighted the importance of learning from developed countries such as Canada, Singapore, the United Kingdom, and Australia. These countries have facilitated blockchain adoption through strong legal frameworks, advanced infrastructure, and comprehensive training programs. Iraq can leverage these experiences to accelerate adoption and avoid costly trial-and-error processes, while also improving policy design, education systems, and workforce preparedness.

Figure 4-1, generated using MAXQDA, presents a word cloud. Based on word frequency in the interview transcripts, the most frequently occurring terms were blockchain, accounting, data, transparency, and processes.



Step 2

In the second stage, after carefully reading all interviews, meaningful statements relevant to the phenomenon under investigation were identified. Accordingly, significant expressions related to the opportunities and challenges of blockchain adoption in accounting were extracted from the interview transcripts. Table 3 presents a sample of the extracted statements along with their interview numbers.

Table 3. Sample of Extracted Statements

Statement Code	Extracted Statement	Formulated Concept	Interview No.
CA1	Blockchain technology increases transparency in financial reporting.	Transparency	1
CA2	Permanent recording of transactions reduces errors and fraud.	Error and fraud reduction	1
CA3	Blockchain makes accounting processes faster and more accurate.	Process efficiency	1
CA4	Secure access to data enhances stakeholder trust.	Stakeholder trust	2
CA5	Many accountants are not familiar with the practical application of blockchain.	Need for training	2
CA6	Training and awareness-raising are essential for technology adoption.	Training and awareness	2
CA7	Limitations in technological infrastructure hinder adoption.	Infrastructure challenges	3
CA8	Outdated equipment prevents proper implementation of technology.	Technical challenges	3
CA9	Blockchain implementation costs are high.	Financial challenges	3
CA10	Organizational resistance is one of the main barriers.	Organizational resistance	4
CA11	Lack of a legal framework causes uncertainty among accountants.	Legal challenges	4

CA12	Blockchain increases organizational productivity.	Productivity improvement	5
CA13	Shifting from routine tasks to data analysis changes the role of accountants.	Role transformation	5
CA14	Technology improves accountants' digital skills.	Skill development	5
CA15	Transparent transaction recording enables better reporting.	Reporting improvement	6
CA16	Reduced financial processing time is one of the benefits of blockchain.	Time efficiency	6
CA17	Quick access to financial data is important for decision-making.	Data-driven decision-making	6
CA18	Blockchain enables advanced economic analysis.	Research implications	7
CA19	Integration with existing systems improves efficiency.	System integration	7
CA20	Innovation in accounting services increases with blockchain technology.	Service innovation	7
CA21	Experiences of developed countries can be used as benchmarks.	International learning	8
CA22	Supportive policies facilitate technology adoption.	Adoption strategy	8
CA23	Blockchain can reduce operational costs.	Cost reduction	9
CA24	Secure data access increases customer trust.	Customer trust	9
CA25	Managerial resistance affects technology adoption.	Managerial challenge	10
CA26	Fear of implementation errors is a barrier to adoption.	Operational risk	10
CA27	Targeted training can reduce resistance.	Practical training	10
CA28	The role of accountants will shift toward strategic advisory services.	Professional transformation	11
CA29	Analytical skills are essential for the future.	Analytical skills	11
CA30	Blockchain improves data accuracy and reporting quality.	Data accuracy	11
CA31	Technology reduces time spent on repetitive tasks.	Time saving	12
CA32	Successful implementation requires interdepartmental coordination.	Organizational coordination	12
CA33	Technology adoption requires cultural change within organizations.	Cultural change	12
CA34	Fast data access enables real-time monitoring.	Real-time monitoring	1
CA35	Increased transparency improves managerial decision-making.	Better managerial decisions	1
CA36	Reduced errors increase investor confidence.	Investor trust	2
CA37	Blockchain enhances reliability of reports.	Report reliability	2
CA38	Transaction traceability is a key advantage.	Transaction traceability	3

CA39	Technology can stimulate innovation in financial services.	Financial innovation	3
CA40	Continuous training improves technology acceptance.	Continuous training	4
CA41	Blockchain can help reduce corruption and fraud.	Fraud reduction	4
CA42	Role change requires new skills.	New competencies	5
CA43	Integrating technology with traditional systems is challenging.	System integration challenges	5
CA44	Data access improves transparency and reporting accuracy.	Transparent reporting	6
CA45	International experience can guide technology adoption.	International benchmarking	6
CA46	Cost and error reduction occur simultaneously with technology adoption.	Efficiency and error reduction	7
CA47	Technology improves accuracy and quality of reports.	Report quality	7
CA48	Legal barriers and inappropriate policies hinder adoption.	Legal barriers	8
CA49	Employee resistance is a major challenge.	Employee resistance	8
CA50	Technology improves accountants' consulting services.	Advisory improvement	9
CA51	Strong technological infrastructure is essential.	Technology infrastructure	9
CA52	Adoption requires top management support.	Management support	10
CA53	Blockchain enables better transaction control and monitoring.	Transaction control	10
CA54	Adoption requires employee motivation.	Employee motivation	11
CA55	Technology can monitor and improve financial performance.	Performance monitoring	11
CA56	Integration of technology and traditional processes improves efficiency.	Process efficiency	12
CA57	IT skill development is essential for accountants.	IT skills	12
CA58	Technological changes require organizational policy revision.	Policy revision	12
CA59	Fast and secure data access improves decision-making.	Better decision-making	12
CA60	Blockchain creates new professional opportunities for accountants.	Professional opportunities	12

The qualitative data analysis based on the 60 extracted codes indicates that blockchain adoption in accounting in Iraq is a multidimensional and complex phenomenon encompassing both opportunities and benefits as well as challenges and barriers.

1. Opportunities and Benefits:

The interviews clearly indicated that blockchain can enhance transparency, accuracy, and data security (CA1, CA2, CA37). The immutable recording of transactions reduces errors, fraud, and corruption while increasing stakeholder trust (CA36, CA41). In addition, the technology improves process efficiency, reduces processing time, and enhances organizational productivity (CA3, CA12, CA46, CA56).

2. Role Change and Skill Development:

A key finding is the transformation of accountants' roles from routine tasks toward data analysis and strategic advisory functions (CA6, CA13, CA28). Participants also emphasized the importance of developing digital, IT, and analytical skills (CA14, CA29, CA42, CA57). This role transformation reflects professional evolution and highlights the need for continuous training and organizational awareness (CA40).

3. Challenges and Barriers to Adoption:

Despite the benefits, several challenges were identified, including infrastructural and technical limitations such as outdated equipment and insufficient technological capacity (CA7, CA8, CA51). In addition, legal barriers, unclear frameworks, and inadequate organizational policies increase uncertainty and resistance (CA5, CA11, CA48, CA58). Resistance from employees and managers also represents a major obstacle requiring targeted motivation and training (CA10, CA25, CA49, CA54).

4. Future Impacts and Organizational Outlook:

The findings show that blockchain can enable innovation in accounting services, create new professional opportunities, and improve advisory functions (CA20, CA50, CA60). Fast and secure access to data supports better decision-making, real-time monitoring, and advanced economic analysis (CA34, CA35, CA55, CA59). Furthermore, learning from international experiences and adopting supportive policies and training strategies can ensure successful implementation (CA21, CA22, CA45).

5. Integration of Findings and Implications:

The results indicate that both opportunities and challenges are simultaneously present across all interviews, highlighting the complex and multidimensional nature of blockchain adoption in Iraq. The findings also suggest that blockchain is not merely a technical innovation but a catalyst for cultural, managerial, and professional transformation within organizations. Successful adoption therefore requires a comprehensive approach involving training, infrastructure development, legal frameworks, and strong managerial support.

Step 3

In the third stage, meaningful statements were further conceptualized. In other words, each statement was transformed into a concept that reflects the essential meaning and underlying thought expressed by the participants. This stage is referred to as meaning formulation. The results are presented in Table 4.

Table 4. Sample of Categorized Meanings

Initial Concept Code	Subsumed Concept Code (Initial Category)	Overarching Concept Code (Main Category)
Increased transparency in financial reporting	Data transparency	Transparency and trust
Reduction of errors and fraud in transactions	Security and reliability	Transparency and trust
Improved accuracy and correctness of reports	Reporting accuracy	Transparency and trust
Secure access to financial data	Stakeholder trust	Transparency and trust
Reduced financial processing time	Speed and efficiency	Efficiency and productivity
Improved organizational productivity	Process improvement	Efficiency and productivity
Resource and cost savings	Cost reduction	Efficiency and productivity

Transformation of accountants' role into strategic advisory	Role change	Skill development and role transformation
Development of digital skills	Technological skills	Skill development and role transformation
Advanced data analysis	Analytical ability	Skill development and role transformation
Need for continuous training	Awareness and education	Skill development and role transformation
Infrastructure limitations	Technological constraints	Challenges and barriers
Technical limitations	Outdated and insufficient equipment	Challenges and barriers
Legal and regulatory barriers	Unclear regulatory framework	Challenges and barriers
Managerial and employee resistance	Organizational resistance	Challenges and barriers
Reduction of corruption and fraud	Transparency and control	Transparency and trust
Transaction traceability	Transparency and monitoring	Transparency and trust
Improved managerial decision-making	Data-driven decision-making	Future impacts and decision-making
Real-time performance monitoring	Monitoring and control	Future impacts and decision-making
Innovation in accounting services	Innovation opportunities	Opportunities and innovation
Creation of new professional opportunities	Job opportunities	Opportunities and innovation
Improvement of accountants' advisory services	Professional service enhancement	Opportunities and innovation
Learning from international experience	Benchmarking	Opportunities and innovation
Coordination between organizational units	Organizational alignment	Efficiency and productivity
Cultural changes for technology adoption	Cultural acceptance	Skill development and role transformation
Integration with existing systems	System integration	Efficiency and productivity
Top management support	Leadership support	Skill development and role transformation
Employee motivation	Encouragement and acceptance	Skill development and role transformation
IT skill development	Information technology capability	Skill development and role transformation
Policy revision	Organizational framework reform	Challenges and barriers
Improved report quality	Accuracy and correctness	Transparency and trust
Innovation in financial services	Financial transformation	Opportunities and innovation

Transaction control and monitoring	Operational oversight	Transparency and trust
Better decision-making	Effective decision-making	Future impacts and decision-making
Increased customer trust	Stakeholder trust	Transparency and trust
Simultaneous reduction of costs and errors	Efficiency and accuracy	Efficiency and productivity
Blockchain-driven professional transformation	Role and skill transformation	Skill development and role transformation
Time savings in repetitive tasks	Time efficiency	Efficiency and productivity
Advanced economic analysis capability	Data analysis	Future impacts and decision-making
Financial performance monitoring	Financial control	Future impacts and decision-making
Improved reporting accuracy	Accuracy and correctness	Transparency and trust
Targeted training to reduce resistance	Training and motivation	Skill development and role transformation
Innovation in professional services	Opportunity development	Opportunities and innovation
Permanent transaction recording	Transparency and security	Transparency and trust
Reduction of operational risk	Risk management	Challenges and barriers
Support for technology adoption	Supportive policies	Skill development and role transformation
Reduction of employee resistance	Technology acceptance	Skill development and role transformation
Development of analytical skills	Data analysis capability	Skill development and role transformation
Fast access to data	Access speed	Future impacts and decision-making
Technology and future opportunities	Professional outlook	Opportunities and innovation
Improved organizational efficiency	Process optimization	Efficiency and productivity
Integration of traditional and modern systems	Successful integration	Efficiency and productivity
Report reliability	Accuracy and trust	Transparency and trust
Reduction of operational errors	Accuracy and control	Transparency and trust
Improved decision quality	Effective decision-making	Future impacts and decision-making
Job opportunities for accountants	Professional development	Opportunities and innovation
Innovation in financial services	Service transformation	Opportunities and innovation
Integration of traditional and modern systems	Technology integration	Efficiency and productivity
Secure access to data	Information security	Transparency and trust

Professional skill development	Training and capability	Skill development and role transformation
Transaction tracking and control	Operational monitoring	Transparency and trust

The data analysis shows that the 60 initial concepts were consolidated into five to six overarching categories, providing a clear and structured framework for understanding the dimensions of blockchain adoption in accounting in Iraq. The initial concepts extracted from interview statements included transparency, accuracy, efficiency, security, skills, and innovation. These were then grouped into intermediate categories based on semantic similarity; for example, "reduction of errors and fraud," "improved reporting accuracy," and "secure access to data" were all grouped under the category of "transparency and trust."

At the level of overarching (core) categories, these were reduced into five key themes:

1. Transparency and Trust:

This theme reflects the expectation that blockchain improves reporting quality, reduces fraud, and enhances stakeholder trust. Nearly all participants emphasized the importance of transparency and data security, which is particularly critical in the Iraqi accounting environment.

2. Efficiency and Productivity:

Many concepts indicated the impact of blockchain on process improvement, reduced processing time, and resource savings. This category highlights the operational and economic benefits of the technology.

3. Skill Development and Role Transformation:

Several concepts reflected the shift of accountants from routine tasks to data analysis and strategic advisory roles, as well as the increasing need for digital skills and continuous training. This category highlights the human and professional dimension of technological transformation.

4. Challenges and Barriers:

The grouping revealed infrastructural, technical, legal, and cultural barriers to blockchain adoption. Resistance from employees and legal limitations represent significant threats to successful implementation.

5. Opportunities and Innovation / Future Impacts:

This category includes concepts related to professional development, innovation in accounting services, improved decision-making, and learning from international experience. It clearly shows that blockchain can act as a driver of positive change and professional advancement.

Step 4

In the fourth stage, after reaching agreement on all formulated meanings, the process of grouping these concepts into clusters representing a unique structure of themes was initiated. According to Colaizzi's approach, once formulated meanings were assigned to each significant statement, these meanings were organized into thematic clusters. Subsequently, clusters reflecting similar perspectives were merged to form distinct overarching themes. Table 5 presents a sample of the extracted themes.

Table 5. Extracted Thematic Clusters

Overarching Concepts	Substituted Concept Codes	Initial Concept Codes
Transparency and trust	Security and reliability	Reduction of errors and fraud in transactions
Transparency and trust	Reporting accuracy	Improved accuracy in financial reports

Transparency and trust	Stakeholder trust	Secure access to financial data
Transparency and trust	Data transparency	Transaction traceability and financial control
Efficiency and productivity	Process optimization	Reduced financial processing time
Efficiency and productivity	Resource savings	Reduced costs and errors
Efficiency and productivity	Productivity enhancement	Coordination between organizational units
Skill development and role transformation	Technological skills	Development of digital skills
Skill development and role transformation	Professional role change	Transformation of accountants' role into strategic advisory
Skill development and role transformation	Training and awareness	Targeted training for technology adoption
Skill development and role transformation	Analytical ability	Advanced data analysis
Challenges and barriers	Technological limitations	Infrastructure constraints
Challenges and barriers	Unclear legal framework	Legal and regulatory barriers
Challenges and barriers	Organizational resistance	Opposition from managers and employees
Challenges and barriers	Risk management	Reduction of operational risk
Opportunities and innovation	Job opportunities	Creation of new professional opportunities
Opportunities and innovation	Financial service innovation	Innovation in accounting services
Opportunities and innovation	Benchmarking	Learning from international experience
Future impacts and decision-making	Data-driven decision-making	Improved managerial decision-making
Future impacts and decision-making	Monitoring and control	Real-time performance monitoring
Future impacts and decision-making	Data analysis	Advanced economic analysis capability

The analysis of this stage shows that clustering initial concepts into overarching themes provides a coherent framework for understanding participants' perspectives and clarifies the relationship between micro-level concepts and key thematic structures.

1. Transparency and Trust:

This theme indicates that one of the main motivations for adopting blockchain is improving reporting quality, reducing fraud, and enhancing stakeholder trust. The clustering shows that concepts related to accuracy, security, and transaction traceability collectively form a central thematic axis.

2. Efficiency and Productivity: This theme reflects the operational importance of blockchain technology. Substituted concepts such as process optimization and resource savings demonstrate that blockchain can increase speed, reduce errors, and enhance organizational productivity.

3. Skill Development and Role Transformation:

This theme shows that technology adoption requires a shift in accountants' professional roles, improvement of digital skills, analytical capabilities, and continuous training. The clustering highlights the link between professional transformation and individual capacity development.

4. Challenges and Barriers:

This theme reflects technical, legal, and organizational resistance that may slow down technology adoption. These clusters represent significant obstacles that require planning, top management support, and clear regulatory frameworks.

5. Opportunities, Innovation, and Future Impacts:

These themes demonstrate that blockchain not only addresses existing problems but also creates opportunities for innovation, professional development, improved decision-making, and advanced data analysis. The clustering of concepts in these themes clearly illustrates the positive and forward-looking potential of the technology.

Step 5

In the fifth stage, based on all collected data, conducted analyses, and the thematic clusters extracted in the fourth stage, a comprehensive description of the opportunities and challenges of blockchain adoption in accounting in Iraq was developed. This comprehensive account aims to provide an integrated and in-depth understanding of the various dimensions of the phenomenon while simultaneously illustrating the interaction among concepts, clusters, and overarching themes.

1. Transparency and Trust:

A large proportion of participants identified transparency and trust as the most influential factor in the adoption of blockchain technology. According to their views, blockchain can enhance the accuracy and reliability of financial reporting while reducing errors and fraud in transactions. Participants also emphasized the importance of secure and reliable access to financial data for stakeholders, stating that blockchain enables real-time, transparent, and traceable financial information. These characteristics increase the confidence of investors, customers, and regulatory bodies and provide a strong foundation for the widespread adoption of blockchain in the Iraqi accounting environment.

2. Efficiency and Productivity:

Participants highlighted the operational benefits of blockchain and considered it an effective tool for improving organizational efficiency and productivity. Blockchain technology reduces transaction processing time, minimizes repetitive tasks, and improves coordination among organizational units, thereby enhancing financial and administrative processes. In addition, it enables savings in human and financial resources and supports better decision-making through accurate data. This theme demonstrates the direct impact of blockchain on operational performance and cost reduction, and it is closely linked with the transparency and trust dimension.

3. Skill Development and Role Transformation:

One of the key findings from the interviews was the transformation of accountants' roles and the development of their competencies. Participants believed that with the adoption of blockchain technology, accountants' roles would shift from traditional and routine tasks toward analytical and strategic advisory functions. This transformation requires the development of digital skills, data analysis capabilities, information technology competencies, and data-driven decision-making skills. Furthermore, training and organizational awareness were considered essential to facilitate technology adoption and reduce employee resistance. Accordingly, skill development and role transformation not only enhance accountants' professional growth but also improve organizations' capacity to effectively utilize blockchain technology.

4. Challenges and Barriers:

Despite the numerous advantages, blockchain adoption is also accompanied by significant challenges and barriers. Participants summarized the most important obstacles into four categories:

1. **Infrastructure and technical limitations:** Lack of technological equipment, limited communication networks, and weaknesses in existing software systems were identified as major technical issues.
2. **Legal and regulatory barriers:** The absence of a clear legal framework for the use of blockchain in accounting and the lack of coordination among regulatory institutions represent a major obstacle to adoption.
3. **Organizational resistance:** Some managers and employees resist technological change and prefer traditional methods.
4. **Risk management and uncertainty:** Limited familiarity with the technology and concerns about operational errors create hesitation in investing in and implementing blockchain systems.

These challenges indicate that technology adoption does not depend solely on the availability of technology, but also requires managerial support, continuous training, legal reform, and cultural change within organizations.

5. Opportunities, Innovation, and Future Impacts: Participants also highlighted the potential opportunities and innovations that blockchain can generate. These include the creation of new job opportunities, innovation in financial services, learning from international experiences, and professional development for accountants. Blockchain technology enables advanced data analysis and improves managerial decision-making, thereby creating a more strategic role for accountants within organizations. This theme demonstrates that blockchain adoption not only addresses existing problems but also provides a promising and motivating future outlook for the accounting profession in Iraq.

Step 6

In the sixth stage of the Colaizzi method, the detailed descriptions of the opportunities and challenges of blockchain adoption in accounting are reduced to a fundamental structure. In other words, the core structure underlying the presented descriptions is identified, and the essential nature of the experienced phenomenon is clarified. Table 6 presents this stage, including the extracted themes, clusters, and the frequency of codes associated with each theme and cluster.

Table 6. Extracted Themes, Clusters, and Code Frequencies

Extracted Theme (Axis)	Clusters	Number of Extracted Codes	Brief Description of Clusters and Codes
Transparency and trust	Error and fraud reduction	14	Includes concepts related to reporting accuracy, transaction traceability, and ensuring the reliability of financial information
	Stakeholder trust	12	Concepts related to gaining the trust of investors, customers, and regulatory bodies
	Data transparency	10	Includes secure and real-time access to information and transaction traceability
Efficiency and productivity	Process optimization	16	Concepts related to reduced processing time, elimination of repetitive tasks, and coordination between organizational units
	Resource savings	13	Concepts related to cost reduction and optimal use of financial and human resources
Skill development	Technological skills	11	Need for ability to work with digital systems and blockchain technology

and role transformation			
	Professional role transformation	12	Shift of accountants' roles from routine tasks to analytical and advisory functions
	Training and awareness	9	Targeted training, increased awareness, and organizational acceptance of technology
Challenges and barriers	Infrastructure and technical limitations	15	Lack of equipment, weak networks, and limitations in organizational software systems
	Legal and regulatory barriers	11	Absence of a clear legal framework and lack of coordination among regulatory bodies
	Organizational resistance	10	Opposition from managers and employees toward technological change
	Risk management	9	Concerns about errors and operational mistakes, need for risk mitigation
Opportunities and innovation	Professional and job opportunities	13	Creation of new job positions and professional development for accountants
	Innovation in financial services	12	Technology-based financial services and advanced data analytics
	International benchmarking and learning	10	Utilizing the experience of countries and organizations with successful blockchain adoption
Future impacts and decision-making	Improved decision-making	14	Enhanced managerial decision-making, real-time monitoring, and data analysis

The analysis of this stage shows that the fundamental structure of blockchain adoption in accounting in Iraq consists of five main themes and sixteen interconnected clusters that operate in a networked and interactive manner.

1. Transparency and Trust:

This theme represents the primary motivation for technology adoption, focusing on reducing fraud, improving data accuracy, and enhancing stakeholder trust. The high frequency of codes in this cluster indicates that participants emphasized transparency and data reliability more than any other factor.

2. Efficiency and Productivity:

This theme reflects the operational benefits of blockchain, including reduced processing time, elimination of repetitive tasks, and resource optimization. These clusters indicate that efficiency and resource savings are key motivational drivers for technology adoption.

3. Skill Development and Role Transformation:

This theme highlights that workforce empowerment and the transformation of accountants' professional roles are essential conditions for successful technology adoption. Concepts related to training, technological skill development, and professional role change emphasize the importance of human capital in the adoption process.

4. Challenges and Barriers:

With a high frequency of codes, this theme clearly indicates that technical limitations, legal constraints, organizational resistance, and risk management issues represent major threats to adoption, requiring systematic organizational responses.

5. Opportunities, Innovation, and Future Impacts:

This theme reflects the positive and motivational dimension of the technology. Clusters include job opportunities, financial service innovation, international benchmarking, and improved managerial decision-making, illustrating the strategic and developmental outlook of blockchain in Iraqi accounting.

Step 7

The seventh and final stage of the Colaizzi method was conducted with the aim of validating and ensuring the accuracy and reliability of the research findings. For this purpose, four criteria proposed by Guba and Lincoln—credibility, dependability, confirmability, and transferability—were applied to ensure that the results were presented in an accurate, trustworthy manner and truly reflected the participants' lived experiences.

Credibility refers to the plausibility and persuasiveness of the research findings and indicates the extent to which the results correspond to the experienced reality. In this study, several complementary strategies were employed to enhance credibility:

1. **External audit:** An independent reviewer, the supervisor of this study, examined all stages of data collection and analysis to ensure that the research process was conducted in accordance with scientific and logical standards and that the findings were accurate and valid.
2. **Ongoing process monitoring:** Throughout data collection and analysis, the researcher carefully documented all procedures and decisions. This continuous documentation ensured transparency in the analytical process, allowing every interpretation and conclusion to be traceable and verifiable, thereby strengthening the validity of the analysis.
3. **Member checking:** Initial interpretations of the findings were shared with some of the interviewees to ensure that the researcher's interpretations aligned with their actual experiences. Where necessary, adjustments were made based on their feedback, resulting in more accurate and reality-based interpretations.
4. **Prolonged engagement with the data:** The researcher's continuous involvement in the data collection environment and careful review of interview transcripts provided sufficient opportunity for deep understanding of the phenomenon. This led to refinement of initial interpretations and contributed to a more comprehensive and robust analysis, thereby enhancing the depth and accuracy of the findings.

By applying these four complementary strategies, the qualitative findings of the study achieved a high level of scientific validity and reliability and are transferable to similar contexts

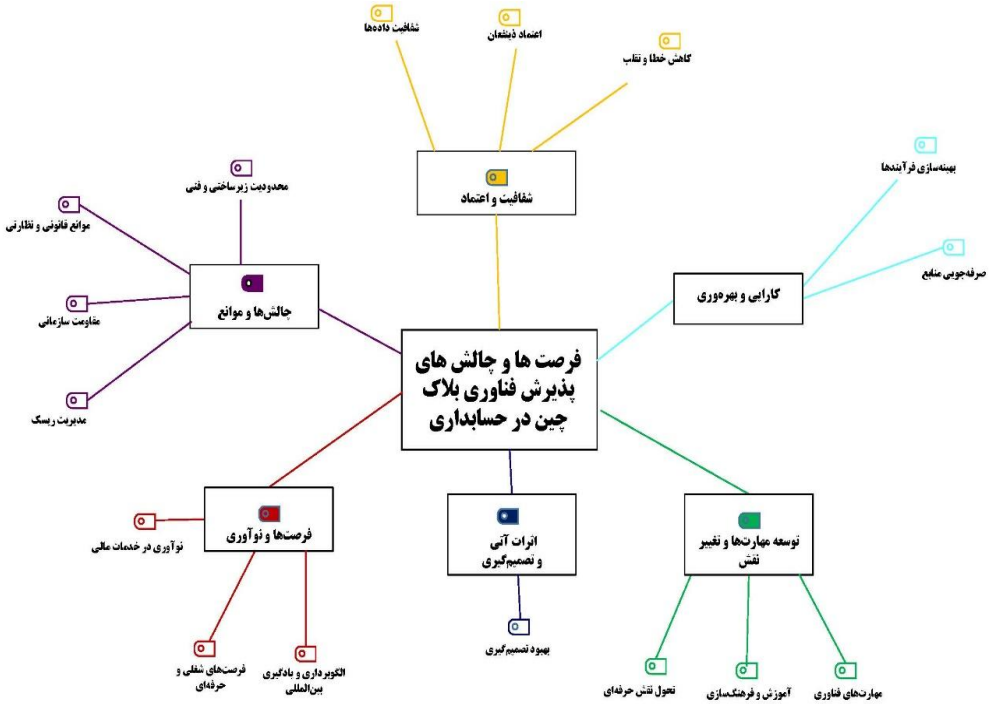


Figure 2: Model of Opportunities and Challenges of Blockchain Technology Adoption in Accounting

4. Results review:

To ensure the accuracy and validity of the obtained data and to avoid any misinterpretation by the researcher, the extracted information was re-presented to the informants and subsequently confirmed by them.

Prolonged engagement:

The researcher was engaged with the research topic over an extended period (approximately 10 months) and conducted informal interviews throughout the year with several accounting experts and academics in the Republic of Iraq. In addition, part of this time was devoted to direct presence in organizational and academic environments, including companies and universities.

5. Discussion and Conclusion

The present study was conducted with the aim of identifying the opportunities and challenges of blockchain technology adoption in accounting based on the perspectives of accounting experts and academics in the Republic of Iraq. The findings indicated that blockchain technology has significant potential to enhance financial transparency, increase the reliability of accounting information, reduce fraud, improve data security, facilitate auditing processes, and accelerate the recording and exchange of financial information. In contrast, factors such as weak technological infrastructure, limited specialized knowledge, absence of clear regulations, organizational resistance, implementation costs, security concerns, and a shortage of skilled human resources were identified as the main barriers to adopting this technology. The results also revealed that the level of readiness within the accounting profession in Iraq for adopting emerging technologies remains limited, and the development of this technology requires substantial infrastructural, educational, and regulatory reforms.

The findings of this study were largely consistent with a considerable body of prior domestic and international research. The results showed that financial transparency and the reduction of data manipulation risks are among the most important benefits of blockchain in accounting, which aligns with the findings of Nicolai et al. (2022), Xu et al. (2023), and Ahmad et al. (2024). These studies similarly emphasized that the decentralized structure of blockchain

can enhance the reliability of financial information and prevent data distortion. Likewise, the findings of the present study regarding the role of blockchain in facilitating auditing and improving access speed to financial data are consistent with the studies of Zhang et al. (2021) and Robertson et al. (2023). They argued that the simultaneous and immutable recording of transactions can reduce audit time and cost while enabling real-time financial monitoring.

On the other hand, the results regarding legal constraints and weak technological infrastructure are consistent with the findings of Al-Qaisi et al. (2022), Youssef et al. (2023), and Haider et al. (2024). These studies also indicated that many developing countries still lack the necessary legal and technical frameworks for widespread blockchain adoption. Similarly, the findings related to organizational resistance and managerial concerns about changes in traditional accounting structures align with Smith et al. (2021), who reported that the adoption of transformative technologies is often accompanied by professional resistance and concerns about role redefinition.

Another important finding of this study was the lack of specialized knowledge and weak professional training as a major barrier to blockchain adoption, which is consistent with Hussein et al. (2023), Jafar et al. (2024), and Karimi et al. (2024). These studies demonstrated that insufficient training in emerging financial technologies complicates the effective adoption and utilization of blockchain systems. Furthermore, the findings regarding the necessity of revising academic curricula are consistent with Raphael et al. (2022), who emphasized that the future accounting profession requires digital competencies and technology-oriented knowledge.

However, some discrepancies were observed between the present study and previous research. In several international studies, organizational readiness for blockchain adoption was reported to be relatively high, whereas participants in this study highlighted limited structural and managerial readiness in Iraq. This difference may be attributed to variations in economic conditions, infrastructure development, and policy frameworks between developed and developing countries. Additionally, while security concerns were less emphasized in some prior studies, participants in the present research expressed greater concern regarding potential risks due to weak cybersecurity infrastructure and the absence of established standards.

The findings of the present study can be interpreted within the framework of the Technology Acceptance Theory. According to this theory, when individuals and organizations perceive a technology as useful and efficient, the likelihood of its acceptance increases. In the present study, participants also believed that blockchain technology can enhance transparency, security, and efficiency in accounting information. This perceived usefulness, therefore, strengthens the conditions for its adoption. On the other hand, technological complexity, implementation costs, and the lack of adequate infrastructure reduce perceived ease of use, thereby hindering its broader adoption.

The results of the study can also be explained through Rogers' Diffusion of Innovations theory. According to this framework, the adoption of any new technology depends on factors such as relative advantage, compatibility, complexity, trialability, and observability. The findings indicated that blockchain offers a strong relative advantage in improving the quality of financial information and increasing trust in accounting data. However, in terms of compatibility with existing organizational structures and infrastructure, it still faces significant limitations. In fact, the greater the organizational flexibility toward technological change, the higher the likelihood of effective blockchain adoption.

Furthermore, the findings can be interpreted through the lens of the digital transformation approach in the accounting profession. According to this perspective, the accounting profession is transitioning from traditional structures toward intelligent, data-driven, and digital systems. Blockchain technology, as one of the key tools of digital transformation, can fundamentally reshape processes of recording, storing, and controlling financial information. However, achieving this transformation requires changes in managerial attitudes, revisions in educational policies, and the development of technical infrastructure.

From the perspective of Human Capital Theory, the findings are also highly relevant. The results revealed that the shortage of skilled human resources and the lack of technological knowledge are among the main barriers to blockchain adoption in accounting. This indicates that technological development without investment in education

and human resource empowerment cannot lead to desirable outcomes. Therefore, enhancing the specialized knowledge of accountants and academics plays a crucial role in the success of the digital transformation process.

The findings also showed that organizational resistance to change is a major barrier to the adoption of new technologies. This can be explained within the framework of the Theory of Resistance to Change. According to this theory, individuals and organizations typically resist technologies that alter existing structures, roles, and processes. In the present study, some participants expressed concerns regarding changes in accountants' roles, increased dependence on technology, and reduced human control over financial processes, reflecting both cognitive and organizational resistance to technological change.

The adoption of blockchain technology in accounting cannot be viewed merely as a technical change; rather, it represents a structural transformation within the financial system and the accounting profession. As organizations move toward decentralized technologies, traditional models of financial control, recording, and reporting are also transformed. Therefore, it is natural that such a technology is accompanied by uncertainty, hesitation, and resistance. In fact, every disruptive technology generates both benefits and uncertainty, which can slow down its adoption process.

One of the most important reasons for the adoption of blockchain is the enhancement of trust in financial information. In environments where financial transparency and data reliability are highly important, blockchain can strengthen stakeholder trust by reducing opportunities for data manipulation. However, when regulatory and legal frameworks are not yet aligned with emerging technologies, organizations tend to adopt a cautious approach. Thus, the absence of clear legal structures can serve as a major obstacle to the development of this technology.

In addition, weak technological infrastructure and limited professional skills reduce organizational readiness for blockchain adoption. The greater the gap between technological knowledge and organizational requirements, the higher the risk of incomplete or unsuccessful implementation. Therefore, the development of blockchain in accounting requires alignment between academic education, professional needs, and policy implementation.

On the other hand, the accounting profession in many countries is still based on traditional structures, and changing these structures requires time, education, and cultural transformation. When managers and accountants clearly perceive the practical benefits of the technology, resistance to change decreases and adoption becomes easier. Accordingly, establishing an innovation-oriented and learning-based organizational culture can play a critical role in the success of digital transformation.

Applied Recommendations

• Organizing specialized training courses on blockchain technology for accountants, financial managers, and academics.

• Revising accounting curricula and incorporating topics related to emerging financial technologies and digital transformation.

• Developing clear laws and standards for the use of blockchain technology within Iraq's financial and accounting system.

• Enhancing information technology infrastructure and cybersecurity capabilities in financial and accounting organizations.

• Supporting pilot projects related to blockchain applications in accounting by government bodies and professional institutions.

• Strengthening collaboration between universities, technology firms, and financial organizations to advance specialized knowledge.

• Increasing managers' awareness of the practical benefits and applications of blockchain technology.
• Establishing research and specialized centers in the field of financial technologies and digital accounting.

• Encouraging organizations to adopt blockchain technology gradually and experimentally to reduce organizational resistance.

• Designing professional capacity-building programs to train skilled human resources in digital accounting and blockchain domains.

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