International Journal of Computer Information Systems and Industrial Management Applications
ISSN 2150-7988 Volume 18(20s) 2026 pp. 1709-1732
https://doi.org/10.70917/ijcisim-2026-6103
Article

Qualitative Analysis of the Role of Internal Auditing in Improving Accounting Information Quality in a Business Intelligence Environment in the Republic of Iraq

Bakr Ayoob Saleh[1], Javad Reza Zadeh[2], Sahar Sepasi[3]

[1] Lecturer, Northern Technical University; Director of the Internal Audit and Control Department at the University Presidency
Email: ayoob.b.2016@ntu.edu.iq
[2] Associate Professor, Faculty of Management & Economics, Tarbiat Modares University, Email: j.rezazadeh@modares.ac.ir
[3] Associate Professor, Faculty of Management & Economics, Tarbiat Modares University
Email: sepasi@modares.ac.ir

Abstract: This study aimed to examine the role of internal auditing in improving the quality of accounting information within business intelligence (BI) environments in organizations in the Republic of Iraq. With the expansion of information technologies, the increasing volume of financial data, and the shift toward data-driven decision-making, the quality of accounting information and the role of internal auditing in ensuring the accuracy and reliability of financial data have gained growing importance.
This research was applied in terms of purpose and qualitative in nature, conducted using a case study approach and based on the seven-step Claizzi method. The study population included managers, internal auditors, financial information technology specialists, management accounting experts, and university professors in the Republic of Iraq. Purposeful sampling was used, and 16 experts with experience in internal auditing, information systems, and business intelligence participated in semi-structured interviews.
Data were collected through face-to-face interviews, organizational document review, and workplace observation, and were subsequently analyzed using qualitative content analysis.
The findings indicated that internal auditing in BI-based environments plays a role beyond traditional financial control and has evolved into an analytical, preventive, and strategic mechanism for managing financial information. The results showed that the use of business intelligence tools, data analytics, management dashboards, process automation, and modern technologies enhances the accuracy, transparency, reliability, and timeliness of accounting information. Furthermore, internal auditing improves financial reporting quality and managerial decision-making by strengthening internal controls, reducing financial errors, preventing irregularities, and enhancing organizational transparency.
Alongside these benefits, challenges such as cultural resistance, weak technological infrastructure, limited financial resources, shortage of skilled personnel, and inadequate technological training were identified as major barriers to the effective implementation of intelligent internal auditing. Ultimately, the findings revealed that the interaction between internal auditing, business intelligence technologies, human skill development, and organizational support provides a foundation for improving accounting information quality and enhancing the effectiveness of organizational decision-making.
Keywords: Internal auditing, accounting information quality, business intelligence, data analytics, intelligent auditing, financial information technology, Republic of Iraq

1. Introduction

In recent decades, the expansion of information technologies and digital transformation has fundamentally reshaped organizational structures and the ways in which financial information is managed. In today's highly competitive environment, organizations require high-quality, reliable, and timely accounting information more than

ever in order to maintain competitive advantage, enhance efficiency, and make accurate and effective decisions. In this context, the emergence of business intelligence (BI) systems has transformed financial and accounting data from traditional records into a strategic resource for analysis, forecasting, and managerial decision-making. By leveraging data analytics, information processing, and intelligent technologies, business intelligence enables rapid access to information and in-depth analysis of organizational performance, thereby supporting managers in making data-driven decisions (Al-Khouri et al., 2018; Goetz & Schmitz, 2023).

The increasing volume of data, the complexity of financial processes, and the development of intelligent systems have not only created extensive opportunities for improving decision-making but have also introduced challenges related to the accuracy, transparency, and reliability of accounting information. In BI-based environments, financial data are continuously collected, processed, and analyzed from multiple sources, and any weakness in data control may lead to the generation of inaccurate information and, consequently, inefficient decision-making. In such conditions, the quality of accounting information has become a critical concern for organizations, as financial information is only valuable when it is accurate, complete, reliable, transparent, and timely (Tran et al., 2025; Liu et al., 2024).

Accounting information quality not only influences managerial decision-making but also plays a crucial role in increasing the trust of investors, regulatory bodies, and other organizational stakeholders. High-quality accounting information can reduce uncertainty in decision-making and support improvements in organizational performance. Conversely, deficiencies in financial information quality increase the likelihood of managerial errors, reduce transparency, and elevate financial risks. In digital and data-driven environments, this issue becomes even more significant, as high processing speeds and data complexity increase the risk of information errors and distortions (Jorfi et al., 2018; Ismail et al., 2021).

In this context, internal auditing, as one of the most important organizational control and monitoring mechanisms, plays a vital role in ensuring accounting information quality. Internal auditing is an independent and systematic process aimed at evaluating internal controls, managing risks, verifying information accuracy, and improving organizational processes. In BI-based environments, the role of internal auditing goes beyond traditional financial control and extends to areas such as data analytics, information system evaluation, data quality control, and financial information validation. In modern organizations, internal auditing is recognized as a key mechanism for ensuring information reliability and reducing information-related risks (Gagnon et al., 2017; Zaman et al., 2017).

Technological developments have led internal auditing to move away from traditional approaches toward intelligent, data-driven auditing. Today, many organizations use data analytics tools, dashboards, intelligent systems, and artificial intelligence technologies to perform auditing activities. These technologies enable the analysis of large volumes of data in a short time and enhance internal auditors' ability to detect errors, fraud, and financial risks. The use of data analytics in internal auditing can improve assessment accuracy, increase information transparency, and enhance the quality of financial reports (Bart, 2019; MindBridge, 2025).

On the other hand, the development of artificial intelligence in the field of internal auditing has enabled a profound transformation in information control and evaluation processes. Artificial intelligence, with its capability to rapidly analyze large datasets, identify abnormal patterns, and detect financial anomalies, can play an effective role in improving accounting information quality. In BI-based environments, the use of intelligent algorithms shifts auditing from a periodic activity to continuous, real-time monitoring. This helps organizations identify and control errors and information risks before they escalate into crises (Ghozi et al., 2024; Kokina & Davenport, 2025).

Despite the extensive benefits of intelligent technologies, many organizations face multiple challenges in effectively implementing business intelligence and integrating it with internal auditing processes. The complexity of information systems, weak technological infrastructure, shortage of skilled human resources, organizational resistance to change, and lack of effective internal controls are among the factors that can negatively affect accounting information quality. In developing countries, these challenges are more pronounced, as many organizations are still in

the early stages of digital transformation and their information systems are not yet fully aligned with intelligent technologies (Shad & Al-Khafaji, 2022; KPMG, 2020).

In the Republic of Iraq, organizations have recently moved toward the adoption of modern information systems and business intelligence technologies. The development of IT infrastructure, the expansion of electronic financial systems, and the increasing demand for financial transparency have heightened the importance of accounting information quality and the role of internal auditing. However, many Iraqi organizations still face problems such as weak internal controls, inefficiencies in certain information systems, limited technological expertise, and insufficient data analytics capabilities. These conditions may reduce the reliability of financial information and negatively affect managerial decision-making effectiveness (Al-Shammari et al., 2020; Baghraan & Mahmoud, 2019).

Furthermore, Iraq's economic and administrative environment has undergone significant changes in recent years, and organizations require efficient accounting and auditing systems to enhance transparency, reduce financial corruption, and improve accountability. In this context, internal auditing can serve as a tool for strengthening internal controls, improving accounting information quality, and increasing confidence in financial reporting. However, the actual role of internal auditing in BI-based environments within Iraqi organizations has not yet been examined in depth from a qualitative perspective, and there is limited understanding of the experiences, perceptions, and challenges of professionals in this field (Al-Khouri et al., 2018; Ismail et al., 2021).

A significant portion of previous studies on internal auditing and accounting information quality has focused on quantitative approaches and statistical relationships between variables, while less attention has been given to the lived experiences of experts, their perceptions of accounting information quality, and the way internal auditing operates in business intelligence environments. In contrast, a deep understanding of these processes requires a qualitative and exploratory approach to identify the hidden dimensions, challenges, and practical realities within organizations. Moreover, most prior studies have been conducted in developed countries, while structural, cultural, and technological differences in developing countries—particularly Iraq—have been largely overlooked (Gagnon et al., 2017; Shad & Al-Khafaji, 2022).

Accordingly, the main research gap lies in the lack of in-depth qualitative studies on the role of internal auditing in improving accounting information quality in BI-based environments in the Republic of Iraq. Limited research has explored the experiences, perspectives, and perceptions of managers, internal auditors, and financial experts regarding how internal auditing influences accounting information quality in the context of intelligent technologies. In addition, the challenges, barriers, and implementation requirements of this process in Iraqi organizations have not been comprehensively addressed. This gap highlights the need for an exploratory qualitative study to identify and analyze the various dimensions of this phenomenon from the perspective of professionals in the financial and auditing fields.

The rationale for selecting this topic lies in the growing importance of accounting information quality in technology-driven environments and the critical role of internal auditing in ensuring the accuracy and reliability of financial information. Furthermore, given the increasing use of business intelligence systems in Iraqi organizations and the need to enhance financial transparency and decision-making efficiency, an in-depth qualitative examination of this issue can contribute to a better understanding of challenges, capacities, and requirements for developing internal auditing in intelligent environments. The main concern of the researcher is to clarify how internal auditing in BI-based environments can enhance accounting information quality and improve the effectiveness of organizational decision-making in the Republic of Iraq.

Theoretical Foundations

Technological transformations and the expansion of digital environments have entered organizations into a new stage of information management, in which data and information have become the most critical strategic assets. In this context, an organization's ability to produce accurate, reliable, and timely information plays a decisive role in the success of managerial decision-making. One of the most significantly affected domains by these transformations is the accounting and auditing system of organizations. The emergence of business intelligence systems has shifted the

process of collecting, analyzing, and interpreting financial information away from traditional approaches toward intelligent data analytics. According to the theory of the "data-driven organization," accounting information can serve as an effective basis for decision-making only when it possesses sufficient quality, transparency, and reliability; otherwise, in complex and competitive environments, any informational weakness may lead to erroneous decisions and increased organizational risk (Al-Khouri, 2018; Ismail & Othman, 2021).

In the theory of "information quality," accounting information, as one of the most important outputs of an organizational information system, must possess characteristics such as relevance, accuracy, completeness, comparability, timeliness, and reliability. From this perspective, the quality of accounting information not only influences managerial decisions but also determines the level of trust of stakeholders, investors, and regulatory bodies in the organization. Accounting information has real value only when it provides a clear and accurate representation of the organization's financial position and performance. Otherwise, decision-making will be based on incomplete or distorted information, increasing the likelihood of managerial errors. Tran (2025) argues that successful organizational decision-making is directly dependent on the quality of accounting information systems, and higher information quality increases managerial confidence in decision-making. Similarly, Liu (2024) emphasizes that accounting information quality is directly related to the strength of internal controls and audit quality.

In business intelligence environments, financial and accounting information is no longer merely a tool for recording financial events; rather, it has become a resource for strategic analysis, trend forecasting, and performance evaluation. The theory of "organizational intelligence" suggests that successful organizations are those capable of transforming raw data into actionable knowledge for decision-making. Business intelligence has emerged in this context and comprises a set of technologies, tools, and processes that enhance decision-making by analyzing data, extracting patterns, and generating intelligent reports. In such environments, the large volume of data and the high speed of information processing increase the need for supervisory and control mechanisms, as any weakness in data accuracy can affect the entire organizational decision-making system (Goetz & Schmitz, 2023; Hatfield et al., 2024).

From the perspective of "organizational control theory," internal auditing is considered one of the most important assurance mechanisms within organizations. Its primary function is to evaluate internal controls, reduce risk, ensure information accuracy, and enhance organizational transparency. In the past, internal auditing mainly focused on detecting financial errors and fraud; however, in modern approaches, it has evolved into a tool for value creation, risk management, and information quality improvement. Through continuous examination of financial and information processes, internal auditing can prevent information distortion and enhance the reliability of accounting information. Based on agency theory, the existence of an effective internal audit function reduces information asymmetry between managers and stakeholders and limits opportunistic managerial behavior. As a result, accounting information quality improves and trust in financial reporting increases (Gagnon & Lavoie, 2017; Zaman & Al-Mousawi, 2017).

In business intelligence environments, the role of internal auditing has shifted from traditional functions toward intelligent, data-driven auditing. The theory of "risk-based auditing" suggests that internal auditors should use technological tools and data analytics to identify and assess financial and informational risks. In this approach, internal auditing is not limited to reviewing financial documents but extends to evaluating the entire process of data generation, processing, and analysis. The use of data analytics, intelligent dashboards, and analytical algorithms enables auditors to detect abnormal patterns, hidden errors, and potential risks with greater accuracy (Bart, 2019; MindBridge, 2025).

One of the key theoretical issues in internal auditing is the relationship between technology and the effectiveness of internal controls. According to the theory of "technological dependency," the effectiveness of internal audit systems in modern environments is largely dependent on the level of information technology adoption. Organizations that utilize business intelligence tools, data analytics, and intelligent systems have greater capability in controlling information, detecting errors, and improving financial data quality. In contrast, weak technological infrastructure may reduce the effectiveness of internal auditing and increase information risk. Shad and Al-Khafaji (2022) argue that one of the most important challenges facing Iraqi organizations in adopting business intelligence is

weak technological infrastructure and a shortage of skilled human resources, both of which can negatively affect accounting information quality.

The expansion of artificial intelligence has also led to a fundamental transformation in internal auditing theories. In modern approaches, artificial intelligence is recognized as a tool for rapid data analysis, fraud detection, risk prediction, and continuous evaluation of financial information. The theory of "intelligent auditing" suggests that the use of intelligent algorithms and big data analytics can increase the accuracy and speed of auditing while reducing the likelihood of human error. In this framework, internal auditors move away from their traditional role as financial controllers and become data analysts and risk assessors. Ghozi (2024) states that artificial intelligence enhances the quality of auditing processes and improves the accuracy of financial data analysis. Similarly, Kokina and Davenport (2025) argue that intelligent technologies are driving the future of internal auditing toward continuous monitoring and real-time data analysis.

Based on theories related to organizational transparency and accountability, the higher the quality of accounting information, the greater the level of organizational accountability and stakeholder trust. Internal auditing, in this context, functions as a mechanism for ensuring information transparency by evaluating internal controls and data accuracy, thereby facilitating more accurate decision-making. Jorfi and Khan (2018) argue that information transparency and financial accountability are among the most important factors influencing organizational decision-making quality, and a strong internal audit system can enhance such transparency.

Overall, the theoretical foundations of this study indicate that internal auditing, accounting information quality, and business intelligence are three interrelated concepts in modern organizational environments. The development of intelligent technologies and the increasing volume of data have heightened the importance of internal auditing in ensuring the accuracy and reliability of financial information. In business intelligence-based environments, internal auditing is not only a control mechanism but also a strategic tool for enhancing information quality, reducing risk, increasing transparency, and improving organizational decision-making.

Review of Previous Studies

Yousefi et al. (2023) conducted a study on "the role of internal auditing in enhancing accounting information quality in educational organizations." The research employed a survey method using a standardized questionnaire. The statistical population included 70 universities and educational institutions in Razavi Khorasan Province. The results indicated that internal auditing improves managerial financial decision-making and increases trust in accounting information by enhancing the transparency, accuracy, and reliability of financial data.

Karimi et al. (2024) examined "the impact of internal auditing on compliance with accounting standards in public banks." The study used a descriptive-correlational design. The statistical population consisted of 10 public banks in Tehran Province. The findings showed that internal auditing, through continuous monitoring and performance evaluation, increases compliance with accounting standards and improves the quality of financial information.

Nikkhah et al. (2025) analyzed "the role of internal auditing in improving accounting processes in public organizations." This qualitative study employed content analysis. The participants included 15 financial managers from governmental ministries in Isfahan Province. The results indicated that internal auditing, by identifying weaknesses in financial processes and providing corrective recommendations, enhances the accuracy, validity, and reliability of financial information.

Fallah et al. (2026) investigated "the effect of internal auditing on reducing financial risks in insurance companies." The study used a correlational design based on structural equation modeling. The statistical population included 20 insurance companies in Tehran Province. The findings revealed that internal auditing, through the implementation of internal controls and detailed financial process reviews, reduces financial risks and improves the quality of financial information.

Al-Zoubi and Jarrar (2023) studied "the role of internal auditing in improving accounting information systems in Jordanian banks with organizational commitment as a mediating variable." The study used a survey approach based

on data collected from 193 bank employees in Jordan. The results showed that internal auditing has a positive and significant relationship with accounting information systems, and organizational commitment plays a mediating role in this relationship.

Liu (2024) analyzed "the quality of internal auditing and its impact on the comparability of accounting information." The study employed a correlational design using statistical data. The findings indicated that higher internal audit quality leads to improved comparability of accounting information and better financial decision-making.

Al-Waqleh (2021) examined "the impact of accounting information systems on internal audit quality with organizational culture as a mediating factor." The study used a survey method with structural equation modeling. The results revealed that accounting information systems have a significant direct effect on internal audit quality, while organizational culture plays a mediating role in this relationship.

Lan (2025) investigated "the impact of internal auditing on accounting information security in listed companies in Vietnam." The study used a correlational approach based on statistical data. The findings showed that internal auditing enhances accounting information security and reduces financial risks by strengthening internal controls and continuous monitoring.

Kokina et al. (2025) explored "challenges and opportunities of artificial intelligence in internal auditing." This study employed a review methodology based on analyzing trends in the use of artificial intelligence in auditing. The results indicated that artificial intelligence can improve the accuracy, speed, and efficiency of internal auditing processes, although challenges such as technology adoption and the need for new skills still exist.

Shawqafah (2025) examined "the role of accounting information systems in improving internal audit quality in commercial banks." The study used a survey design based on data collected from commercial banks. The findings indicated that accounting information systems, by providing accurate and timely data, improve internal audit quality and enhance the reliability of financial reporting.

Seymour (2025) studied "the use of data analytics in internal auditing to improve decision-making." The research used a qualitative approach based on content analysis of audit reports. The results showed that the use of data analytics and information visualization tools improves decision-making processes in internal auditing and enhances transparency in reporting.

Orlić et al. (2020) examined "the value added of internal auditing." The study was a literature review analyzing existing research in the field of internal auditing. The results demonstrated that internal auditing creates significant value for organizations by strengthening internal controls, increasing transparency, and reducing risks.

Zhao et al. (2022) investigated "the effect of mutual trust on the relationship between internal control and accounting information quality." The study employed a correlational design using statistical data. The findings indicated that mutual trust among organizational members strengthens internal controls and improves accounting information quality.

2. Research Methodology

The present study was applied in terms of purpose and qualitative in terms of nature, and it was conducted with the aim of explaining the role of internal auditing in improving the quality of accounting information in a business intelligence environment within organizations in the Republic of Iraq. Given that the research topic focuses on examining the perceptions, experiences, and professional interpretations of managers and specialists in the fields of finance and accounting regarding accounting information quality and the role of internal auditing in BI-based environments, a qualitative approach was deemed appropriate for this study. Moreover, due to the exploratory nature of the topic and the need for an in-depth understanding of participants' experiences within real organizational contexts, a case study strategy was selected as the main research approach. The study was grounded in a social constructivist paradigm, as the quality and reliability of accounting information in business intelligence environments are considered

phenomena shaped by professional interactions, subjective interpretations, and organizational experiences, requiring a deep exploration of participants' meanings and interpretations.

The research population included managers, internal auditors, management accounting experts, financial information technology specialists, university professors, and researchers in accounting and business intelligence in the Republic of Iraq. These individuals were employed in various institutions and organizations, including the Central Bank of Iraq, the Ministry of Finance, as well as companies operating in the oil, electricity, telecommunications, transportation sectors, and universities. The participants possessed diverse experience in internal control, risk management, IT-based auditing, financial data analysis, and business intelligence systems, and thus had sufficient professional and technical expertise to contribute meaningfully to the study.

Sampling in this study was conducted using a purposive sampling technique. The inclusion criteria for participants were having professional experience in internal auditing or management accounting, familiarity with business intelligence systems, and direct involvement in the production, analysis, or use of accounting information in managerial decision-making processes. Based on these criteria, 16 experts with relevant experience were selected and interviewed. The sample size was determined based on the principle of theoretical saturation, meaning that data collection continued until no new concepts or categories emerged and redundancy was observed in the data.

Data were collected through semi-structured face-to-face interviews. To guide the interviews, an interview protocol based on the research objectives was developed. The interview questions focused on the role of internal auditing in enhancing accounting information quality, the level of trust in financial information generated in BI environments, the effectiveness of internal controls, the challenges of using business intelligence technologies, and how managers utilize accounting information in organizational decision-making. Each interview lasted between 60 and 90 minutes, and all interviews were recorded with participants' consent and fully transcribed. The transcribed texts were then returned to some participants for member checking to ensure accuracy and consistency with their views.

In addition to interviews, to enrich the data and increase analytical rigor, organizational documents such as accounting reports, internal audit reports, operational and strategic plans, annual reports, and other documents related to financial processes and business intelligence systems were reviewed. Furthermore, direct observation of the work environment and familiarity with organizational contexts helped deepen the understanding of implementation conditions and processes related to the generation and use of accounting information.

To ensure credibility and trustworthiness of the data, strategies such as prolonged engagement in the data collection process, triangulation of data sources, participant review of findings, and continuous data comparison were employed. Additionally, to enhance validity, interview data were cross-checked with organizational documents, and codes and categories were continuously reviewed and refined throughout the analysis process. The reliability of the study was ensured through detailed documentation of data collection and analysis procedures, recording the researcher's decision-making process, and maintaining analytical memos to allow for traceability and verification by other researchers.

Data analysis was conducted using the seven-step Colaizzi method. In the first step, interview transcripts were read multiple times to gain a comprehensive understanding of participants' experiences and perspectives. In the second step, significant statements relevant to the research topic were extracted. In the third step, meanings were formulated from these significant statements. In the fourth step, formulated meanings were organized into clusters of themes and main categories. In the fifth step, an exhaustive description of the phenomenon was developed based on the identified categories, and in the sixth step, the fundamental structure of the phenomenon was derived by focusing on the relationships among key concepts. Finally, in the seventh step, the findings were returned to several participants to verify the extent to which the results reflected their actual experiences.

3. Findings

Table 1. Demographic Characteristics of Participants

Interview No.	Organization/Company	Position	Work Experience (Years)	Expertise	Gender
1	Al-Raed International Trading Company	Internal Audit Manager	15	Internal controls, risk analysis, financial reporting	Male
2	Al-Mustansiriyah University	Professor of Accounting and Information Systems	20	Business intelligence, financial reporting, modern accounting education	Male
3	General Audit Department, Ministry of Finance	Senior Government Auditor	18	Risk-based auditing, financial transparency, anti-corruption	Male
4	Central Bank of Iraq	Internal Audit Manager	17	Internal auditing, financial risk management, financial reporting quality improvement	Male
5	South Oil Company of Iraq	Internal Audit Supervisor	14	Mega-project auditing, business intelligence, risk management	Male
6	Iraq Information Technology Development Company	IT & BI Project Manager	12	Data analytics, business intelligence, digital transformation	Male
7	Iraq Telecommunications Company	Internal Audit Manager	15	Internal auditing, risk management, technology-based financial controls	Male
8	University of Baghdad	Professor and Accounting & Auditing Researcher	20	Internal auditing, IT in auditing, business intelligence	Female
9	International Transport Company of Iraq	Internal Audit Manager	13	Financial auditing, modern auditing technologies, risk management	Male
10	Iraq Electricity Company	Chief Internal Audit Manager	18	Large-scale project auditing, risk management, audit process improvement	Male

Based on Table 1, the majority of participants were male, with only one female participant in the sample. This indicates the limited presence of women in managerial and research positions related to internal auditing and business intelligence in Iraqi organizations. The average work experience of participants is approximately 16 years, indicating that the sample consists of highly experienced professionals in financial and technological domains. Furthermore, participants were drawn from diverse public and private organizations, including the Central Bank, Ministry of Finance, oil, transportation, electricity companies, and universities, which enhances the diversity of perspectives and the breadth of practical and academic experience. The identified expertise includes internal auditing, risk management, financial controls, data analytics, business intelligence, and information technology, reflecting a strong focus on integrating financial knowledge with modern technological advancements to improve accounting information quality.

Stage one 1 (Colaizzi Analysis)

In the first step of Colaizzi's seven-step method, the recorded interviews were listened to repeatedly in order to become familiar with the participants' experiences and to gain a holistic understanding of the content. Subsequently, all verbal descriptions—commonly referred to as protocols—were transcribed verbatim. Each interview was written out in full and then carefully analyzed. Table 2 presents a sample of interview excerpts.

Table 2. Sample Interview Statements

Interview No.	Theme	Interview Content
1	Role of internal auditing in improving financial information quality	Internal auditing is the backbone of financial control. Through risk-based checklists and procedures, reporting accuracy has increased by up to 70%, and managerial trust has been strengthened. BI dashboards facilitate real-time decision-making and risk analysis. Challenges include cultural resistance, limited technical resources, and the need for continuous training.
2	BI and financial reporting accuracy	BI acts as a second eye for auditors, identifying hidden patterns and financial errors. Reporting speed and accuracy have improved, and decisions are increasingly data-driven. Challenges include organizational culture, lack of skilled personnel, and budget constraints.
3	Government auditing and transparency	Internal auditing is a trust-building tool. In public projects, BI has detected data inconsistencies and prevented billion-dollar losses. Barriers include weak infrastructure, traditional regulations, and lack of digital training. The future belongs to data-driven integrated audit systems.
4	Central Bank and real-time analysis	Internal auditing in the Central Bank, supported by strong internal controls, has improved information quality. BI analyzes transaction trends in real time, enabling optimal resource allocation. Challenges include cultural resistance, lack of BI expertise, data security concerns, and implementation costs.
5	Oil industry and audit intelligence	Strong financial controls and BI have enabled anomaly detection, risk reduction, and real-time decision-making. Challenges include employee resistance, data quality issues, infrastructure limitations, and technology costs. The future depends on smart systems and machine learning.
6	Technology development and BI	BI provides a comprehensive framework for data analysis, reducing errors, enabling interactive reporting, and discovering patterns. Challenges include data quality, resistance to change, lack of expertise, and cost issues. BI is expected to become predictive and intelligent.
7	Technology-oriented companies	Intelligent controls, real-time monitoring, and BI alerts have enabled prevention and forecasting of financial problems. Challenges include resistance, technical complexity, and shortage of skilled personnel. AI and machine learning play a key role.
8	Universities and BI education	BI has transformed auditing through real-time analysis and improved managerial decision-making. Challenges include lack of expertise, limited infrastructure, and the need for university-industry collaboration. Continuous training and technological acceptance are essential.
9	Transport companies and integrated analysis	Control frameworks and BI ensure financial accuracy, detect anomalies, and increase response speed. Challenges include insufficient training, poor data quality, and technology costs. BI creates competitive advantage and transforms auditing.
10	Electricity company and automation	Internal auditing is a pillar of transparency. BI enables real-time data analysis and cost reduction. Barriers include lack of technical expertise, cultural resistance, and financial constraints. The future depends on automation and intelligent decision-making.

11	Central Bank and financial control	Internal auditing increases transparency and strengthens public trust. BI supports transaction monitoring and real-time analysis. Challenges include cultural resistance and lack of expertise.
12	Oil company and BI	BI helps identify errors and anomalies in oil projects and improves financial decision-making. Challenges include data quality, training needs, and cost. The future depends on intelligent analytics.
13	Ministry of Finance and anti-corruption	Internal auditing enhances transparency and monitoring of projects, enabling anti-corruption efforts. BI is limited to certain departments. Challenges include weak infrastructure and traditional regulations.
14	University and skill development	Universities play a key role in BI and data analytics education. Internal auditing can become advisory and analytical in nature. Challenges include lack of expertise and limited infrastructure.
15	Trading company and data-driven decision-making	BI enables real-time decision-making and reduces accounting errors. Risk-based internal auditing improves data quality and stakeholder trust. Challenges include cultural resistance and continuous training needs.
16	IT company and digital transformation	BI optimizes data collection and analysis and transforms internal auditing from reactive to proactive. Benefits include error reduction, interactive reporting, and pattern recognition. Challenges include data quality, resistance, and implementation costs.

Cross-Case Analysis

The analysis of the 16 interviews indicates that the central focus of all responses revolves around the role of internal auditing and modern information technologies—particularly business intelligence systems—in improving accounting information quality, reducing errors, enhancing transparency, and facilitating managerial decision-making.

Most participants emphasized that internal auditing is not merely a control function but also plays a strategic and advisory role through an analytical and preventive approach.

The interviews revealed that the use of BI as an intelligent tool enables the identification of hidden patterns, financial errors, and anomalies, significantly improving reporting speed and accuracy. Many participants also highlighted the advantages of real-time data analysis, which enables fast, optimized, and data-driven decision-making. This feature is particularly important in sensitive sectors such as banking, oil, public projects, and technology-driven industries, where it enhances stakeholder trust and financial transparency.

However, several common challenges were also identified across all interviews. The most significant barriers include cultural resistance among employees, weak technological infrastructure, shortage of skilled personnel, poor data quality, and high implementation costs. Many respondents believed that fully benefiting from BI and improving internal auditing requires continuous training, development of IT infrastructure, and organizational cultural transformation.

The qualitative analysis further revealed that the adoption of modern technologies and BI has transformed internal auditing from a traditional, reactive function into a proactive and strategic one. This transformation enables internal auditors not only to identify past errors and anomalies but also to predict future trends and potential risks. In sectors such as banking, oil, transportation, and technology companies, BI has contributed to increased efficiency, reduced costs, and improved supervisory processes.

Overall, the findings indicate that internal auditing and business intelligence are complementary systems that play a crucial role in enhancing accuracy, transparency, trust, and the effectiveness of financial decision-making. At the same time, successful implementation depends on overcoming cultural, technical, and educational barriers, and the future of internal auditing is clearly moving toward a data-driven and intelligent paradigm.

Figure 4-1: The output of MAXQDA software presents a word cloud. Based on word frequency in the interview transcripts, the most frequently occurring terms were auditing, technology, internal, information, technology, and BI.



Figure 1: MaxADA Software Output – Word Cloud of Key Terms

4. Stage Two

In the second stage, after carefully reviewing all interviews, meaningful information related to the phenomenon under investigation was identified. Accordingly, significant statements concerning the role of internal auditing in improving the quality of accounting information in a business intelligence (BI) environment were extracted from the interview texts. Table 3 presents a sample of the extracted statements along with the corresponding interview numbers.

Table 3. Sample Extracted Statements

Statement Code	Formulated Concepts	Interview No.
CA1	Improving the accuracy of financial statements through internal control frameworks	1
CA2	Increasing reporting transparency and stakeholder trust	1
CA3	Reducing accounting errors through checklists	1
CA4	Using BI dashboards for data analysis	1
CA5	Real-time data-driven decision-making	1
CA6	Cultural resistance to new technologies	1
CA7	Continuous employee training for BI usage	1
CA8	Upgrading information technology systems	1
CA9	Risk analysis and financial problem forecasting	1
CA10	Supporting financial management and budgeting	1
CA11	Improving financial reporting quality and standardization	2
CA12	Data-driven approach in internal auditing	2
CA13	BI as a complementary tool and “second eye” for auditors	2
CA14	Identification of hidden patterns and recurring errors	2
CA15	Need to revise academic education for BI integration	2

CA16	Budget constraints in technology implementation	2
CA17	Financial forecasting and integration of data analytics with auditing	2
CA18	Financial transparency and public trust-building	3
CA19	Monitoring public projects using BI data	3
CA20	Weak technological infrastructure and traditional regulations	3
CA21	Lack of digital training in public auditing	3
CA22	Role of BI in detecting data inconsistencies and contract anomalies	3
CA23	Fighting financial corruption through data analysis	3
CA24	Improving financial reporting quality in the Central Bank	4
CA25	Real-time data analysis using BI dashboards	4
CA26	Optimal allocation of resources and reduction of waste	4
CA27	Cultural resistance and lack of BI expertise	4
CA28	Data security and implementation costs	4
CA29	Use of strict financial controls in oil projects	5
CA30	Rapid data analysis for anomaly detection	5
CA31	Real-time managerial decision-making in project management using BI	5
CA32	Data quality and employee training	5
CA33	Smart auditing using machine learning	5
CA34	Data collection and analysis in BI environments	6
CA35	Preparing organizational culture for technology adoption	6
CA36	Interactive reporting and discovery of complex patterns	6
CA37	Preventive auditing and financial risk forecasting	6
CA38	Intelligent controls and BI alerts in technology companies	7
CA39	Prevention and prediction of problems through advanced data analytics	7
CA40	Advisory role of auditing and improvement of managerial decision-making	8
CA41	University–industry collaboration for BI education	8
CA42	Ensuring financial accuracy and control frameworks in transportation	9
CA43	Integrated data analysis and anomaly detection	9
CA44	Investment in training and technology for competitive advantage	9
CA45	Real-time data analysis and cost reduction in electricity companies	10
CA46	Automation and intelligentization of auditing processes	10
CA47	Lack of technical expertise and financial resources	10
CA48	Digital foresight and data-driven decision-making	11
CA49	Improving decision quality and organizational transparency	11
CA50	Use of modern technologies for financial control and risk management	11

Table 3 presents key examples of extracted statements from the interviews, highlighting the main themes of the study. Content analysis indicates that internal auditing and business intelligence (BI), as two central pillars, play a significant role in improving financial information quality, increasing transparency, reducing errors, and enhancing managerial decision-making.

Across all interviews, strong emphasis was placed on data-driven approaches, real-time and rapid data analysis, and anomaly detection, reflecting a clear shift in auditing practices from traditional methods toward intelligent and preventive auditing. Additionally, common challenges identified include cultural resistance, shortage of skilled personnel, infrastructure limitations, and high technology costs, all of which represent major barriers to the implementation of modern technologies.

The analysis further shows that the use of BI dashboards, machine learning, and advanced technologies enhances transparency, accountability, stakeholder trust, and resource optimization, enabling organizations to make timely and data-based decisions. Moreover, continuous training and a supportive organizational culture were repeatedly emphasized as essential requirements for successful digital transformation.

Overall, the table of extracted statements demonstrates a direct relationship between internal auditing and business intelligence in improving organizational and financial performance, providing a foundation for deeper analysis in Chapter Four and for the development of the study's conceptual model.

5. Stage Three

In the third stage, meaningful statements were formulated. In fact, an attempt was made to extract from each statement a concept that reflects the underlying meaning and the essential aspect of the participant's thinking. This stage is known as meaning formulation. The results are presented in Table 4.

Table 4. Sample Formulated Meanings

Initial Concept Code	Subsumed Concept Code (Preliminary Category)	Overarching (Core) Concept Code
Improving the accuracy of financial statements	Improving reporting quality	Financial information quality
Increasing reporting transparency and stakeholder trust	Financial transparency	Financial information quality
Reducing accounting errors using checklists	Error control in financial reporting	Financial information quality
Using BI dashboards for data analysis	Data analytics technologies	Innovative technologies in auditing
Data-driven decision-making	Data-driven decision-making	Innovative technologies in auditing
Cultural resistance to new technologies	Technology adoption challenges	Cultural and organizational barriers
Continuous training for BI usage	Development of technological skills	Skills development and training
Improving IT infrastructure	Improving technological infrastructure	Innovative technologies in auditing
Risk analysis and financial forecasting	Data-driven risk management	Innovative technologies in auditing
Supporting financial management and budgeting	Improved managerial decision-making	Financial information quality
Data-driven internal auditing	Data-driven decision-making	Innovative technologies in auditing

Identification of hidden patterns and recurring errors	Advanced data analytics	Innovative technologies in auditing
Weak technological infrastructure and traditional regulations	Organizational limitations	Cultural and organizational barriers
BI role in detecting data inconsistencies and contracts	Data-based monitoring and control	Innovative technologies in auditing
Fighting financial corruption through data analysis	Prevention of financial irregularities	Financial information quality
Use of precise financial controls in projects	Project management and control	Financial information quality
Smart auditing using machine learning	Process automation	Innovative technologies in auditing
Data collection and analysis in BI environments	Organizational data analysis	Innovative technologies in auditing
Preparing organizational culture for technology adoption	Organizational culture change	Cultural and organizational barriers
Interactive reporting and discovery of complex patterns	Advanced analytical tools	Innovative technologies in auditing
Preventive activities and financial forecasting	Forecasting and risk management	Innovative technologies in auditing
University–industry collaboration for BI training	Skill enhancement through education	Skills development and training
Ensuring financial accuracy and control frameworks	Process standardization	Financial information quality
Investing in training and technology for competitive advantage	Human and technological development	Skills development and training
Automation and intelligent auditing processes	Error reduction and efficiency improvement	Innovative technologies in auditing
Digital foresight and data-driven decision-making	Intelligent and preventive decision-making	Innovative technologies in auditing

Table 4 illustrates the coding and categorization process of interview data. It shows the transformation of raw statements (initial codes) into sub-categories and ultimately into overarching (core) concepts. Content analysis indicates that three main overarching dimensions can be identified in this study:

Financial information quality:

Most participants emphasized transparency, accuracy, and control of financial processes. The use of frameworks, internal controls, and data analysis contributes to improved decision-making and increased stakeholder trust.

Innovative technologies in auditing:

The use of BI dashboards, machine learning, automation, and advanced data analytics represents a major dimension reflecting digital transformation in auditing and financial management. These technologies contribute to forecasting irregularities, reducing errors, and enabling data-driven decision-making.

Cultural and organizational barriers and skills development:

Beyond technology, resistance to change, weak infrastructure, and lack of technical expertise represent significant organizational challenges. Continuous training and the development of an organizational culture supportive of technology adoption are highlighted as effective solutions.

The analysis shows that these three dimensions form an interconnected and overlapping network, and that achieving improvements in financial quality and technological advancement is not possible without addressing cultural and competency-related factors. These findings provide the foundation for developing the conceptual model of the study and for the data analysis chapter.

6. Stage Four

In the fourth stage, after reaching agreement on all formulated concepts, the process of grouping these concepts into clusters reflecting a unique thematic structure begins. According to Claes's methodology, once meaningful statements are assigned formulated meanings, these are categorized into clusters. Subsequently, groups of clusters representing specific perspectives are merged to construct a distinct structure of extracted themes. Table 5 presents a sample of the extracted themes.

Table 5 (4-5). Sample Extracted Themes

Core Concepts	Substitutional Concept Codes	Initial Concept Codes
Financial information quality	Improving accuracy and reliability of reports, financial transparency, standardization, internal control, error prevention, process improvement, data analysis, data integration, financial accountability, documentation, regular reporting	A1, A2, A3, A8, A22, A31, A32, A39, A40, A43, A50, A51, A52, A60, A61, A62, A63, A64, A65, A66, A67, A68, A69
Innovative technologies in auditing	Process automation, advanced accounting software, BI dashboards, advanced data analytics, automation, online reporting, digital tools, information security, cloud storage, intelligent databases, digital risk management, technological innovation	A4, A5, A6, A7, A9, A10, A11, A12, A13, A14, A15, A16, A17, A18, A53, A54, A70, A71, A72, A73, A74, A75, A76, A77
Skills development and training	Continuous employee training, workforce empowerment, workshops, collaborative learning, organizational culture development, university–industry cooperation, mentoring, competency development, experience sharing, training evaluation, soft skills development, innovation encouragement	A19, A20, A21, A23, A24, A25, A26, A27, A28, A29, A30, A55, A56, A57, A78, A79, A80, A81, A82, A83, A84, A85, A86, A87, A88
Cultural and organizational barriers	Resistance to change, weak technological infrastructure, legal constraints, communication problems, lack of innovation acceptance, organizational challenges, interdepartmental misalignment, resource scarcity, conservative behaviors, environmental pressures, managerial instability, lack of employee participation	A33, A34, A35, A36, A37, A38, A41, A42, A44, A45, A46, A47, A48, A49, A58, A59, A89, A90, A91, A92, A93, A94, A95, A96, A97

This table represents the final outcome of the qualitative coding process and illustrates the four main themes of the study.

Financial information quality constitutes the core theme of the research. The extensive initial and substitutional codes indicate that transparency, accuracy, and reliability of data are of high importance to participants. The presence of concepts such as internal control, error prevention, and standardization suggests that respondents focus not only on outcomes but also on the processes of financial information production. This theme highlights that improving financial information quality is not possible without systematic process improvement and documentation.

Innovative technologies in auditing represents a complementary theme, highlighting the role of digital tools and process automation in improving financial quality. Sub-themes such as BI dashboards, advanced analytics, and cloud storage emphasize the importance of technological innovation and data-driven financial management. This theme clearly demonstrates the relationship between technology and financial information quality.

Skills development and training forms the human dimension of the study. The data show that workforce empowerment, continuous training, and the development of a learning-oriented organizational culture are prerequisites for the effective use of modern technologies and the improvement of financial information quality. Without investment in human capital, technological tools and standards cannot achieve their full potential.

Cultural and organizational barriers represent the practical challenges and constraints. Codes such as resistance to change, weak infrastructure, regulatory limitations, and conservative behaviors indicate that human and organizational factors may hinder the achievement of research objectives. Identifying these barriers enables the design of appropriate mitigation strategies and highlights that technology and training alone are insufficient without cultural transformation and managerial support.

Overall, these four themes—through the interaction of technology, information quality, skills development, and organizational challenges—constitute the conceptual framework of the study and provide the basis for the data analysis chapter, the development of the conceptual model, and the formulation of practical recommendations.

7. Stage Five

In the fifth stage, a comprehensive description of the phenomenon is developed. This holistic description presents a narrative of all dimensions of the role of internal auditing in improving the quality of accounting information within a business intelligence (BI) environment, as experienced by the interview participants. Based on the previous tables, stages, and the eleven extracted themes, this stage is presented as follows:

7.1 The role of internal auditing in enhancing financial information quality

The interviews revealed that the quality of financial and accounting information is considered by participants as the central axis and starting point of all organizational decision-making and control processes. Participants clearly stated that accounting information, without accurate control and continuous review by internal auditing, may contain errors, deficiencies, or serious inconsistencies.

Extracted initial concepts such as “improving accuracy,” “financial transparency,” “internal control,” and “process documentation” indicate that internal auditing plays not only a supervisory role but also a preventive and corrective role. In other words, participants believed that internal auditing establishes a structured and standardized system for data collection and recording, and by improving financial processes, it minimizes the risk of errors and non-compliance with standards.

These findings are fully consistent with the “financial information quality” theme in Table 4-5 and demonstrate that the initial and substitutional codes highlight the importance of systematic and precise data control.

7.2 Impact of modern technologies and the business intelligence environment

Another important dimension of the phenomenon is the role of technology and business intelligence in facilitating internal auditing and improving financial information quality. Participants repeatedly emphasized that BI tools, analytical dashboards, advanced software, and process automation enable access to real-time and reliable data.

These findings suggest that integrating BI with internal auditing processes increases the speed of error detection, reduces human mistakes, and improves reporting accuracy. Extracted substitutional concepts such as “BI dashboards,” “advanced data analytics,” and “cloud storage” clearly demonstrate the critical role of technology in data-driven environments.

Participants stressed that without such technologies, internal auditing would remain limited to traditional, retrospective reviews with minimal impact on information quality.

7.3 Human empowerment and skills development

Another key dimension of the phenomenon is the empowerment and skill development of personnel in the fields of auditing and business intelligence. Interviewees emphasized that internal auditors must continuously enhance their analytical, decision-making, and accounting knowledge in parallel with technological advancements to effectively utilize BI tools.

Findings from Tables 4 and 5 show that continuous training, specialized workshops, collaborative learning, and experience sharing are prerequisites for improving financial information quality. In other words, technology alone cannot achieve reliable and accurate information without skilled human resources.

This dimension highlights that skills development and training play a complementary and reinforcing role alongside technology and internal auditing in improving information quality.

7.4 Cultural and organizational barriers

Participants also identified several cultural and organizational challenges that may hinder the effective implementation of internal auditing and BI systems. Resistance to change, weak technological infrastructure, regulatory limitations, conservative behaviors, and lack of employee participation were among the most significant barriers.

These obstacles demonstrate that even with advanced tools and skilled personnel, financial information quality cannot reach an optimal level without managerial support, an appropriate organizational culture, and interdepartmental coordination.

The identification of the “cultural and organizational barriers” theme indicates the necessity of recognizing and addressing these limitations through targeted organizational strategies.

7.5 Integration of dimensions and final narrative of the phenomenon

By integrating these four main dimensions, it can be concluded that the role of internal auditing in improving accounting information quality in a BI environment is a multidimensional and dynamic process. This process includes:

Internal auditing as a supervisory and corrective mechanism that ensures accuracy, transparency, and reliability of information.

Business intelligence technology as a facilitating and data-driven tool that enhances the speed and accuracy of analysis.

Skilled and empowered human resources that enable effective use of technological tools through training and capacity building.

Organizational support and change management that reduce cultural resistance and facilitate the improvement of information quality.

Thus, the comprehensive description of the phenomenon demonstrates that internal auditing, modern technologies, skills development, and organizational culture interactively enhance accounting information quality in BI environments.

This narrative is based on interview data, coded tables, and the extracted eleven themes, providing a complete and integrated representation of the research phenomenon.

8. Stage Six

In the sixth stage of the Colaizzi method, the detailed description of the role of internal auditing in improving accounting information quality in a BI environment is reduced to its fundamental structure. In other words, the essential structure of the experienced phenomenon is identified and the core essence of the phenomenon is formulated.

Table 6 presents this stage, including extracted themes, clusters, and the frequency of related codes.

8.1 Table 6. Extracted Themes, Clusters, and Code Frequencies

Extracted Theme	Clusters	Number of Codes	Brief Description
Internal control and supervisory role	Financial process control, information transparency, reporting accuracy, error prevention	12	This cluster indicates that internal auditing produces reliable and accurate financial information through continuous monitoring and process correction.
Data quality improvement and documentation	Data standardization, systematic recording, decision documentation, data validation	10	This cluster highlights operational activities of internal auditing that enhance data reliability and structure.
Integration of BI technologies	BI dashboards, data analytics, automation, real-time information access	14	This cluster shows that BI technologies increase the speed, accuracy, and efficiency of data processing and reporting.
Human resource development and training	Employee training, analytical empowerment, updating accounting knowledge	9	This cluster emphasizes the importance of skilled human capital for effective use of auditing technologies and processes.
Change management and organizational culture	Managerial support, interdepartmental coordination, reduction of resistance	8	This cluster reflects the role of organizational culture and leadership in facilitating internal auditing and improving financial information quality.

Analysis of Table 6 shows that the phenomenon is multidimensional and dynamic, where each dimension plays a complementary role in improving accounting information quality:

The internal control and supervisory role forms the foundational dimension of the phenomenon, demonstrating that internal auditing ensures the accuracy and reliability of financial information through continuous monitoring and error correction. The high frequency of codes (12) confirms its critical importance.

The data quality improvement and documentation cluster represents the operational and systematic dimension. With 10 codes, it highlights the importance of standardization, structured recording, and documentation in enhancing data reliability.

The integration of BI technologies cluster, with 14 codes, has the highest frequency, indicating that technology acts as a key enabler and accelerator of internal auditing processes. It emphasizes the significance of BI tools and data analytics in data-driven environments.

The human resource development and training cluster (9 codes) highlights the human dimension of the phenomenon. Findings indicate that without skilled personnel, even advanced technologies cannot fully improve financial information quality.

Finally, the change management and organizational culture cluster (8 codes) represents the institutional dimension, emphasizing managerial support, coordination, and resistance reduction as essential conditions for effective implementation.

Overall, Table 6 demonstrates that the essence of the phenomenon emerges from the interaction of supervisory, technological, human, and organizational dimensions. Each cluster, based on its code frequency, shows that these dimensions collectively and synergistically enhance the quality of accounting information in BI environments.

9. Stage Seven

The seventh and final stage of the Colaizzi method is conducted with the aim of validating the study's findings. To ensure trustworthiness, the framework proposed by Guba and Lincoln was applied. They introduced four criteria for assessing the rigor of qualitative research: credibility, dependability, confirmability, and transferability.

Credibility refers to the believability and persuasiveness of the research findings. It reflects the logical arguments and essential processes that establish trust in the research outcomes (Aboulmaali, 2011). In the present study, credibility was ensured through four strategies: external auditing, member checking (review of findings by informants), and prolonged engagement.

External auditing:

In the external audit approach, an independent reviewer supervises and evaluates the research process. In this study, the supervisor acted as the external auditor, carefully reviewing the methodological procedures and analytical process, thereby enhancing the rigor and validity of the research.

Ongoing verification (continuous checking):

During the qualitative data recording and analysis process, the researcher made a continuous effort to document all stages of the research in detail. This continuous documentation was used as a method of ongoing verification to strengthen the internal validity of the findings and ensure transparency in the research process.

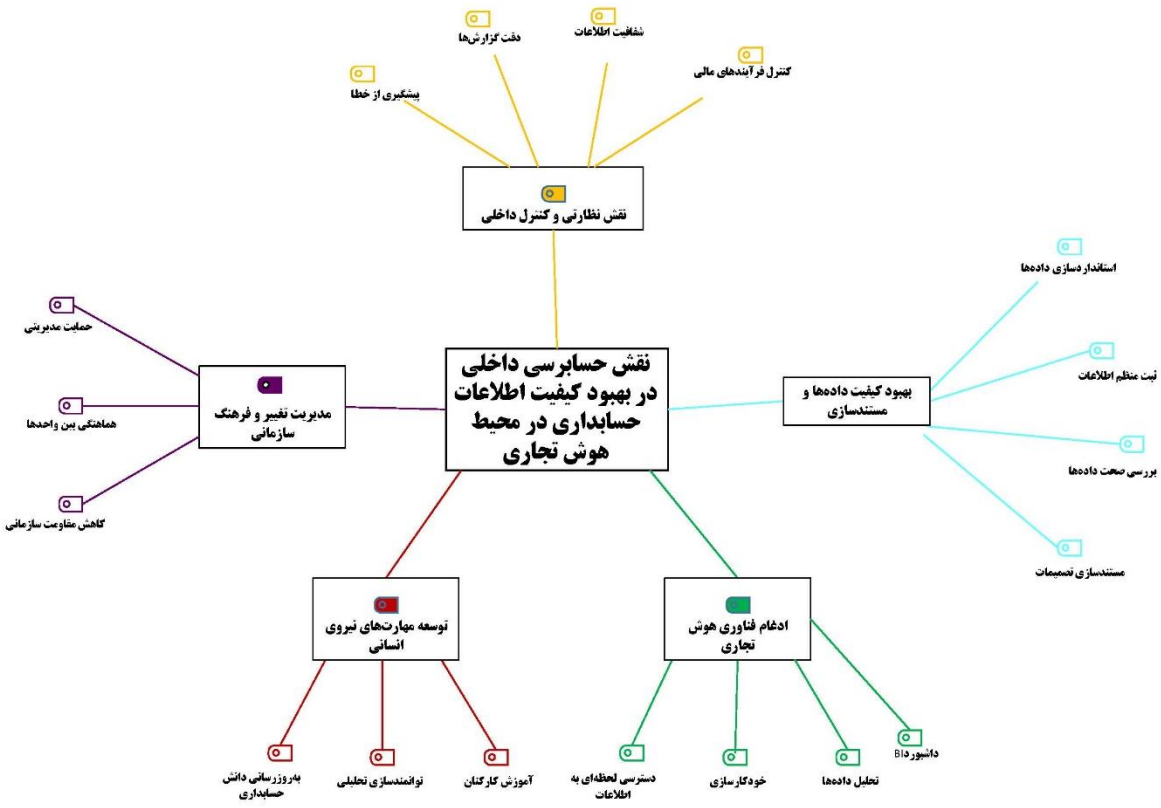


Figure 2: The model of the role of internal auditing in improving accounting information quality in a business intelligence environment (interview-based)

Member checking:

During the validation and verification of the obtained data, in order to prevent researcher misunderstanding, the collected information was presented again to the informants and was confirmed by them.

Prolonged engagement:

The researcher was involved in the study for an extended period (approximately 10 months) and, throughout the year, conducted informal interviews with several managers and experts regarding the role of internal auditing in improving the quality of accounting information in a business intelligence environment. In addition, part of this time was dedicated to field presence in companies and universities.

10. Discussion and Conclusion

The aim of the present study was to explain the role of internal auditing in improving the quality of accounting information in a business intelligence environment within organizations in the Republic of Iraq. The findings indicated that internal auditing in business intelligence–driven environments is not merely a traditional control tool, but rather a strategic, data-driven mechanism that enhances financial information quality, increases transparency, reduces accounting errors, and improves managerial decision-making.

The results of the interview analysis revealed that the use of business intelligence technologies, data analytics, management dashboards, and financial process automation has led to higher accuracy and reliability of accounting information. Moreover, the findings showed that the role of internal auditing in a business intelligence environment has shifted from a reactive function toward a more preventive, analytical, and forward-looking role. Alongside these advantages, challenges such as cultural resistance, weak technological infrastructure, a shortage of specialized human resources, and educational limitations were identified as major barriers to the effective implementation of intelligent internal auditing.

The findings of the present study are consistent with the results of Yousefi et al. (2023), who also emphasized that internal auditing enhances the transparency, accuracy, and reliability of financial information. Likewise, the results align with the study by Karimi et al. (2024), which confirmed the role of internal auditing in improving compliance with accounting standards and enhancing financial information quality. The findings are also in agreement with Nikخواه et al. (2025), who demonstrated that internal auditing increases the accuracy and validity of financial information by identifying process weaknesses.

Furthermore, the results are consistent with Fallah et al. (2026), who found that internal auditing is effective in reducing financial risks and strengthening internal controls. Similarly, the findings align with Al-Zoubi and Jara (2023), who stated that internal auditing improves accounting information systems and consequently enhances financial information quality. The present study also corresponds with Liu (2024), who showed that the quality of internal auditing improves the comparability and reliability of accounting information. In addition, it is consistent with Al-Waqila (2021), who highlighted the role of accounting information systems in strengthening internal audit quality.

In this study, business intelligence technologies and data analytics were also identified as key tools for enhancing internal auditing effectiveness. The results are further aligned with Lan (2025), who indicated that internal auditing increases information security and reduces financial risks. Moreover, the findings are consistent with Kokina et al. (2025), who argued that artificial intelligence and data analytics improve the accuracy and efficiency of internal auditing. The study also aligns with Shawagfa (2025) and Seymour (2025), who confirmed the role of information technologies and data analytics in improving audit quality and organizational decision-making.

Additionally, the findings are in line with Orlich et al. (2020) and Zhao et al. (2022), who emphasized the importance of internal controls, organizational trust, and information transparency in improving accounting

information quality. However, compared to previous studies, the present research, through a qualitative and exploratory approach, examined the experiences and perceptions of Iraqi experts and provided a deeper explanation of the cultural, organizational, and technological dimensions affecting internal auditing.

The findings of the present study can be explained based on the theory of information quality, organizational control theory, risk-based auditing theory, and organizational intelligence theory. According to information quality theory, accounting information is valuable and effective only when it possesses characteristics such as accuracy, transparency, reliability, and timeliness. The results of the present study indicated that internal auditing, through the establishment of precise controls and continuous monitoring of financial processes, provides the basis for achieving these characteristics. In addition, organizational control theory suggests that effective monitoring and control systems can reduce errors, deviations, and information asymmetry. The findings of the present study also showed that internal auditing in a business intelligence environment, by utilizing analytical tools and data-driven technologies, plays a significant role in controlling financial risks and improving information transparency.

On the other hand, risk-based auditing theory argues that internal auditors should go beyond the examination of financial documents and, through data analysis and identification of potential risks, prevent financial crises. The results of the present study also support this view, as participants stated that BI technologies and data analytics enable the identification of hidden patterns, prediction of problems, and detection of financial anomalies. Furthermore, organizational intelligence theory emphasizes that successful organizations transform raw data into actionable knowledge for decision-making. In the present study, it was also found that business intelligence-based environments transform internal auditing from a traditional and reactive activity into an analytical, intelligent, and decision-oriented process.

The findings are also consistent with technology dependency theory, which states that the effectiveness of auditing and internal control systems depends on the extent of information technology utilization. The results of the present study showed that business intelligence tools, management dashboards, and data analytics have increased the speed, accuracy, and efficiency of internal auditing. At the same time, the existence of barriers such as weak infrastructure and a shortage of skilled personnel indicates that without the development of technology and human capital, the realization of intelligent auditing remains challenging.

Moreover, transparency and organizational accountability theory suggests that the higher the quality of accounting information, the greater the stakeholders' trust and organizational accountability. The findings of the present study revealed that internal auditing in a business intelligence environment, by enhancing information transparency, improving financial reporting, and strengthening internal controls, increases the trust of managers and stakeholders. In addition, the findings indicate that organizational culture and managerial support play a decisive role in the successful implementation of intelligent technologies and the effectiveness of internal auditing. This is also consistent with theories of change management and digital transformation, as digital transformation cannot lead to desirable outcomes without cultural acceptance and organizational readiness.

Overall, the theoretical interpretation of the findings shows that internal auditing, accounting information quality, and business intelligence technologies are three interrelated elements in modern organizational environments. The interaction among these three elements leads to the formation of an intelligent, transparent, and data-driven financial system, guiding organizations toward more accurate decision-making, risk reduction, and improved efficiency.

The results indicate that internal auditing in business intelligence-based environments has shifted from a purely control-oriented function to an analytical and strategic process. In contemporary organizations, the vast volume of data and the complexity of financial processes have made traditional auditing methods insufficient for managerial needs. Therefore, the use of intelligent technologies and data analytics has strengthened the role of internal auditing in improving accounting information quality. When financial information is analyzed in real time using business intelligence tools, rapid identification of errors, deviations, and financial risks becomes possible, thereby contributing to improved managerial decision-making.

On the other hand, the findings show that accounting information quality is not solely dependent on technology; human and organizational factors also play a decisive role. If employees and managers do not have a positive attitude toward new technologies or lack the necessary skills to use them, the effectiveness of intelligent systems will be reduced. Therefore, continuous training and organizational cultural development are among the most important requirements for the success of internal auditing in data-driven environments.

Furthermore, the results indicated that business intelligence-based environments enhance financial transparency and increase organizational accountability. When financial data are accurately, systematically, and traceably recorded and analyzed, the likelihood of misuse, concealment, and financial fraud is reduced. In such conditions, internal auditing can act as a tool for building trust and strengthening organizational legitimacy.

In addition, challenges such as weak technological infrastructure, budget limitations, resistance to change, and a shortage of IT specialists indicate that the transition toward intelligent auditing requires long-term planning and organizational investment. Many organizations are still in the digital transition phase, and aligning financial processes with modern technologies requires structural and managerial transformation.

Overall, it can be concluded that internal auditing in a business intelligence environment has evolved beyond traditional financial oversight and has become a key instrument for risk management, information transparency, and strategic decision-making. The success of this transformation depends on the interaction between technology, human resources, organizational culture, and managerial support. The more harmoniously these factors operate, the greater the improvement in accounting information quality and the effectiveness of organizational decision-making.

11. Practical Recommendations

1. Iraqi organizations should develop their information technology infrastructure and business intelligence systems to enhance the quality of accounting information.
2. It is essential to organize specialized training programs in data analytics, business intelligence, and intelligent auditing for internal auditors and financial managers.
3. Organizations should strengthen a culture of technological acceptance and innovation through training initiatives and managerial support.
4. The use of management dashboards and real-time data analytics systems should be expanded within internal auditing processes.
5. Universities and educational institutions in Iraq should enhance curricula related to digital auditing, data analytics, and business intelligence.
6. Organizations should adopt emerging technologies such as artificial intelligence and machine learning to identify financial risks and anomalies.
7. Strengthening collaboration among finance, information technology, and internal audit units can improve information integration and enhance financial transparency.
8. Senior managers in organizations should provide stronger support for digital transformation and data-driven auditing projects in order to reduce cultural and organizational barriers.

REFERENCES

1. Al-Khouri, A. M. (2018). The role of internal auditing in enhancing accounting information quality in organizations using business intelligence systems. Journal of Accounting and Finance, 18(2), 45–59.
2. Al-Khouri, A. M. (2018). The role of internal auditing in enhancing accounting information quality in organizations using business intelligence systems. Journal of Accounting and Finance, 18(2), 45–59.
3. Al-Shammari, M., & Al-Saleh, N. (2020). Impact of internal auditing and business intelligence on managerial decision-making in Iraqi public organizations. Iraqi Journal of Business Administration, 12(1), 78–96.

4. Al-Shammari, M., & Al-Saleh, N. (2020). Impact of internal auditing and business intelligence on managerial decision-making in Iraqi public organizations. Iraqi Journal of Business Administration, 12(1), 78–96.
5. Bagran, A. R., & Mahmoud, S. A. (2019). Business intelligence as a mediator in improving audit effectiveness: Evidence from Iraq. International Journal of Accounting Research, 7(4), 112–128.
6. Bagran, A. R., & Mahmoud, S. A. (2019). Business intelligence as a mediator in improving audit effectiveness: Evidence from Iraq. International Journal of Accounting Research, 7(4), 112–128.
7. Barrett, M. J. (2019). The use of data analytics in internal audit to improve decision-making: An investigation of data visualizations and data sources. Internal Audit Foundation.
8. CBH. (2025). Data analytics in internal audit: Smarter process & IT testing. CBH Insights. https://www.cbh.com/insights/articles/enhance-internal-audit-testing-with-data-analytics/
9. Deloitte. (2025). Adding insight to internal audit: Analytics applied. WSJ. https://deloitte.wsj.com/cio/adding-insight-to-internal-audit-analytics-applied-01671158651
10. Durrani, H. (2025). Internal audit and business intelligence: Leveraging data for enhanced decision-making. LinkedIn Pulse. https://www.linkedin.com/pulse/internal-audit-business-intelligence-leveraging-data-hayat-durrani
11. Gagnon, S., & Lavoie, P. (2017). Internal auditing and organizational decision-making: A review of current literature. Accounting Horizons, 31(3), 25–44.
12. Gagnon, S., & Lavoie, P. (2017). Internal auditing and organizational decision-making: A review of current literature. Accounting Horizons, 31(3), 25–44.
13. Gätman, J. (2008). Emotional divorce: A psychological perspective on relationships. New York: Harmony Books.
14. Ghozi, H. S. A. (2024). Artificial intelligence in internal auditing: Enhancing accounting sector practices. DMAME Journal, 5(2), 45–60.
15. Götz, M., & Schmitz, M. (2023). Business intelligence as an internal audit tool. ResearchGate. https://www.researchgate.net/publication/236902484_Business_Intelligence_as_Internal_Audit_Tool
16. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate data analysis (8th ed.). Cengage Learning.
17. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate data analysis (8th ed.). Cengage Learning.
18. Hatfield & Associates. (2024). How business intelligence helps in decision making. Hatfield & Associates. https://hatfieldandassociates.com/how-business-intelligence-helps-in-decision-making-key-benefits/
19. IIA Global. (2025). Internal audit of artificial intelligence applied to business processes. IIA Global. https://www.theiia.org/en/content/articles/affiliate-content/internal-audit-of-artificial-intelligence-applied-to-business-processes/
20. IIA Spain. (2025). Internal audit of artificial intelligence applied to business processes. IIA Spain. https://www.theiia.org/globalassets/documents/affiliate-content/internal-audit-of-artificial-intelligence-applied-to-business-processes/ia-of-ai-applied-to-business-processes-iia-spain.pdf
21. Ismail, H., & Othman, R. (2021). Effect of internal auditing and business intelligence on accounting information quality. Journal of Accounting and Management, 11(2), 55–70.
22. Ismail, H., & Othman, R. (2021). Effect of internal auditing and business intelligence on accounting information quality. Journal of Accounting and Management, 11(2), 55–70.
23. Jorfi, H., & Khan, F. (2018). The role of transparency and accountability in improving financial decisions in organizations. International Journal of Accounting and Finance Studies, 5(1), 33–49.
24. Jorfi, H., & Khan, F. (2018). The role of transparency and accountability in improving financial decisions in organizations. International Journal of Accounting and Finance Studies, 5(1), 33–49.
25. Kokina, J., & Davenport, T. H. (2025). Challenges and opportunities for artificial intelligence in auditing. Journal of Emerging Technologies in Accounting, 22(1), 1–15. https://doi.org/10.1016/j.jeta.2025.01.001
26. KPMG. (2020). Business intelligence in auditing: Best practices and challenges. KPMG Insights.
27. KPMG. (2020). Business intelligence in auditing: Best practices and challenges. KPMG Insights.
28. KPMG. (2024). Transforming internal audits through the power of AI. KPMG Insights. https://home.kpmg/xx/en/home/insights/2024/04/transforming-internal-audits-power.html
29. Li, X., & Chen, Y. (2019). Enhancing internal audit effectiveness through BI tools: Empirical evidence. Journal of Business Analytics, 6(3), 101–119.
30. Li, X., & Chen, Y. (2019). Enhancing internal audit effectiveness through BI tools: Empirical evidence. Journal of Business Analytics, 6(3), 101–119.
31. Liu, G. (2024). Internal audit quality and accounting information comparability. PLOS ONE, 19(5), e0310959. https://doi.org/10.1371/journal.pone.0310959
32. MindBridge. (2025). Data analytics in internal audit: The next evolution of risk management. MindBridge Blog. https://www.mindbridge.ai/blog/data-analytics-in-internal-audit-the-next-evolution-of-risk-management/
33. Seymore, M. (2025). The use of data analytics in internal audit to improve decision-making: An investigation of data visualizations and data sources. Internal Audit Foundation.
34. Shad, Z., & Al-Khafaji, M. (2022). Challenges of implementing business intelligence in auditing: The Iraqi experience. Iraqi Journal of Finance and Accounting, 14(2), 88–105.
35. Shad, Z., & Al-Khafaji, M. (2022). Challenges of implementing business intelligence in auditing: The Iraqi experience. Iraqi Journal of Finance and Accounting, 14(2), 88–105.

36. Shad, Z., & Al-Khafaji, M. (2022). Challenges of implementing business intelligence in auditing: The Iraqi experience. Iraqi Journal of Finance and Accounting, 14(2), 88–105.
37. Shawaqfeh, G. N. (2025). The moderating role of accounting information systems in AI's impact on internal audit quality. SSRN. https://doi.org/10.2139/ssrn.4917446
38. Supervizor. (2025). Audit analytics: Why data quality changes everything. Supervizor Blog. https://www.supervizor.com/blog/audit-analytics-why-data-quality-changes-everything
39. TeamMate+. (2025). 5 benefits of data analytics for internal audit. Wolters Kluwer. https://www.wolterskluwer.com/en/expert-insights/5-benefits-of-data-analytics-for-internal-audit
40. Tran, T. T. N. (2025). Effect of accounting information system quality on decision-making success. Journal of Accounting and Decision Sciences, 8(1), 1–15. https://doi.org/10.1080/23311975.2024.2447913
41. Zaman, A., & Al-Mousawi, H. (2017). Internal auditing and accounting information quality: The moderating role of technology. Accounting and Management Review, 9(1), 50–67.
42. Zaman, A., & Al-Mousawi, H. (2017). Internal auditing and accounting information quality: The moderating role of technology. Accounting and Management Review, 9(1), 50–67.