Integrated Audit Risk Assessment Model Based on Financial and Non-Financial Indicators: A Qualitative Study

Alireza Karkon[1], Heydar Mohammadzadeh Salteh [2,*], Ebrahim Navidi Abbaspour [3] and Akbar Kanani [4]



[1] Department of Accounting, Mara.C., Islamic Azad University, Marand, Iran;
[2] Department of Accounting, Mara.C., Islamic Azad University, Marand, Iran;
[3] Department of Accounting, Mara.C., Islamic Azad University, Marand, Iran;
[4] Department of Accounting, Mara.C., Islamic Azad University, Marand, Iran;

* Correspondence: 2752323883@iau.ir

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Abstract: The primary objective of this study was to design and explain an "Integrated Audit Risk Assessment Model Based on Financial and Non-Financial Indicators" with the aim of improving the accuracy of risk estimation in the audit process. In terms of purpose, this study is applied research, and in terms of its nature and methodological approach, it falls within the domain of qualitative research. In the first stage, thematic analysis was employed, and semi-structured interviews were conducted with 16 auditing experts, members of the Iranian Association of Certified Public Accountants, and university faculty members to identify and classify the main themes and financial and non-financial indicators affecting audit risk. The data collection instrument at this stage was a semi-structured interview. Based on the findings and through thematic analysis, 140 basic themes were classified into six global themes. The principal themes and financial indicators, such as liquidity, profitability, leverage, and growth, as well as non-financial indicators, including corporate governance, behavioral factors, information technology, and environmental factors, were identified and categorized. The findings indicate that the systematic integration of financial and non-financial indicators within a unified framework enhances auditors' ability to predict and identify high-risk areas. The proposed model can serve as a strategic tool during the audit planning stage to improve the quality of audit opinions, reduce audit risk, and enhance the transparency of financial reporting in the professional environment.

Keywords: audit risk, integrated risk assessment model, qualitative approach, financial and non-financial indicators.

1. Introduction

Audit risk assessment is one of the most consequential stages of the external audit process because it determines the nature, timing, and extent of subsequent audit procedures and directly influences the auditor's ability to obtain sufficient and appropriate audit evidence. In contemporary organizations, however, the conditions under which audit risk is assessed have become substantially more complex than in conventional financial reporting environments. Business models are increasingly affected by digital transformation, technological interdependence, volatile markets, cybersecurity exposure, complex financing structures, sustainability pressures, and changing patterns of corporate governance. Consequently, audit risk can no longer be interpreted solely through traditional financial ratios or historical accounting information. Rather, the assessment of audit risk requires a multidimensional approach capable of integrating financial information with organizational, behavioral, technological, governance-related, and

environmental indicators. Recent developments in the auditing literature reflect this shift from relatively static financial assessments toward more comprehensive and dynamic risk-oriented frameworks [1, 2].

The fundamental purpose of audit risk assessment is to identify circumstances that may increase the likelihood of material misstatement and to allocate audit resources to those areas in which the probability or potential consequences of error, fraud, or reporting failure are greatest. Financial indicators remain central to this process because they reveal important aspects of liquidity, profitability, leverage, solvency, cash flow adequacy, earnings quality, and financial distress. Financial deterioration may place pressure on management to alter accounting estimates, accelerate revenue recognition, defer expenses, modify classifications, or otherwise influence reported performance. Studies examining financial distress and audit-related outcomes have shown that the financial condition of the client can significantly affect the auditor's perception of engagement risk and the intensity of audit work [3]. Similarly, research on financial risk management emphasizes that corporate financial security depends on the systematic identification and control of risks associated with financing, liquidity, investment, and exposure to financial uncertainty [4]. Accordingly, indicators such as declining sales, high leverage, weak working capital, cash-flow deterioration, unusual accruals, and dependence on external financing may provide auditors with important early-warning signals.

Nevertheless, exclusive reliance on financial indicators may provide an incomplete representation of audit risk. Financial statements constitute an outcome of underlying organizational processes, managerial decisions, information systems, governance arrangements, and environmental conditions. Therefore, weaknesses in these underlying factors may precede measurable deterioration in accounting numbers. Research on voluntary non-financial reporting, for example, indicates that auditors consider non-financial information relevant to their evaluation of client risk, particularly in environments characterized by uncertainty and post-crisis adjustment [5]. Non-financial information may help explain the operational and strategic conditions underlying reported financial results and may therefore enhance the auditor's ability to recognize inconsistencies between accounting outcomes and organizational realities. This perspective is particularly important when financial results appear acceptable while internal controls, employee behavior, technology infrastructure, governance quality, or market conditions suggest increasing exposure to misstatement.

Corporate governance represents one of the most important non-financial dimensions of audit risk. Weak oversight, concentration of decision-making authority, conflicts of interest, insufficient board independence, ineffective audit committees, and limited accountability may create conditions in which managerial opportunism is more difficult to detect or constrain. In such environments, the likelihood of earnings management, incomplete disclosure, and management override of controls may increase. Risk-based auditing therefore requires consideration not only of transaction-level risks but also of the institutional mechanisms through which organizational decisions are monitored and controlled. Sustainable risk management research has highlighted the importance of structured risk-management systems in supporting risk-based internal auditing and strengthening the integration between organizational risk identification and assurance activities [6]. Likewise, research addressing internal auditing from a sustainability perspective emphasizes that internal audit functions can contribute to broader risk-management processes by linking assurance activities to operational, governance, and sustainability-related risks [7].

The effectiveness of internal control and internal audit functions is particularly relevant because these mechanisms influence the reliability of accounting information before the external auditor begins substantive examination. Weak internal controls, inadequate segregation of duties, poor documentation, insufficient

monitoring, and ineffective internal audit functions can increase control risk and thereby expand the scope of external audit procedures. In contrast, mature risk-management and control systems can provide a more reliable information environment. The increasing dependence of organizations on information technology, however, has complicated this assessment. Information technology controls, cybersecurity arrangements, automated processing, digital platforms, and integrated enterprise systems have become central components of financial reporting reliability. IT risk-management maturity models illustrate the importance of systematically evaluating governance, control, security, and technology-related processes as part of organizational assurance [8]. Thus, technological maturity should be considered an integral component of audit risk assessment rather than a separate technical issue.

Digital transformation has further expanded the scope of technology-related audit risk. Organizations increasingly rely on automated systems, cloud-based infrastructure, algorithmic processes, artificial intelligence, distributed databases, and digital financial platforms. Such technologies may enhance efficiency and reduce some forms of human error, but they can simultaneously create new risks relating to system access, data integrity, cybersecurity, model opacity, process dependency, and the auditability of automated transactions. Evidence suggests that digital transformation can materially affect audit risk by changing the information environment and the manner in which transactions are generated, processed, stored, and reviewed [2]. Studies of disruptive technologies also show that technological innovation may reshape the risk profile of audit clients and generate new areas of audit concern that traditional procedures were not originally designed to address [9]. Therefore, an integrated audit risk model must incorporate technology-related indicators alongside conventional financial measures.

The emergence of blockchain and other distributed technologies demonstrates the complexity of this technological transformation. Blockchain may improve traceability, data immutability, and transactional transparency, but its use can also alter the auditor's understanding of system architecture, control responsibility, transaction authorization, and evidence reliability. Exploratory evidence suggests that client use of blockchain technology may influence both audit risk and the auditor's choice of audit approach [10]. Similarly, the rapid expansion of digital finance has increased the relevance of cybersecurity to audit resilience. Cyber incidents can compromise financial data, disrupt operational continuity, affect internal controls, and potentially create material financial reporting consequences. Cybersecurity should therefore be interpreted not only as an information technology issue but also as a financial reporting and audit-risk issue [11]. The growing intersection between auditing and technology supports the need for models that can systematically integrate technological vulnerability into overall risk assessment.

Technology adoption by auditors themselves has also become an important aspect of risk-based auditing. Analytical tools, automated procedures, advanced data processing, and other audit technologies can improve coverage and efficiency, but the decision to adopt and rely on such technologies also involves judgments regarding risk, reliability, and appropriate use. Research adopting an audit-risk perspective on technology adoption indicates that perceptions of risk can influence how new technologies are incorporated into financial audit processes [12]. This suggests that audit risk operates in two directions: auditors must assess risks arising from the client's technology environment while simultaneously evaluating the risks and benefits associated with their own technological tools. An integrated model should therefore remain sufficiently flexible to accommodate changing technological conditions rather than treating technology as a fixed or peripheral factor.

Data quality is another important dimension of this problem. Audit conclusions depend on the reliability of the data used in risk assessment and substantive procedures. Increasingly complex datasets may contain hidden biases, incomplete observations, structural inconsistencies, or processing limitations that affect the quality of analytical conclusions. Research on auditing geospatial datasets demonstrates that data auditing can be necessary to identify systematic biases that may otherwise remain concealed within large or technologically generated datasets [13]. Although geospatial data represent a specialized domain, the broader implication is highly relevant to financial auditing: the existence of large quantities of data does not automatically imply high-quality evidence. Auditors therefore need to assess the origin, integrity, completeness, consistency, and potential biases of financial and non-financial data incorporated into risk models.

Beyond technology and governance, auditor judgment itself may introduce additional risk into the assessment process. Audit risk assessment is not a purely mechanical procedure; it depends significantly on professional judgment, interpretation, and cognitive processing. Auditors may interpret identical information differently depending on experience, expectations, prior beliefs, and contextual cues. Confirmation bias is particularly relevant because auditors may give greater weight to information that supports an initial risk assessment while discounting contradictory evidence. Research on auditors' confirmation bias indicates that cognitive bias can affect both audit risk assessment and subsequent professional judgment [14]. Therefore, a more structured and integrated framework may contribute to greater consistency by prompting auditors to consider multiple categories of evidence rather than relying excessively on a limited subset of financial indicators or intuitive judgments.

The identification of financial misrepresentation further demonstrates the importance of combining different types of signals. Misrepresentation may arise through complex combinations of accounting choices, estimates, classification decisions, disclosures, and managerial incentives. Literature reviewing methods for detecting financial information misrepresentation highlights the need for continued development of more comprehensive approaches capable of identifying patterns that may not be apparent through isolated accounting measures [15]. This is especially important because a single financial ratio rarely provides conclusive evidence of elevated audit risk. Rather, risk frequently emerges from the interaction of multiple indicators, such as deteriorating liquidity, unusual earnings patterns, governance weaknesses, managerial pressure, poor controls, and adverse market conditions.

External environmental conditions also influence audit risk and may substantially alter the meaning of financial indicators. Economic instability, regulatory change, market disruption, political uncertainty, supply-chain problems, sanctions, inflation, and unexpected crises can affect business continuity and financial reporting estimates. The COVID-19 pandemic provided a clear example of how a major external shock could rapidly change key audit risks, including going-concern assessments, asset valuations, impairment, revenue recognition, inventory measurement, and estimates involving substantial uncertainty. Analysis of audit reports during the initial year of the pandemic demonstrated changes in key audit risks and audit procedures in response to crisis conditions [16]. Such evidence reinforces the importance of incorporating environmental indicators into risk assessment rather than relying exclusively on internal financial metrics.

Macroeconomic and market risks can also interact with firm-level characteristics. Credit risk, market risk, capital adequacy, financial distress, and macroeconomic conditions can jointly influence corporate outcomes and may have implications for audit quality and financial reporting risk [17]. Consequently, a financial indicator may not have a stable meaning across different economic environments. For example, declining liquidity may reflect internal operational inefficiency in one organization but broad market disruption in another. A comprehensive model

should therefore assist auditors in interpreting financial signals in conjunction with environmental circumstances instead of evaluating them in isolation.

The concept of sustainability has also broadened the boundaries of contemporary risk assessment. Audit risk increasingly intersects with sustainability, environmental performance, long-term resilience, and strategic innovation. Research examining audit risk in relation to green innovation in small and medium-sized enterprises suggests that audit-related risk considerations may interact with firms' strategic and innovation activities [18]. Similarly, the growing emphasis on sustainable risk management demonstrates that organizational risks are increasingly understood as interconnected rather than compartmentalized [6]. These developments make it increasingly difficult to maintain a strict distinction between financial and non-financial risk factors, because environmental, strategic, and governance conditions may ultimately affect financial performance and reporting reliability.

The temporal dimension of the auditor–client relationship is another relevant factor. Auditor tenure may influence knowledge accumulation, audit efficiency, independence perceptions, and reporting timeliness. Evidence concerning the relationship between auditor tenure and audit report lag indicates that the characteristics of the auditor–client relationship can shape audit outcomes, particularly in emerging-market environments [19]. Such findings suggest that audit risk assessment should not be restricted to the client's accounting and operational characteristics but should also consider engagement-specific factors that may influence the auditor's ability to identify, interpret, and respond to risk.

In the Iranian auditing context, the development of localized models is particularly important because institutional, regulatory, economic, and organizational conditions may differ from those assumed in international models. Prior research has attempted to identify and prioritize audit risk factors through structured decision-making methods such as the fuzzy analytic hierarchy process, demonstrating that risk factors differ in relative importance and should be systematically weighted rather than treated as equivalent [20]. Other Iranian research has proposed corporate tax sustainability as a potentially informative indicator for audit risk assessment, illustrating how locally relevant financial and regulatory variables may contribute to more comprehensive risk analysis [21]. Such evidence indicates the value of developing context-sensitive models that reflect the characteristics of the professional and economic environment in which auditors operate.

Despite these advances, an important conceptual and practical gap remains. Existing studies often examine individual dimensions of audit risk separately, focusing on financial distress, governance, information technology, cybersecurity, sustainability, auditor judgment, disruptive technology, or specific external shocks. While each stream contributes valuable knowledge, auditors in practice must simultaneously synthesize these heterogeneous signals into a coherent overall assessment. The absence of integration may create fragmented judgments in which financial indicators are evaluated independently of governance quality, technological vulnerabilities, behavioral risks, or environmental instability. The evolution of auditing research toward broader accountability and risk-management perspectives further demonstrates the need for frameworks capable of integrating multiple sources of risk information [1]. In addition, the increasing complexity of contemporary organizations means that financial and non-financial indicators may reinforce, moderate, or contradict one another, making isolated assessment progressively less adequate.

An integrated audit risk assessment model can address this limitation by organizing diverse indicators within a systematic conceptual structure. Such a model can help auditors distinguish between direct financial warning signs and underlying organizational causes, identify relationships among risk factors, prioritize high-risk areas, and

design more targeted audit procedures. It may also provide a basis for continuous risk monitoring rather than limiting assessment to a single point during audit planning. By integrating financial performance, liquidity, leverage, earnings quality, governance, technology, employee behavior, internal control, market conditions, environmental pressures, and implementation constraints, auditors may obtain a more realistic representation of the client's overall risk profile. This approach is also consistent with the broader movement toward risk-based auditing, in which audit resources are allocated according to the relative probability and significance of potential misstatement rather than distributed uniformly across accounts and transactions.

At the same time, the development of such a model requires empirical grounding in professional experience because the practical significance of individual risk indicators may not be fully captured through theoretical analysis alone. Experienced auditors, financial experts, academics, and members of the professional accounting community possess tacit knowledge regarding warning signs, organizational behaviors, control weaknesses, and combinations of conditions that frequently precede reporting problems. Qualitative inquiry is particularly appropriate for identifying these context-dependent patterns and for revealing relationships that may subsequently be tested quantitatively. It enables researchers to move beyond predetermined variables and capture risk factors emerging directly from professional practice. In this respect, thematic analysis can provide a systematic mechanism for transforming expert narratives into basic themes, organizing themes, and higher-order categories that collectively form an integrated conceptual model.

Accordingly, the aim of this study is to design and explain an integrated audit risk assessment model based on financial and non-financial indicators through a qualitative thematic analysis of expert perspectives.

2. Methods and Materials

In this study, thematic analysis was employed to identify, analyze, and explain patterns within the qualitative data. Thematic analysis is one of the commonly used methods in qualitative research within the humanities and social sciences, enabling the identification, organization, and interpretation of meaningful themes and concepts contained in the data. This method helps researchers systematically examine the data, extract latent patterns and relationships among concepts, and explain them in terms of main and subsidiary themes. In this regard, the orientation of the study, the research questions, and the researcher's knowledge and experience concerning the subject under investigation played an influential role in identifying and interpreting the themes.

The participants in the qualitative phase of the study consisted of academic experts in finance and auditing as well as experienced auditors. Purposive sampling was employed, and participant selection continued until theoretical saturation was achieved. Theoretical saturation is reached when newly collected data no longer generate new concepts or categories and the extracted concepts demonstrate sufficient adequacy and recurrence. Expert judgment sampling was also employed in this study, meaning that knowledgeable and experienced individuals who demonstrated the highest degree of relevance to the research objectives were identified and selected through consultation with specialists. In addition, theoretical sampling was conducted concurrently with data collection and analysis, and decisions regarding the selection of subsequent participants were made based on emerging concepts and patterns. Ultimately, theoretical saturation was achieved after 16 interviews, at which point data collection was terminated.

The primary data collection instrument in this study was the semi-structured interview. Because of its high degree of flexibility and its ability to facilitate an in-depth understanding of participants' perspectives and experiences, this type of interview is among the most commonly used instruments in qualitative research. In this

method, the general framework of questions was consistent across all participants; however, respondents were able to express their views and experiences freely and emphasize issues they considered important. This characteristic enabled the researcher to obtain rich and in-depth information regarding various dimensions of the phenomenon under investigation. The interview data were subsequently coded and analyzed systematically to extract the main concepts, categories, and themes.

To enhance the credibility and trustworthiness of the qualitative findings, several procedures were employed to assess reliability and validity. Two methods, namely test–retest coding and coding by two independent coders, were used to examine data reliability. In the test–retest procedure, a portion of the interviews was recoded at two different points in time, with a specified interval between them, in order to assess coding stability. The results indicated an acceptable level of agreement between the two coding rounds, demonstrating adequate stability in the analytical process. In addition, under the independent-coder procedure, the data were coded separately by two researchers and the degree of inter-coder agreement was examined, thereby improving the precision and dependability of the analyses.

To assess the content validity of the interviews, expert judgment, the Content Validity Ratio (CVR), and the Content Validity Index (CVI) were employed. For this purpose, the interview items and questions were provided to a group of experts, who evaluated the necessity, appropriateness, and relevance of each item in relation to the research objectives. Following the analysis of expert opinions, items that did not demonstrate adequate content validity were revised or removed. Consequently, the final research instrument achieved satisfactory content validity.

The qualitative data analysis process was conducted in accordance with the stages of thematic analysis. In the first stage, the interview transcripts and other collected data were read and reviewed several times to enable the researcher to develop a comprehensive understanding of the data content. Initial codes were then extracted from meaningful segments of the data, and similar concepts were classified into preliminary categories and themes. Subsequently, the identified themes were reviewed and refined in terms of internal coherence, consistency with the data, and relevance to the research objectives, leading to the development of the final themes. After the themes had been defined and labeled, the relationships among them were explained and the conceptual framework of the study was developed. Finally, the research findings were organized into an analytical report comprising interpretations of the themes and supporting evidence extracted from the data. ATLAS.ti software was also used to manage the data, organize the codes, and facilitate the analytical process.

3. Findings and Results

To collect data for the qualitative phase, interviews were conducted with 16 academic experts as well as financial and capital-market managers and deputies. In this study, 16 experts and university faculty members were interviewed, of whom 81% were men and 19% were women. Regarding professional experience, 13% had 10–15 years of experience, 50% had 15–20 years, and 37% had more than 20 years of professional experience. In terms of educational attainment, 81% of the participants held doctoral degrees or higher qualifications, while 19% held master's degrees. All interviews were conducted in Tehran.

Thematic analysis was employed to analyze the qualitative data in this study. Among the various approaches to thematic analysis, the "thematic network" technique was selected as the principal analytical framework because it enables the systematic identification, organization, and representation of relationships among themes extracted from the data and facilitates explanation of the conceptual structure of the findings.

At this stage of the study, concepts and key points associated with the development of the structural model were extracted and listed from the interviews with reference to the dimensions and components of the integrated audit risk assessment model based on financial and non-financial indicators. For this purpose, the statements, concepts, and items derived from the interviews were carefully analyzed and reviewed and subsequently organized through a process of conceptual standardization, including the selection of more precise terminology, consolidation of similar concepts, and elimination of duplicate items. As a result of this process, a total of 140 initial items were extracted.

The identified themes were compiled into a checklist for conducting supplementary interviews with experts. As the interview process continued and specialized feedback was received, some of the extracted items were reconsidered, and several were revised or removed.

After the interview transcripts had been finalized, the coding process commenced. During the theoretical coding stage, the data were examined carefully, thoroughly, and systematically. Meaningful statements and concepts were identified, and initial codes were extracted from them. Subsequently, related categories were identified, their dimensions and characteristics were described, and the intended conceptual pattern was analyzed and evaluated. This stage provided the basis for organizing the concepts and developing the conceptual structure of the study.

During the organizing-category stage, synonymous or related concepts were grouped into broader categories. These categories functioned as an intermediate level between the initial concepts and the main themes and provided the basis for developing the final structure of the thematic network. Ultimately, through the integration of similar responses, consolidation of overlapping concepts, and organization of the concepts into a coherent structure, six main categories were established as the basis for the subsequent analyses.

Category 1: Audit Risks

The thematic network indicates that audit risk in companies originates from four principal sources: weaknesses in controls and oversight structures, ineffective corporate governance, information-related issues and operational complexity, and environmental and behavioral factors. The basic themes classified under structural and control risks indicate that the absence of effective internal controls, lack of a strong internal audit function, absence of risk management, and weak board oversight increase the likelihood of errors and misstatements. Themes related to corporate governance further indicate that the influence of major shareholders, discretionary decision-making, conflicts of interest, and managerial resistance create an environment in which transparency decreases and the probability of earnings management or concealment increases. With regard to information and operational risks, weaknesses in information systems, manual controls, non-transparent transactions, and organizational complexity may result in auditors having access to information that is incomplete, unreliable, or difficult to examine. Finally, environmental and behavioral factors, including unstable economic conditions, continuous regulatory changes, pressure to manage earnings, and lack of cooperation from financial departments, further intensify audit risk. Overall, this thematic network demonstrates that audit risk results from the simultaneous interaction of structural, managerial, informational, and environmental factors and that its effective management requires a more comprehensive assessment of the organizational context.

Category 2: Financial Indicators Affecting Audit Risk

Within this thematic network, a set of financial indicators that directly affect audit risk was organized into three principal thematic networks. The first is "financial performance risk," which includes basic themes such as earnings volatility, unstable profitability, declining profit margins, reductions in sales, and increasing operating expenses. Collectively, these factors reflect instability in a company's financial performance, which increases the likelihood

of financial statement misstatement or earnings management and consequently elevates audit risk. The second is "liquidity and debt risk," which focuses on restricted cash resources and an unfavorable debt structure. Basic themes such as a high debt ratio, liquidity risk, inadequate working capital, a low current ratio, and declining cash flows indicate that a company that is unable to meet its short-term obligations is more likely to experience pressure to manage earnings or conceal financial difficulties, thereby constituting a warning signal for auditors. The third is "financial structural risk," which concerns the quality of the capital structure and the composition of assets and liabilities. Themes such as high financial leverage, dependence on financing facilities, doubtful receivables, obsolete inventories, growth in accruals, and a high accrual ratio indicate that a complex or unhealthy financial structure may create conditions conducive to misstatement, reduced transparency, and higher audit engagement risk. Together, these three thematic networks provide a comprehensive representation of the most important financial indicators influencing auditors' risk assessments.

Category 3: Early-Warning Financial Indicators

The thematic network extracted at this stage identifies a set of financial indicators that may function as early signals of audit risk and alert auditors to the potential occurrence of material misstatement or serious problems within the business entity. The first thematic network, entitled "financial failure risk," emphasizes factors that threaten a company's ability to continue operations and maintain financial stability. Basic themes such as asset–liability mismatch, going-concern risk, and sudden declines in sales indicate that the company may be exposed to significant liquidity problems, an inability to meet its obligations, or an abrupt deterioration in operating performance. The experts stated that any structural imbalance between assets and liabilities, particularly when accompanied by declining sales or uncertainty regarding going concern, constitutes an important warning signal for auditors because such circumstances frequently lead to earnings management, abnormal changes in item classification, or pressure to conceal underlying problems.

The second thematic network, entitled "earnings quality," addresses factors indicating low financial reporting quality and reduced reliability of reported earnings. According to the interviewees, basic themes such as year-end adjusting entries, abnormal revenue fluctuations, and uncertainty surrounding provisions are signs that increase the likelihood of earnings management or manipulation of the timing of revenue and expense recognition. Substantial year-end entries may indicate management attempts to "adjust" financial figures before the financial statements are issued, while unusual revenue fluctuations may reflect instability and a lack of transparency in the revenue recognition process. Moreover, provisions based on non-transparent estimates expose auditors to risks arising from discretionary judgments and potential misstatement.

The third thematic network, entitled "market and customer risks," addresses aspects of a company's market structure and customer relationships that may directly influence its financial condition and, consequently, audit risk. Basic themes such as dependence on a single customer, customer concentration risk, dependence on a single product, customer complaints, and declining product quality collectively indicate vulnerability in the company's competitive position. Heavy dependence on a single customer or product makes the company vulnerable to changes in customer behavior, market conditions, or product quality. Such circumstances may create uncertainty regarding future revenues and increase auditors' sensitivity to earnings sustainability and the risk of revenue misstatement. Moreover, increases in customer complaints or declines in product quality signify greater operational and financial risk because they may lead to reductions in sales, contingent liabilities, and lower profitability.

Overall, this three-level thematic network demonstrates that early-warning financial indicators are not limited to numerical values and ratios but also encompass behavioral, operational, and structural signals whose changes

may alert auditors to hidden or emerging risks. The analysis clearly indicates that audit risk results from the complex interaction of financial failure risk, earnings quality, and the company's market and customer position, all of which can play an important role in audit planning and the design of audit procedures.

Category 4: Non-Financial Indicators Affecting Audit Risk

This section of the thematic network examines non-financial indicators affecting audit risk. Although these factors are not directly reflected in the financial statements, they can fundamentally influence reporting quality, information reliability, and consequently the level of audit risk.

Within the first thematic network, namely organizational risks, basic themes such as frequent structural changes, weak employee motivation, inadequate planning, and non-compliance with commercial law indicate disorder in the company's internal structure and processes. Continuous organizational changes generally create instability in control systems and disruptions in information flows. Weak employee motivation and inadequate planning can also reduce productivity and increase operational errors. Furthermore, failure to comply with commercial legal requirements signals weaknesses in compliance controls and the potential occurrence of violations to which auditors should be particularly attentive.

The second thematic network, entitled technology risks, concerns risks arising from the absence of integrated and secure information infrastructure. Basic themes such as IT risk, weak data security, deficiencies in warehousing systems, and the absence of an Enterprise Resource Planning (ERP) system indicate that the company's information systems lack the required consistency, adequacy, and integration. Weaknesses in data security or the absence of an ERP system impair auditors' access to reliable data and increase the probability of errors or information manipulation. Inefficient warehousing systems may also result in discrepancies in inventories and other assets and make the data reconciliation process more difficult for auditors.

The behavioral risk thematic network, comprising basic themes such as inadequate employee training, employee fraud, failure to implement internal auditors' recommendations, and weak managerial ethics, addresses the human and cultural dimensions of audit risk. According to the experts, insufficient training, disregard for standards of conduct, and failure to take internal auditors' recommendations seriously create an environment in which both errors and intentional misconduct are more likely to occur. Weak managerial ethics constitute another key factor that increases audit risk, because under such conditions managers may engage in earnings management, concealment, or negligence regarding required disclosures.

Finally, environmental risks, represented by basic themes such as non-transparent government transactions, sanctions, weaknesses in the costing system, and dependence on a single supplier, refer to external conditions that lie beyond the company's direct control but nevertheless affect its stability and transparency. Non-transparent government transactions or excessive dependence on a single supplier may create opportunities for abuse, fraud, or organizational corruption. Moreover, sanctions and weaknesses in the costing system generate uncertainty regarding asset valuation and the accuracy of reported costs, thereby creating challenges for auditors in performing verification and obtaining assurance.

Overall, this thematic network demonstrates that audit risks are not limited to financial indicators. A range of organizational, technological, behavioral, and environmental factors may also significantly reduce the quality of financial reporting and the reliability of audit information. This understanding enables auditors to adopt a more comprehensive perspective in audit planning and risk assessment that extends beyond financial figures and ratios and incorporates contextual and non-financial factors into the analysis.

Category 5: Challenges in Implementing the Integrated Model

In this section, the extracted thematic network identifies a set of key challenges associated with implementing the integrated audit risk assessment model. These challenges not only complicate implementation of the model but may also affect the efficiency and effectiveness of the audit process. The network comprises three main dimensions: structural barriers, managerial barriers, and environmental challenges. Each dimension contains basic themes that reveal the underlying sources of implementation difficulties.

First, structural barriers reflect problems embedded within the company's internal structures and processes. Basic themes such as the absence of process standardization, inadequate coordination among departments, frequent organizational changes, and audit time constraints indicate that the organization lacks the infrastructure necessary to implement an integrated and systematic model. The absence of standardized processes prevents financial and operational data from achieving the required degree of consistency, thereby creating uncertainty in model implementation. Inadequate coordination among departments also results in information flows that are neither timely nor complete, leaving auditors to deal with incomplete or contradictory data. Frequent organizational changes and audit time constraints further exacerbate these difficulties and impede accurate, phased, and reliable implementation.

Second, managerial barriers originate from managerial behaviors and organizational decision-making. Themes such as managerial resistance, lack of cooperation from the finance department, excessive dependence on the chief executive officer, and weak accountability indicate that the company's managerial environment is not adequately prepared to accept the integrated model. Managerial resistance typically arises from concerns regarding greater transparency, increased oversight, or the disclosure of organizational weaknesses. Lack of cooperation from the finance department and excessive dependence on the chief executive officer also indicate concentration of authority and inadequate delegation, a situation that interferes with the free flow of information and the structured implementation of the model. Weak accountability further implies that managers and employees do not feel sufficiently responsible for providing accurate and timely information.

Finally, environmental challenges refer to factors external to the organization that have a direct effect on the feasibility of implementing the model. Basic themes including economic instability, foreign exchange risk, tensions with suppliers, the absence of commitment limits, and weaknesses in the costing system indicate that the company's surrounding economic and operational environment lacks sufficient stability. Economic instability and foreign exchange risk cause continuous fluctuations in prices and cash flows and reduce the predictability of information. Tensions with suppliers or the absence of commitment limits also create uncertainty and reduced transparency in contracts and liabilities. Furthermore, weaknesses in the costing system reduce the accuracy of financial reports and the credibility of the underlying data, representing a major obstacle to the implementation of integrated and analytical models.

Overall, this thematic network indicates that implementation of an integrated audit risk assessment model is not merely a technical process; rather, it is influenced by a combination of structural, managerial, and environmental barriers. These barriers must be identified, managed, and, to the extent possible, mitigated prior to model implementation so that the model can achieve its intended effectiveness.

Category 6: Characteristics of an Appropriate Risk Assessment Model

This thematic network indicates that the characteristics of an appropriate audit risk assessment model can be classified into three key domains: transparency and reporting quality, risk control and governance, and organizational integration. Each of these domains comprises a set of basic themes that constitute essential foundations for model effectiveness.

First, transparency and reporting quality emphasize the importance of providing accurate, reliable, and comparable information. Basic themes including reporting transparency, benchmarking, conservative reporting, and a performance evaluation system clearly indicate that an appropriate model should be capable of providing a clear and unambiguous representation of the company's actual condition. Reporting transparency refers to the complete and explicit disclosure of information; benchmarking enables comparison of company performance with industry standards; conservative reporting reduces the likelihood of upward distortion of information; and a performance evaluation system enables continuous and accurate assessment of managerial and departmental performance. Collectively, these elements provide auditors with a reliable basis for risk assessment.

Second, the domain of risk control and governance concerns the organization's monitoring and control infrastructure. Basic themes such as a risk management system, audit committee independence, written policies, and anti-fraud mechanisms demonstrate the necessity of formal, transparent, and independent frameworks for identifying, assessing, and controlling risks. An active risk management system, combined with an independent audit committee and documented policies, helps ensure that control processes are implemented without inappropriate managerial interference or direction. Anti-fraud mechanisms also play an important role in preventing misconduct, reducing incentives for abuse, and improving the reliability of financial reporting. Collectively, these factors strengthen the organization's control structure and reduce audit risk.

Finally, organizational integration refers to coordination, alignment, and a coherent flow of information throughout the organization. Basic themes such as the integration of financial and non-financial data, integration among organizational units, appropriate accountability, and continuous risk monitoring indicate that an appropriate model should be able to collect and analyze diverse information in an integrated manner. Integrating financial and non-financial data provides a comprehensive view of the organization's condition and facilitates more accurate decision-making. Integration among organizational units also ensures that information is transferred with minimal error and delay. Appropriate accountability enhances the responsibility of managers and employees, while continuous risk monitoring enables the organization to respond rapidly to environmental and operational changes.

Subsequently, categorization was conducted on the basis of the thematic network, whereby homogeneous and overlapping categories were grouped into broader categories according to their conceptual commonalities. A table of initial concepts and categories was then developed, and the concepts were abstracted to a higher level in order to derive the main themes of the study. Finally, related categories were grouped under an overarching theme, and the final titles of each theme were determined with reference to the theoretical framework and research literature.

Table 1. Final Categories of the Thematic Network Model

Thematic Network	Organizing Theme	Global Theme
Structural and control risks	Audit risks	Integrated audit risk assessment model based on financial and non-financial indicators
Corporate governance risks	Audit risks	Integrated audit risk assessment model based on financial and non-financial indicators
Information and operational risks	Audit risks	Integrated audit risk assessment model based on financial and non-financial indicators
Environmental and behavioral risks	Audit risks	Integrated audit risk assessment model based on financial and non-financial indicators
Financial performance risk	Financial indicators affecting audit risk	Integrated audit risk assessment model based on financial and non-financial indicators
Liquidity and debt risk	Financial indicators affecting audit risk	Integrated audit risk assessment model based on financial and non-financial indicators
Financial structural risk	Financial indicators affecting audit risk	Integrated audit risk assessment model based on financial and non-financial indicators

Financial failure risk	Early-warning financial indicators	Integrated audit risk assessment model based on financial and non-financial indicators
Earnings quality	Early-warning financial indicators	Integrated audit risk assessment model based on financial and non-financial indicators
Market and customer risks	Early-warning financial indicators	Integrated audit risk assessment model based on financial and non-financial indicators
Organizational risks	Non-financial indicators affecting audit risk	Integrated audit risk assessment model based on financial and non-financial indicators
Technology risks	Non-financial indicators affecting audit risk	Integrated audit risk assessment model based on financial and non-financial indicators
Behavioral risks	Non-financial indicators affecting audit risk	Integrated audit risk assessment model based on financial and non-financial indicators
Environmental risks	Non-financial indicators affecting audit risk	Integrated audit risk assessment model based on financial and non-financial indicators
Structural barriers	Challenges in implementing the integrated model	Integrated audit risk assessment model based on financial and non-financial indicators
Managerial barriers	Challenges in implementing the integrated model	Integrated audit risk assessment model based on financial and non-financial indicators
Environmental challenges	Challenges in implementing the integrated model	Integrated audit risk assessment model based on financial and non-financial indicators
Transparency and reporting quality	Characteristics of an appropriate risk assessment model	Integrated audit risk assessment model based on financial and non-financial indicators
Risk control and governance	Characteristics of an appropriate risk assessment model	Integrated audit risk assessment model based on financial and non-financial indicators
Organizational integration	Characteristics of an appropriate risk assessment model	Integrated audit risk assessment model based on financial and non-financial indicators

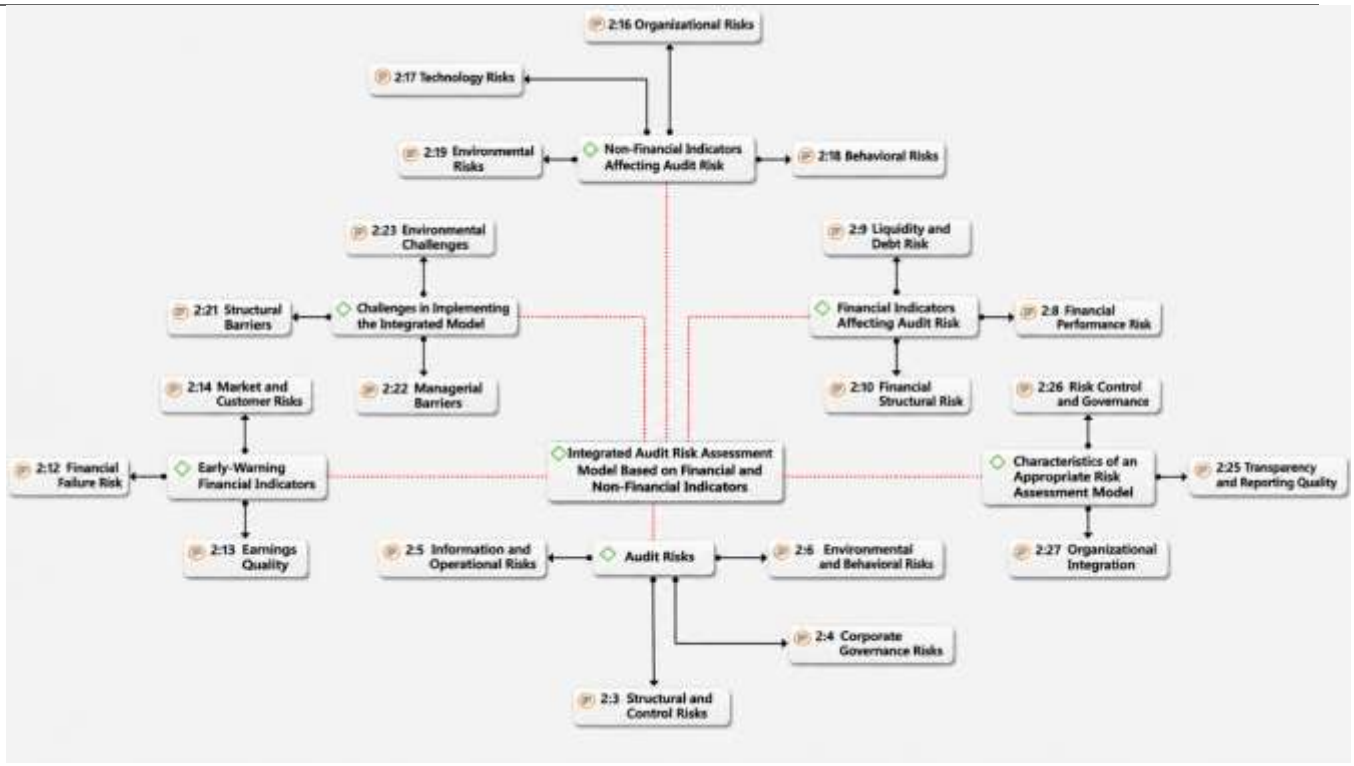


Figure 1. Thematic Network of the Integrated Audit Risk Assessment Model Based on Financial and Non-Financial Indicators

4. Discussion and Conclusion

The findings of this study led to the development of an integrated audit risk assessment model based on financial and non-financial indicators. The qualitative analysis identified six major categories: audit risks, financial indicators affecting audit risk, early-warning financial indicators, non-financial indicators affecting audit risk, challenges in implementing the integrated model, and characteristics of an appropriate risk assessment model. These categories collectively indicate that audit risk should not be assessed as a narrowly financial phenomenon. Rather, it emerges from the interaction of structural, financial, organizational, technological, behavioral, governance-related, and environmental factors. The findings therefore support a multidimensional interpretation of audit risk in which financial indicators retain a central role but become substantially more informative when interpreted alongside non-financial evidence. This result is consistent with the broader evolution of auditing toward more comprehensive risk-based approaches that incorporate contextual, technological, and organizational information into professional judgment [1, 2].

The first major category identified in the study concerned audit risks themselves, which were organized into structural and control risks, corporate governance risks, information and operational risks, and environmental and behavioral risks. This finding shows that audit risk is rooted in more than the possibility of accounting error; it is also shaped by the quality of internal controls, the strength of governance mechanisms, the reliability of information systems, and the organizational environment in which financial reporting takes place. Weak internal controls, insufficient internal audit functions, ineffective risk management, managerial resistance, conflicts of interest, and poor board oversight were identified as factors that can increase the likelihood of material misstatement. This result aligns with evidence emphasizing the importance of internal audit and risk-management systems in reducing organizational exposure to risk and improving the quality of assurance processes [6, 7]. It is also consistent with findings that risk assessment becomes more effective when control maturity and organizational governance are considered as part of the audit environment rather than treated as separate institutional characteristics [8].

The identification of corporate governance risk as a major component of audit risk is particularly important. The interviews indicated that shareholder influence, discretionary managerial decision-making, conflicts of interest, and managerial resistance can reduce transparency and increase the possibility of earnings management or concealment. This result can be explained by the fact that governance mechanisms determine the degree to which management decisions are monitored and constrained. When governance structures are weak, the risk of management override, biased estimates, incomplete disclosures, and selective financial reporting increases. Such conditions can also intensify cognitive demands on auditors, because professional judgment must be exercised under greater uncertainty. In this regard, the present findings are compatible with evidence showing that auditors' judgments may be affected by confirmation bias and that risk assessment may be distorted when auditors rely excessively on pre-existing expectations rather than contradictory evidence [14]. An integrated model may therefore contribute to more disciplined judgment by requiring the systematic evaluation of several sources of risk evidence.

The second major category concerned financial indicators affecting audit risk. The findings grouped these indicators into financial performance risk, liquidity and debt risk, and financial structural risk. Profit volatility, declining margins, falling sales, increasing operating costs, high leverage, insufficient working capital, low current ratios, weak cash flows, dependence on financing, doubtful receivables, obsolete inventories, and increasing accruals were all identified as indicators of heightened audit risk. This finding is consistent with the fundamental

logic of financial risk assessment, according to which deteriorating financial conditions can increase incentives for earnings management and reduce the entity's capacity to absorb operational shocks. Previous research similarly demonstrates that financial distress and related measures can increase audit risk and influence the intensity and cost of audit procedures [3]. The result also corresponds with research emphasizing the importance of liquidity, leverage, and financial security in corporate risk management [4]. In addition, evidence concerning capital adequacy, credit risk, market risk, and financial distress indicates that financial risk factors interact with broader corporate and macroeconomic conditions, supporting the need to interpret such indicators within a wider risk framework [17].

The findings also identified a distinct category of early-warning financial indicators comprising financial failure risk, earnings quality, and market and customer risks. This distinction is important because it suggests that not all relevant risk signals appear as conventional ratios. Asset–liability mismatches, going-concern concerns, sudden declines in sales, unusual year-end adjustments, abnormal revenue fluctuations, unclear provisions, dependence on a single customer or product, increased customer complaints, and declining product quality were all considered warning signs. These findings indicate that auditors should monitor patterns that may precede visible financial deterioration. This interpretation is strongly supported by research on the detection of financial misrepresentation, which emphasizes that manipulation frequently becomes evident through combinations of unusual accounting patterns and contextual signals rather than through any single indicator [15]. The emphasis on going-concern and instability is also consistent with evidence from crisis-period auditing, where uncertainty, impairment, revenue recognition, and going-concern issues became central audit risks [16].

The identification of earnings quality as an early-warning theme is particularly relevant. The experts in this study viewed large year-end adjusting entries, unexplained revenue variation, and ambiguous provisions as potential indications of earnings management and reporting manipulation. This result can be explained by the discretionary nature of many accounting estimates and the opportunity for management to use timing, classification, and estimation choices to shape reported results. The literature on financial misrepresentation similarly underscores the importance of examining abnormal accounting behavior, inconsistencies, and discretionary reporting practices when assessing the likelihood of misstatement [15]. The present findings therefore reinforce the argument that audit risk assessment should include not only static financial ratios but also the quality, stability, and credibility of reported earnings.

The third major area of interpretation concerns non-financial indicators. The study identified organizational, technological, behavioral, and environmental risks as important determinants of audit risk. Frequent structural changes, low employee motivation, poor planning, lack of compliance, weak IT infrastructure, inadequate data security, absence of ERP systems, employee fraud, insufficient training, weak managerial ethics, sanctions, supplier dependency, and deficiencies in costing systems were among the factors identified. This result provides strong support for the central premise of the study: non-financial indicators may contain risk-relevant information that is not directly observable in the financial statements. The finding is consistent with research showing that non-financial reporting influences auditors' evaluation of audit risk, particularly in uncertain environments [5]. It also aligns with broader risk-based auditing research that views organizational and sustainability-related information as essential to understanding the underlying causes of financial reporting risk [6, 7].

Technology-related risk emerged as one of the most significant non-financial dimensions. Weak information systems, poor data security, inadequate warehousing systems, and the absence of integrated ERP environments were identified as factors that reduce the reliability and traceability of audit evidence. These findings are compatible

with contemporary auditing research showing that digital transformation can materially alter audit risk by changing how transactions are created, processed, stored, and reviewed [2]. They also correspond with evidence that disruptive technologies introduce new audit risks and may require revisions to established audit procedures [9]. The finding that technology can simultaneously improve efficiency and create new sources of audit exposure is further supported by research on blockchain, which demonstrates that client use of advanced technologies changes both audit risk and audit approach [10]. Similarly, research on cybersecurity highlights the growing importance of digital resilience, system protection, and information integrity for the audit function [11].

The relevance of technology also extends to data reliability. The finding that auditors need integrated, secure, and dependable information systems can be interpreted in light of research demonstrating that data-intensive environments may contain hidden biases, inconsistencies, or weaknesses that affect analytical conclusions [13]. This is important because the use of large datasets or automated systems does not automatically guarantee reliable audit evidence. Therefore, an integrated audit risk assessment model should consider not only the availability of data but also its provenance, completeness, consistency, and susceptibility to manipulation. Research on technology adoption in auditing likewise suggests that auditors' use of new technologies must itself be considered through a risk-oriented lens [12]. Thus, the technological dimension of audit risk concerns both the client's systems and the auditor's own tools and methods.

The study further identified environmental risks such as economic instability, regulatory change, sanctions, supplier dependence, and external market pressures. These findings indicate that audit risk is partly shaped by conditions beyond the direct control of the audited entity. This conclusion is consistent with evidence from crisis-related auditing, where external shocks significantly altered key audit risks and the nature of audit procedures [16]. It also corresponds with research showing that macroeconomic and market risks interact with firm-level financial conditions and can influence organizational outcomes [17]. In this context, an auditor who interprets financial deterioration without considering the external environment may misjudge both the source and severity of risk.

Another important finding concerned the challenges associated with implementing an integrated audit risk assessment model. Structural barriers included the absence of standardized processes, poor coordination among units, frequent organizational changes, and limited audit time. Managerial barriers included resistance, insufficient cooperation from finance departments, excessive dependence on chief executives, and weak accountability. Environmental challenges included economic instability, foreign exchange exposure, supplier tensions, and weaknesses in costing systems. These findings show that the effectiveness of an integrated model depends not only on its analytical design but also on the organizational conditions required for its implementation. This result is consistent with studies emphasizing that risk-based auditing requires mature risk-management infrastructure, formal processes, and adequate institutional support [6]. It also supports the view that audit effectiveness is influenced by broader features of the engagement environment, including the auditor–client relationship and the availability of timely information [19].

The identification of implementation challenges also has methodological significance. Existing models often assume that relevant information is available, reliable, standardized, and accessible. The present findings demonstrate that these assumptions may not hold in practice. Weak coordination, fragmented systems, and managerial resistance can undermine even technically sophisticated models. This helps explain why locally grounded prioritization of audit risk factors is necessary. Previous research using fuzzy analytic hierarchy processes to rank audit risk factors has similarly demonstrated that different risk components vary in importance

and should not be treated equally [20]. The present model extends this logic by emphasizing not only the relative significance of different risks but also the organizational feasibility of integrating them.

The sixth major category concerned the characteristics of an appropriate audit risk assessment model. The findings emphasized transparency and reporting quality, risk control and governance, and organizational integration. The experts considered reporting transparency, benchmarking, conservative reporting, performance evaluation, risk-management systems, independent audit committees, written policies, anti-fraud mechanisms, integration of financial and non-financial data, accountability, and continuous risk monitoring to be essential characteristics. These findings suggest that an effective audit risk model should function not simply as a classification tool but as part of a broader organizational information and governance architecture. The emphasis on transparency and integrated information is consistent with evidence that non-financial reporting can improve the informational environment relevant to audit risk evaluation [5]. The importance of risk control and governance also aligns with findings concerning internal audit, sustainable risk management, and organizational assurance [6, 7].

The findings are also compatible with developments linking audit risk to sustainability and strategic organizational behavior. The inclusion of environmental, governance, and non-financial dimensions reflects the increasing interdependence between financial reporting risk and broader corporate resilience. Research on audit risk and green innovation suggests that audit-related considerations can interact with strategic innovation and sustainability activities [18]. Likewise, the inclusion of tax-related and regulatory indicators in risk analysis is supported by research proposing corporate tax sustainability as an indicator for audit risk assessment [21]. Together, these studies reinforce the argument that audit risk assessment should be sufficiently broad to capture emerging forms of organizational exposure.

Overall, the results support an integrated conceptualization of audit risk in which financial and non-financial indicators are mutually reinforcing. Financial indicators provide observable signals of performance deterioration, liquidity pressure, leverage, earnings instability, and financial failure, whereas non-financial indicators explain many of the organizational and environmental conditions that generate those financial outcomes. The model developed in this study therefore contributes by connecting financial performance, early-warning signals, governance, internal controls, technology, behavior, and environmental conditions within a unified thematic structure. This integration is consistent with the continuing development of auditing toward broader accountability and risk-management frameworks [1]. It also responds to the increasing complexity created by digital transformation, technological disruption, and new forms of financial and organizational risk [2, 9]. In this sense, the principal contribution of the model lies in shifting audit risk assessment from fragmented indicator-based evaluation toward a comprehensive and context-sensitive framework for professional judgment.

This study has several limitations that should be considered when interpreting the findings. First, the research employed a qualitative design and relied on semi-structured interviews with 16 experts, which provided rich and specialized insights but limits the statistical generalizability of the results. Second, all interviews were conducted in Tehran, and the professional and institutional characteristics of participants may therefore reflect conditions specific to the Iranian audit environment. Third, the model was developed primarily from expert perceptions and has not yet been empirically tested using archival audit data, financial statements, or actual engagement outcomes. Fourth, although theoretical saturation was achieved, the inclusion of other groups such as audit committee members, regulators, internal auditors, information technology specialists, and senior corporate managers could have revealed additional perspectives. Finally, the relative importance and causal influence of the identified

indicators were not quantitatively estimated, and the model should therefore be interpreted at this stage as a qualitative conceptual framework rather than a predictive scoring system.

Future research should quantitatively validate the proposed model using larger and more diverse samples of auditors, firms, industries, and geographical regions. The identified categories and indicators can be operationalized as measurable constructs and tested through exploratory and confirmatory factor analysis, structural equation modeling, or partial least squares modeling. Researchers may also develop a weighted audit risk index to determine the relative importance of financial and non-financial indicators and evaluate their predictive power for actual outcomes such as audit adjustments, modified opinions, restatements, fraud detection, audit fees, or audit report lag. Longitudinal studies could examine whether changes in the identified indicators predict subsequent increases in audit risk over time. Comparative research across industries and countries would also be useful for identifying context-specific and universal components of the model. In addition, future studies may investigate the application of machine learning, artificial intelligence, and real-time data analytics to integrate the proposed indicators into continuous audit risk monitoring systems.

Audit firms and professional bodies should consider incorporating the proposed integrated framework into audit planning and risk-assessment procedures so that financial indicators are systematically assessed alongside governance, behavioral, technological, and environmental factors. Audit teams should develop standardized risk-assessment checklists or digital dashboards that combine liquidity, leverage, earnings quality, customer concentration, internal control quality, governance characteristics, cybersecurity, ERP integration, management behavior, and external environmental pressures. Particular attention should be given to early-warning indicators that may emerge before clear financial deterioration becomes visible. Audit firms should also strengthen multidisciplinary collaboration by involving IT auditors, risk-management specialists, fraud experts, and industry specialists when assessing complex engagements. Organizations being audited can support this process by improving data integration, strengthening audit committee independence, formalizing risk-management procedures, enhancing cybersecurity, establishing clear accountability mechanisms, and improving cooperation between financial and non-financial units. Continuous monitoring of integrated risk indicators can help both auditors and management identify emerging problems earlier, allocate resources more efficiently, and improve the reliability and transparency of financial reporting.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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References

[1] T. P. Nugrahanti, "Analyzing the evolution of auditing and financial insurance: tracking developments, identifying research frontiers, and charting the future of accountability and risk management," *West Science Accounting and Finance,* vol. 1, no. 02, pp. 59-68, 2023, doi: 10.58812/wsaf.v1i02.119.

[2] L. Wang, "Digital transformation and audit risk," *Finance Research Letters,* vol. 71, p. 106445, 2025, doi: 10.1016/j.frl.2024.106445.

[3] M. Hasani and B. Younes Hama, "The relationship between audit fees and audit risk in the presence of restatements and financial distress," *Professional Auditing Research,* vol. 2, no. 6, pp. 82-111, 2022, doi: 10.22034/jpar.2022.548146.1075.

[4] T. R. Akash, J. Reza, and M. A. Alam, "Evaluating financial risk management in corporation financial security systems," *World Journal of Advanced Research and Reviews,* vol. 23, no. 1, pp. 2203-2213, 2024, doi: 10.30574/wjarr.2024.23.1.2206.

[5] S. Trucco, M. C. Demartini, K. McMeeking, and V. Beretta, "Does voluntary non-financial reporting matter for the evaluation of audit risk after a crisis period? Perceptions from Italian auditors," *Meditari Accountancy Research,* vol. 30, no. 7, pp. 280-309, 2022, doi: 10.1108/MEDAR-11-2021-1503.

[6] A. Almgrashi and A. Mujalli, "The Influence of Sustainable Risk Management on the Implementation of Risk-Based Internal Auditing," *Sustainability,* vol. 16, no. 19, 2024, doi: 10.3390/su16198455.

[7] V. Choudhary and S. Trivedi, "The role of internal audit in risk management with sustainability perspective," in *The Impact of Climate Change and Sustainability Standards*, 2023.

[8] H. Berrada, J. Boutahar, and S. E. G. El Houssaïni, "Simplified IT risk management maturity audit system based on COBIT 5," *IJACSA,* vol. 12, no. 8, 2021, doi: 10.14569/IJACSA.2021.0120875.

[9] M. Elnahass, X. Jia, and L. Crawford, "Disruptive technology and audit risks: Evidence from FTSE 100 companies," *Emerging Markets Review,* vol. 63, p. 101218, 2024, doi: 10.1016/j.ememar.2024.101218.

[10] M. C. Dyball and R. Seethamraju, "The impact of client use of blockchain technology on audit risk and audit approach-An exploratory study," *International Journal of Auditing,* vol. 25, no. 2, pp. 602-615, 2021, doi: 10.1111/ijau.12238.

[11] M. Asif, H. Shah, and H. A. H. Asim, "Cybersecurity and audit resilience in digital finance: Global insights and the Pakistani context," *Journal of Asian Development Studies,* vol. 14, no. 3, pp. 560-573, 2025, doi: 10.62345/jads.2025.14.3.47.

[12] A. Cohen, J. Kantor, and S. Levy, "Does Risk Matter? An Audit Risk Approach for Technology Adoption in Financial Audits," *International Journal of Auditing,* 2025, doi: 10.1111/ijau.70005.

[13] C. M. Gevaert, T. Buunk, and M. J. Van Den Homberg, "Auditing geospatial datasets for biases," *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing,* vol. 17, 2024, doi: 10.1109/JSTARS.2024.3422503.

[14] R. Adibi and L. Safdarian, "Factors influencing auditors' confirmation bias and its consequences for audit risk assessment and auditor judgment," *Accounting, Finance and Computational Intelligence,* pp. 1-17, 2025.

[15] R. Cimini and A. Mechelli, "Detecting misrepresentation of financial information: a literature review and a call for future studies," *Journal of Accounting Literature,* vol. 47, no. 5, pp. 300-322, 2025, doi: 10.1108/JAL-08-2024-0196.

[16] M. Kend and L. A. Nguyen, "Key audit risks and audit procedures during the initial year of the COVID-19 pandemic: an analysis of audit reports 2019-2020," *Managerial Auditing Journal,* vol. 37, no. 7, pp. 798-818, 2022, doi: 10.1108/MAJ-07-2021-3225.

[17] H. Yoewono and S. Ariyanto, "The Impact of Capital Adequacy Ratio, Credit Risk, Market Risk, Financial Distress, and Macroeconomic Toward Stock Return With Audit Quality as Moderator," *Accounting and Finance Studies,* vol. 2, no. 4, pp. 213-228, 2022, doi: 10.47153/afs24.5072022.

[18] D. Yang, X. Jiao, and W. Liao, "Audit risk and green innovation in SMEs," *Finance Research Letters,* vol. 76, p. 106978, 2025, doi: 10.1016/j.frl.2025.106978.

[19] O. Abouelela, A. Diab, and S. Saleh, "The determinants of the relationship between auditor tenure and audit report lag: evidence from an emerging market," *Cogent Business & Management,* vol. 12, no. 1, p. 2444553, 2025, doi: 10.1080/23311975.2024.2444553.

[20] M. Vakilzadeh Rouholamini, K. Azadi, and F. Mohammadi Nodeh, "Determining the importance of audit risk factors using fuzzy analytic hierarchy process," *Investment Knowledge,* vol. 15, no. 59, pp. 137-157, 2024, doi: 10.30495/jik.2023.71871.4230.

[21] F. Daresh, S. A. Vaezi, M. Basirat, and A. Kaab Omeir, "Corporate tax sustainability: An indicator for audit risk assessment based on the comprehensive tax plan," *Auditing Knowledge,* vol. 20, no. 80, pp. 201-214, 2020. [Online]. Available: https://sid.ir/paper/968541/fa.